

March 15, 1927.

1,621,402

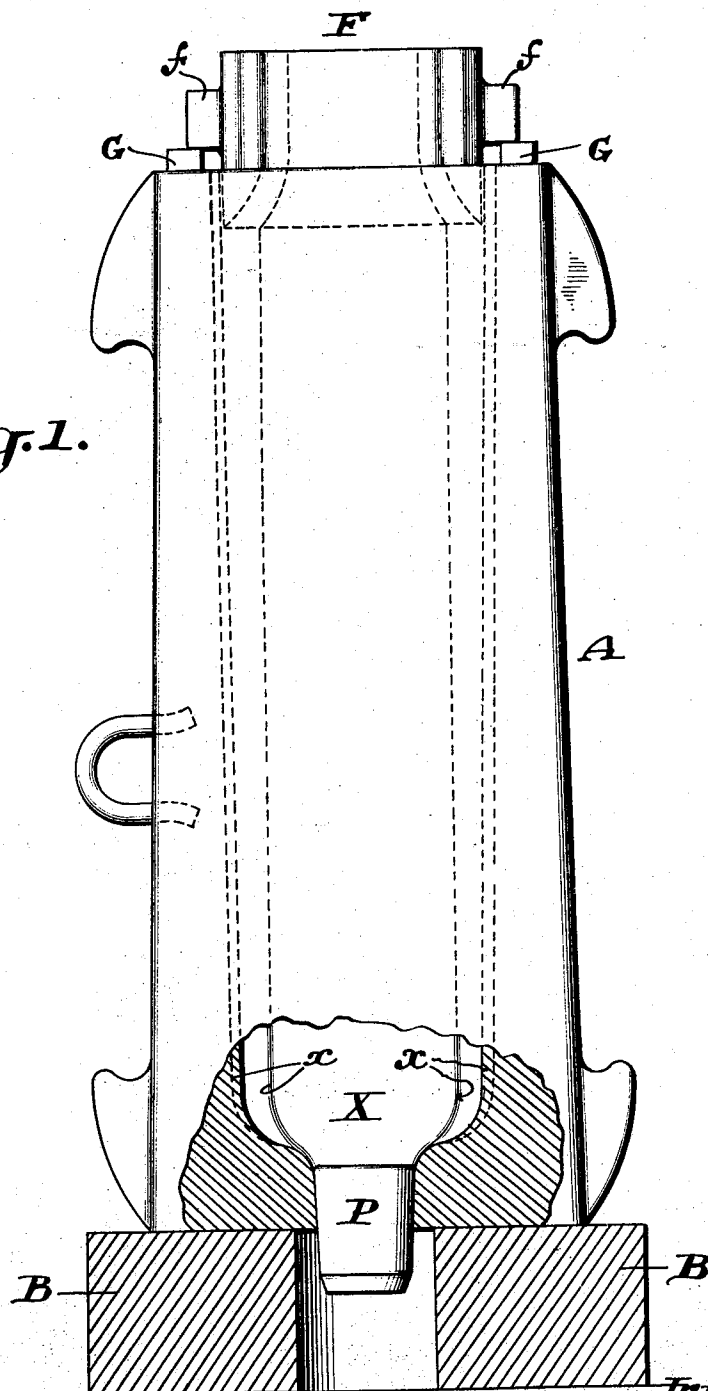
E. GATHMANN

INGOT MOLD

Filed Aug. 20, 1923

2 Sheets-Sheet 1

Fig. 1.



Inventor
Emil Gathmann
by his Attorneys
Pulver & Wright

March 15, 1927.

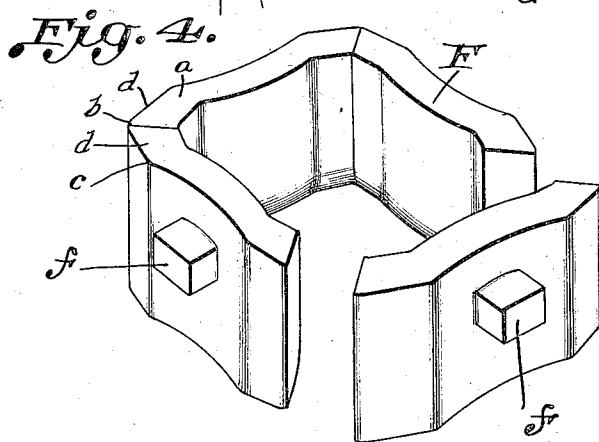
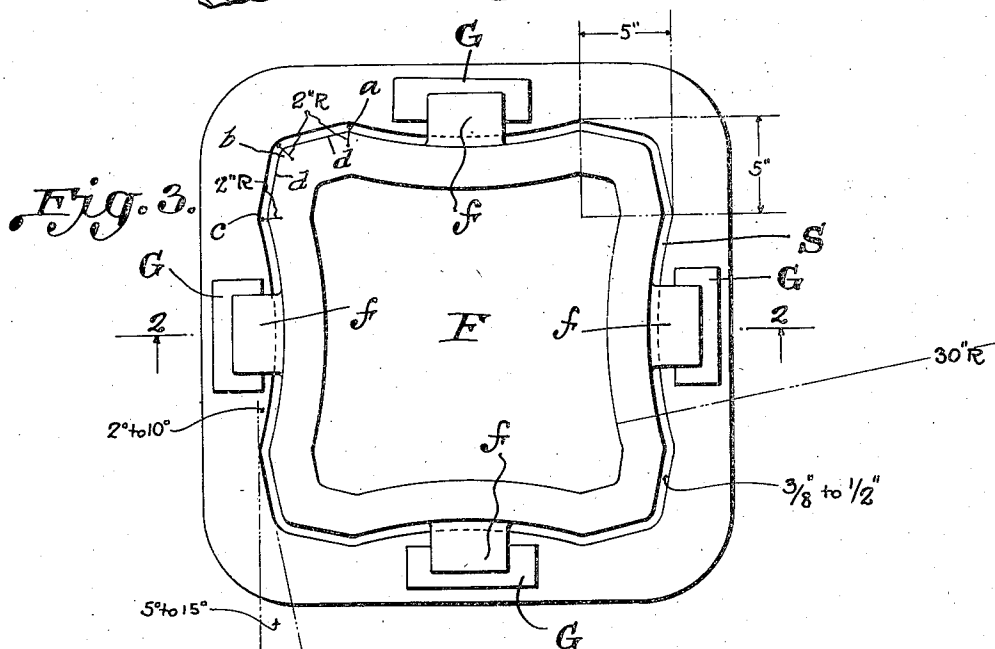
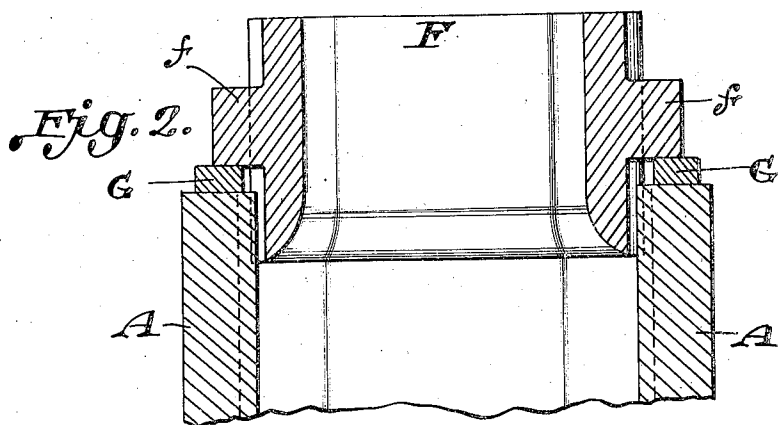
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2 Sheets-Sheet 2



Inventor
Emil Gathmann
by his Attorneys
Baldern & Wright

Patented Mar. 15, 1927.

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UNITED STATES PATENT OFFICE.

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

INGOT MOLD.

REISSUED

Application filed August 20, 1923. Serial No. 658,371.

This invention relates particularly to the casting of ingots from either steel which has been deoxidized as much as possible or from partially deoxidized steel and it involves certain improvements in the shape or contour of the mold chamber and of the ingot formed therein.

More especially my present invention relates to the form of the mold chamber for casting and shaping ingots in the manner shown, described and claimed in my U. S. Patent No. 1,440,535 of January 2, 1923.

One object of the invention is to so construct or shape the mold chamber that the ingot formed therein may have such shape that it may be withdrawn from contact with the walls of the chamber without undue or harmful straining of the outer walls of the ingot and which is better adapted for rolling or reduction when reheated.

In my patent of January 2, 1923, I have shown a mold in which the upper part of the ingot is cast in a portion of the mold which is integral with the body of the mold and the walls of the mold chamber are corrugated and the corners shaped in a novel way whereby the ingot metal is solidified with lessened strains, tears or cracks in the mold chamber and is of such shape as to be more efficiently rolled or reduced in cross section when suitably reheated, and in my application for patent, filed August 20, 1923, Serial No. 658,370 I have shown certain improvements in the form of the mold chamber by means of which still better results are obtained for some kinds of casting.

According to my present invention, I provide a sink head for feeder for molds with corners or salients shaped in the manner described in said patent and said application and which is itself provided with corners and salients in such manner as to properly match within the top of the mold provided with like corners and salients. The feeder is preferably made of fire brick or good heat insulating refractory material, and it may be formed in one piece or in sections and is of such size as to leave a clear space between its outer side wall and the inner corrugated walls of the mold chamber, which space is of such width as to permit the feeder to be readily moved into and withdrawn from the mold proper, but sufficiently narrow so that the molten metal will not pass freely through the space when the mold is poured.

The invention is clearly illustrated in the accompanying drawings and will be hereinafter more fully described.

Figure 1 is a view partly in side elevation and partly in vertical section of a mold constructed in accordance with my invention, my improvements in this instance being applied to a big-end-up mold mounted on a suitable support or stool.

Figure 2 is a detail view in section of the upper portion of the mold proper and of the feeder.

Figure 3 is a top plan view of the mold and feeder.

Figure 4 is a perspective view of a modified form of the feeder which is in this instance made in sections.

The mold shown in Figure 1 is a big-end-up mold. The mold cavity is corrugated and is provided with corners and salients in the manner most clearly shown in Figure 3 and is hereinafter described, and its lower portion is necked-in as indicated at X, the corrugations α merging into the necked-in part as shown. The opening in the bottom of the mold is closed by a plug P which is of service in the stripping of the ingot from the mold when cast. The mold rests on a stool B of usual construction for Gathmann big-end-up molds.

As indicated in Figure 3, the cross sectional contour of the mold is similar to that shown in my application filed August 20, 1923, Case 1. It is sufficient to say that the mold shown has four inwardly extending primary side walls or salients which are connected to each other at the corners by outwardly extending side walls or salients, in fact the mold A shown is similar in all respects to that shown in my application filed August 20, 1923. My present invention is not limited, however, to the precise form of corrugated mold shown, but primarily consists in a feeder or sinkhead of improved construction, preferably but not necessarily involving the use of corrugations for its primary side walls, and specifically involving, and adapted to co-operate with, any mold of substantially square or rectangular cross section ingot chamber provided with four primary side walls and four widened corners, each corner being provided with a plurality of outwardly extending curved salients which intervene between two adjacent primary side walls. The feeder F

may be made of fire brick or similar refractory material and may be of one piece or formed in sections as indicated in Figure 4.

In each case the cross section of the feeder is somewhat less than the cross section of the upper portion of the mold chamber into which it projects, there being a space which is preferably from $\frac{1}{4}$ to $\frac{1}{2}$ inch in width. This space is sufficient to allow the feeder to be readily inserted and withdrawn from the mold chamber, but is sufficiently narrow so that the molten metal forming the ingot will not pass through it. The exterior walls of the feeder are of such form that in all parts there is a clearance of the kind referred to. If there were a greater clearance at any point, the molten metal would rise and form fins between the feeder and the mold walls and possibly run out over the top of the mold proper.

In order to accomplish this result in the best way, the exterior walls of the feeder are made of the same form as the walls of the mold chamber, that is, they have the same configuration. The feeder is provided with lugs *f* supported on the mold. These lugs are preferably located intermediate between the upper and lower ends of the feeder and preferably they rest on wedges or blocks *G* which hold the feeder at the desired elevation. By using different sizes of blocks the feeder may be adjusted to stand at different heights. The feeder may be made in one piece as indicated in Figures 1, 2 and 3 or it may be made in sections as indicated in Figure 4, a sectional feeder having some advantages for some kinds of work. Preferably also the contour of the inner side of the feeder is of the same kind as the contour of the mold chamber.

While the feeders shown in the drawings and hereinafter described are especially adapted for use in connection with corrugated molds of the kind shown in my application referred to, the invention is also applicable to feeders used in connection with ingot molds having corrugations of other forms.

It will be observed that the feeder, made in accordance with my invention, has a plurality of side walls which on the inside are bellied inwardly toward the center of the feeder and the same walls are concaved or

bellied on the outside in the same manner. These walls are oppositely arranged as shown. At each corner two primary side walls are connected on the outside by three outwardly curved salients, *a*, *b*, *c*, there being an outwardly curved salient at the end of each primary side wall which connects by a straight wall *d* or *d'* with a centrally arranged salient *b*. Preferably the feeder is of the same thickness throughout except where the lugs *f* are formed where the sides of the feeder are thickened to that extent. It will be observed by reference to Figure 3 that the feeder is of substantially the same contour, both inside and outside, as the mold cavity. The preferred radius for the salients at the corners is indicated in Figure 3. As shown, there is a two-inch radius for each of the three salients at each corner.

I claim as my invention.

1. A mold top or feeder for ingot molds having a chamber provided with four primary side walls of convex contour and four widened corners, each provided with three curved salients intervening between the adjacent primary side walls of the feeder.

2. A mold top made of refractory material having a low degree of heat absorption or conductivity, said mold top being provided with a chamber defined by four primary side walls of convex contour and with four widened corners, each provided with a plurality of outwardly curved salients intervening between the adjacent primary side walls.

3. A shrink head casing for ingot molds having a chamber provided with four primary side walls at least two of which have a convex contour and four widened corners each provided with two curved salients intervening between the widened corners and the adjacent primary side walls of the mold.

4. A shrink head casing for ingot molds having a chamber provided with four primary convex side walls and four widened corners, each provided with two salients intervening between the widened corners and the adjacent primary side walls of the mold.

In testimony whereof, I have hereunto subscribed my name.

EMIL GATHMANN.