E. J. TURNER & B. H. HOWARD.

FEEDER FOR STANDARD INGOT MOLDS.

APPLICATION FILED MAR. 10, 1915.

1,208,703.

Patented Dec. 12, 1916.

Fig. 1.

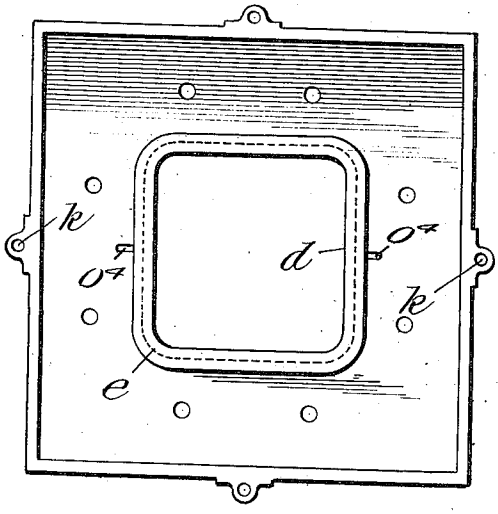


Fig. 3.

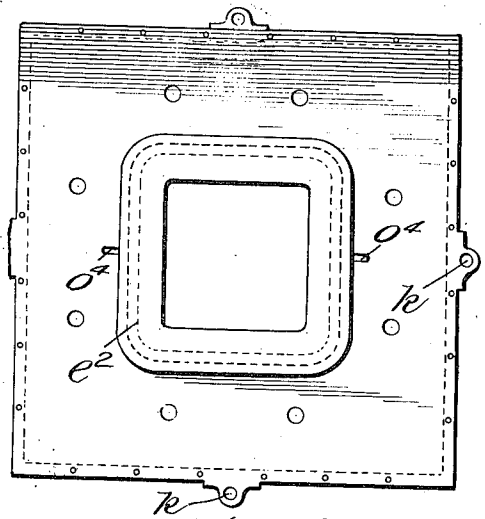


Fig. 2.

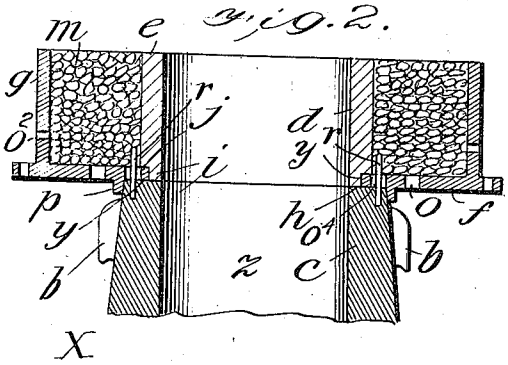


Fig. 4.

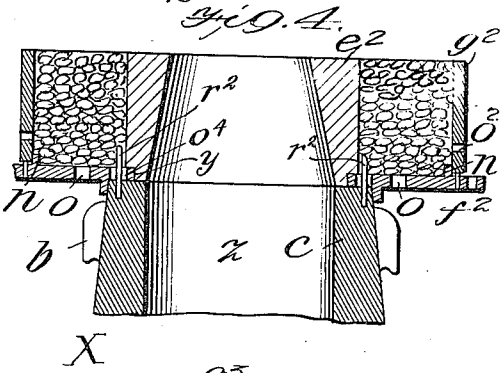


Fig. 5.

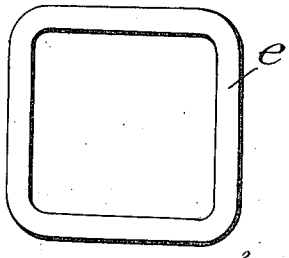


Fig. 6.

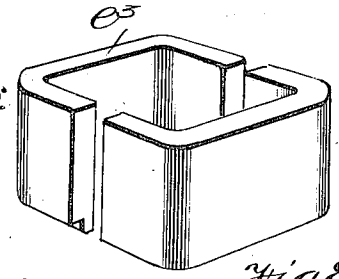


Fig. 7.

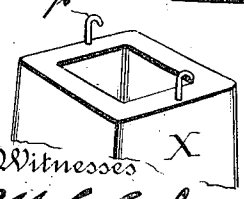


Fig. 9.

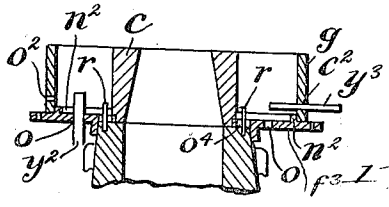
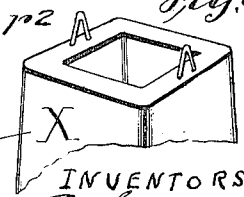


Fig. 8.



Witnesses

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FEEDER FOR STANDARD INGOT-MOLDS.

1,208,703. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed March 10, 1915. Serial No. 13,551.

To all whom it may concern:

Be it known that we, ERNEST J. TURNER and BLOOMFIELD H. HOWARD, citizens of the United States, and residents, respectively, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, and of Aspinwall, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Feeders for Standard Ingot-Molds, of which the following is a specification.

Our invention relates to the manufacture of iron or steel ingots and has for its object, to prevent, or reduce to a minimum the formation of cavities, holes, or seams, known as "piping" in the upper portion of the ingot.

A further object of the invention is to produce a feeder for ingot molds in such practical form that it may be used in connection with any standard ingot mold.

A further object of the invention is to provide a feeder having a ring made of fire clay or other refractory material and which forms an extension of the upper portion of the mold.

A still further object of the invention is to provide a novel method of heating the ring extension of the molds.

Other objects and advantages of our invention will appear during the course of the description.

Ingot mold feeders have been invented from time to time but these almost invariably form part of a complicated ingot mold both difficult and expensive to construct and often impracticable to use and consequently they are of no advantage and cannot be used to any extent under existing conditions in the manufacture of steel.

A practical embodiment of our invention is represented in the accompanying drawing forming a part of this specification and in which like letters are employed to designate like parts throughout the several views.

In the drawing, Figure 1 is a plan view of the preferred form of feeder; Fig. 2 is a vertical section of the same showing it applied to a mold; Fig. 3 is a plan view of a modified form of feeder; Fig. 4 is a vertical section of the feeder shown in Fig. 3 and applied to a mold; Fig. 5 is a plan view of the refractory ring of the feeder; Fig. 6 is a perspective view of the refractory ring made in sections; Figs. 7 and 8 are detail perspective views of ingot molds provided with hooks and loops or apertured lugs respectively; Fig. 9 is a vertical section of a modification and showing the application of gas burners.

Referring to the drawings, X is any standard ingot mold of approved construction and of any size, shape or dimensions whatsoever, with suitable ears or lugs *b*, to which may be fastened chains, rods, or other suitable attachments for the purpose of lifting or moving the ingot mold, X, by means of a crane, derrick or other suitable device prior to the feeder being placed thereon; *c* represents the inner wall of the ingot mold X, and is continued by the inner wall *d*, of a ring *e*, made of fire clay or other refractory material and may be made solid as shown in Figs. 2, 4 and 5 or in sections as shown in Fig. 6; *f* is a floor plate made preferably of boiler plate steel and containing an opening, *y*, larger than the bore *z*, of the ingot mold X, so that when the floor plate *f*, rests upon the top of the ingot mold X, a shoulder *h* will be formed into which the lower portion *i* of the ring *e* fits snugly, the shoulder *j*, of the ring *e*, resting on the floor plate, *f*.

The floor plate *f* is provided with an outer wall *g* which is preferably integral with the plate and forms with the refractory ring the combustion chamber *m*. The floor plate *f* is also provided with openings, or perforations *o* through which air will be admitted if coal, charcoal or other similar combustible material is used in the combustion chamber *m*, or through which burners y^2 for suppiying gas for fuel may be inserted, as shown in Fig. 9. If desired additional openings o^2 may also be made through the outer wall, *g*, through which burners y^3 may be inserted. Lifting lugs *k* are provided on the plate *f*, so that a chain, bail or other suitable means may be attached thereto to place the feeder in position on the mold, X. Lugs or projections *p* may be attached to the lower portion of the floor plate *f* to hold the feeder in place while in use and are so located as not to come in contact with the ears *b*. But the lugs *p* may be omitted if desired for the weight of the feeder will generally be sufficient to keep it in the desired position. The feeder is further secured in position by lugs with hooks or eyes *r*, r^2 which often form a part of standard ingot

molds and are firmly attached thereto. These lugs extend through openings o^4 in the floor plate f up into the combustion chamber m, and to these lugs hooks or other suitable means may be attached in the use of a crane in stripping the mold X from the ingot.

The feeder shown in Figs. 3 and 4 is similar to that shown in Figs. 1 and 2 except as to the refractory ring and the outer wall of the floor plate. The refractory ring e^2 in this figure has its bore decreasing in size from its lower to its upper end, and the wall g^2 is separate from the plate f^2. The wall g^2 is held in position on the floor plate f^2 by the lugs n, attached to the floor plate f^2 in any approved manner. If desired, these lugs, n may be replaced by an annular ring n^2 on the floor plate f^2 as shown in Fig. 9. The outer wall g^2 may be made of steel, tile, fire clay or any other suitable material.

From the foregoing description taken in connection with the drawings, the method of casting ingots by the use of our improved feeder is as follows: The feeder may be prepared for use either before or after being placed upon the ingot mold. The ring of refractory material is placed in position, and also the outer wall if it is separate from the floor plate. The combustion chamber is filled with combustible material and ignited or a burner is projected into the said chamber. When the ring of refractory material is sufficiently heated, molten metal is poured into the ingot mold until it reaches the top of the space inclosed by the wall of the ring of refractory material which will retain the heat so that the upper portion of the ingot will remain in a viscous condition for a considerable portion of time. The metal thus held in a molten state will flow downward and fill any pipes that may be formed by the contraction of the metal in cooling below, so that a solid ingot free from "pipes" or "seams" is produced.

By our construction of feeder it will readily be seen that it can be applied to the ordinary ingot mold and when not in use it can be quickly removed from the mold to facilitate the removal of the ingot from the mold. By our construction, also, a tight joint is made between the feeder and the top of the mold thereby preventing any likelihood of the molten metal finding its way into the combustion chamber, a difficulty that has been encountered in molds of this character, and which renders the removal of the ingot from the mold difficult.

Having thus described our invention what we claim and desire to secure by Letters Patent is:—

In a feeder for ingot molds, the combination with a mold, of a plate adapted to rest on the top of the mold and having an opening of greater diameter than the bore of the mold, said plate being provided with a marginal wall, and a refractory ring having its lower end reduced, said reduced end fitting in the opening of the plate and resting upon the top of the mold.

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