(No Model.)

G. NIMMO.

FEEDER FOR INGOT MOLDS.

No. 357,286. Patented Feb. 8, 1887.

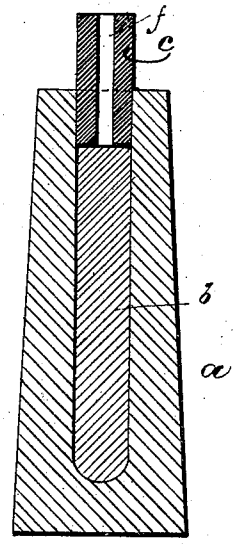


Fig. 1.

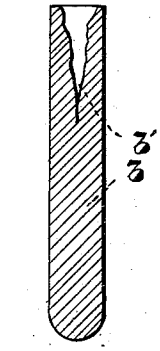


Fig. 2.

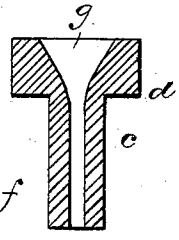


Fig. 3.

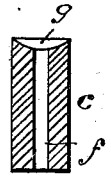


Fig. 4.

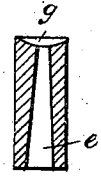


Fig. 5.

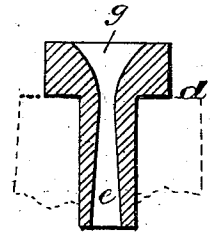


Fig. 6.

WITNESSES:

Wm. S. Corwin.
Jos. C. Farr.

INVENTOR:

George Nimmo,

BY Drake & C. ATT'YS.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE NIMMO, OF NEWARK, NEW JERSEY.

FEEDER FOR INGOT-MOLDS.

SPECIFICATION forming part of Letters Patent No. 357,286, dated February 8, 1887.

Application filed August 13, 1886. Serial No. 210,763. (No model.)

To all whom it may concern:

Be it known that I, GEORGE NIMMO, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Feeders for Ingot-Molds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to enable ingots to be cast free from that class of imperfections commonly known as "pipes," and to accomplish said results at the least possible cost and expense of time and labor.

The invention consists in a feeder of clay or other fire-proof material, and in the combination of the same with an ingot or other mold, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claims.

Referring to the drawings, in which like letters indicate corresponding parts in each of the figures, Figure 1 illustrates an ingot-mold of any suitable construction and of any convenient form. Fig. 2 shows an ingot having an imperfection or pipe in its upper end. Figs. 3, 4, 5, and 6 show in cross-section various forms of feeders embodying my improvement.

In Fig. 1, *b* represents the ingot cast in the mold, and *c* a feeder of clay or other fire-proof material. Ordinarily, when the metal is cast in a mold without a feeder it cools and solidifies on the outer surface, while the center remains in a liquid state, and then when the center begins to cool it shrinks away from the outer lamina, forming a hollow or pipe, as shown at *b'*, Fig. 2. To obviate this tendency I employ a feeder, *c*, of clay or other fire-proof material.

The feeders in Figs. 1, 4, and 5 are first heated to redness or a white heat and then inserted in the top of the mold immediately after the ingot is poured, and the space *f* in the center of the feeder is filled or charged by pouring in metal. This charge in the feeder becomes a continuation of the molten metal of the ingot, and will prevent the said ingot from piping by being fed to the body of the ingot as it shrinks in the process of cooling. The metal in the mold under the feeder will crystallize regularly, the cooling or crystallization being regulated by the said feeder and its charge of metal, the pipe or imperfections being formed in the charge rather than in the body of the ingot. The said charge, when hardened, may be broken off or removed before the ingot is placed in the market.

The feeders shown in Figs. 3 and 6 are provided with flanged tops, *d*, which are preferably used when the feeder inserted in the mold rests on the top of said mold. The feeder is thus prevented from slipping into the mold-chamber. These flanged feeders may be placed in the mold before the metal is poured, and are provided with funnel-shaped opening *g* in the top to facilitate the pouring of the metal or to render the process more certain. The pouring of said metal continues until the mold and feeder is full, the charge of the feeder acting as above described.

Fig. 4 shows a feeder having a funnel-shaped depression, *g*, in the top to facilitate the pouring of the metal. Fig. 5 shows a feeder where the central feed-hole, *e*, flares or has the form of a cone—larger at the base than at the top. This construction facilitates the process of drawing away the feeder when the metal becomes solid. Fig. 6 represents a flanged feeder with the same modification.

It is obvious that other changes in shape may be made without departing from the scope of this invention—that is, the shape of the feeder may be varied, both as to the outside and inside or aperture, to conform to the shape of the mold or of the ingot to be cast therein, whether it be square, round, oval, or other form. It will also be understood that the feeders are thoroughly dried and baked before being used, in order to enable them to withstand the intense heat, as also the handling, to which they are subjected.

I aware that refractory or heat-resisting substances have been used as a lining for iron gates or feeders when making metal casts, and I therefore limit myself herein accordingly. It may be remarked, however, that such structures could not be utilized in such cases as are contemplated in the present invention, owing, among other things, to the unequal expansion

and contraction and to the difference in the heat-resisting powers of the two substances.

Having thus fully described my invention, I claim as new—

1. In combination with an ingot-mold, a feeder composed of fire-clay or other equivalent fire-proof material, and arranged to operate substantially as and for the purposes herein set forth.

2. A feeder for ingot-molds, consisting of a hollow body of clay or other fire-proof material, having a flanged top to rest on the mold, and provided with a funnel-shaped hole communicating with the hollow body, substantially as set forth.

3. A feeder for ingot-molds, consisting of a body of clay or other fire-proof material, having a funnel-shaped depression in the top thereof communicating with a feed-hole through the center thereof, substantially as set forth.

4. A feeder for ingot-molds, consisting of a body of clay or other fire-proof material, having a flanged top integral therewith to rest on the mold, and having in said flanged top a funnel-shaped opening communicating with a flaring opening in the lower portion of said body, the said opening being larger toward the bottom, substantially as and for the purposes herein described.

5. A feeder for ingot-molds, consisting of a body of clay or other fire-proof material, having a funnel-shaped depression in the top communicating with a flaring opening in the lower portion of said body, the said opening being larger toward the bottom, substantially as set forth.

6. The combination, with a mold, of a heated feeder inserted in or over the opening in the top of the mold, substantially as set forth.

7. A feeder for ingot-molds, composed of clay or other fire-proof material, and provided with a tapering aperture therethrough, for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of August, 1886.

GEORGE NIMMO.

Witnesses:
CHARLES H. PELL,
OSCAR A. MICHEL.