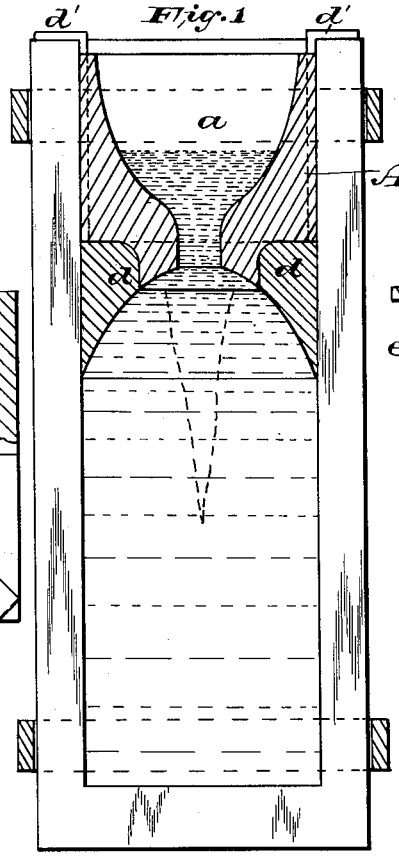
(No Model.)

S. H. BOUCHER.

FEEDER FOR INGOT MOLDS.

No. 385,836. Patented July 10, 1888.

Fig. 1



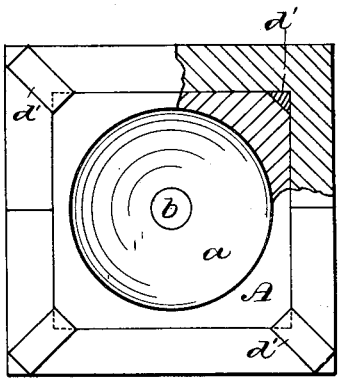


Fig. 2

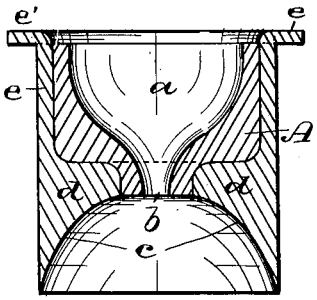


Fig. 3

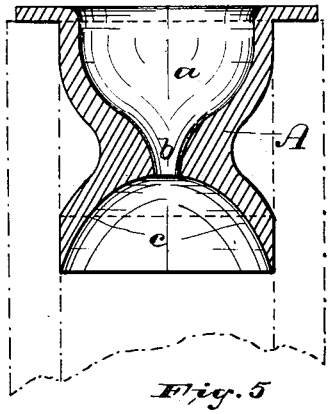


Fig. 5

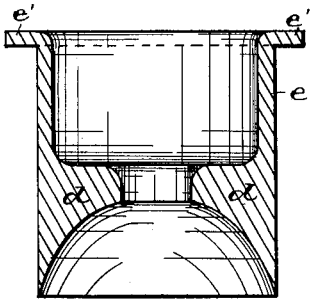


Fig. 4

WITNESSES:

John P. Scarlett.
F. P. Thebeath.

INVENTOR:

Sidney H. Boucher,

BY Campbell & Co ATTYS.

UNITED STATES PATENT OFFICE.

SIDNEY H. BOUCHER, OF WEST BERGEN, ASSIGNOR TO CYRUS C. CURRIER, OF NEWARK, NEW JERSEY.

FEEDER FOR INGOT-MOLDS.

SPECIFICATION forming part of Letters Patent No. 385,836, dated July 10, 1888.

Application filed July 19, 1887. Serial No. 244,682. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. BOUCHER, a citizen of Great Britain, residing at West Bergen, in the county of Hudson 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 purpose of this invention, which relates to improvements in means for the prevention of piping in ingots of steel of high carbon, is to keep the top of the ingot in the mold in a fluid condition and to maintain a supply of fluid metal flowing into the mold sufficient to fill up the spaces made by the shrinkage of the metal in cooling.

The invention is further designed to enable a large number of ingots to be cast at the same time when the metal is melted in large quantities, as in a Siemens-Martin furnace, and in the casting of a large number of ingots to secure the same result with reference to the piping that is obtained in casting a single ingot, as above stated. For this purpose I have devised an improved feeder, which is illustrated in the accompanying drawings, and will be hereinafter described, and the novel features thereof finally embodied in the claims.

In said drawings, in which similar letters of reference indicate corresponding parts in each of the views, Figure 1 is a view in elevation and section of one-half of a mold and a feeder inserted in the top thereof. Fig. 2 is a top view of said mold and feeder, partly in section. Figs. 3 and 4 are respectively sectional views of a feeder composed of a casing and a refractory lining and of the casing itself; and Fig. 5 is a sectional view of a feeder, the mold being shown in dotted outline.

As ingots are ordinarily cast, the metal is poured into the top of open mold until the mold is filled, when the pouring must cease, as the full capacity of the mold has been reached. Upon the contact of the metal with the sides of the mold the metal becomes cooled and begins to shrink and set, and also to settle down within the mold, resulting in the formation of the pipe. The shrinkage of the ingot cannot be supplied by fresh or molten metal, as the top of the ingot has become crusted over and oxidized, and the added metal will not unite with that first cast. By my improvement the top of the ingot is protected from the air and is kept in a fluid condition, so as to unite with the metal subsequently added to fill up the pipe. In the figures of the drawings is illustrated the means which I have devised to accomplish this result, which consists of a feeder, A, for the mouth of the mold, and having a receptacle or reservoir, *a*, for the metal, in the center of the bottom of which is a gate, *b*, through which the metal flows into the mold. The bottom *c* of said feeder slopes downward and away radially—that is, downwardly and outwardly—from the gate *b* in either a curved or straight line, preferably slightly curved, to the sides of the mold, as shown in Figs. 1 and 5.

In Fig. 1 of the drawings the feeder consists of the main portion A, formed, preferably, of refractory material, and is supported by means of a flange, *d*, the under side of which is curved and forms the bottom of the feeder, and which is supported within the mold by corner rods, *d'*, which hook over the top of the mold. The form of feeder shown in Figs. 3 and 4 consists of an inclosing-casing, *e*, having an inner lining of refractory material, which rest upon the flange *d*, the feeder as a whole being supported within the mold by the flange *e'*. By these constructions the feeder is suitably supported in the mold to hold the heavy mass of metal poured into the reservoir.

In casting in my improved device the metal is poured into the reservoir *a* and flows through its gate *b* in just such quantities and at such a rate of movement as to facilitate the setting of the metal. This is effected by making the gate of the proper size, varying according to the quantity of metal poured and the size of the mold. The pouring into the reservoir continues until the mold is full and the reservoir partly filled, as indicated in Fig. 1. As the metal in the mold becomes gradually cooled and settles or shrinks within the mold, the quantity of molten metal left in the reservoir flows into the mold through the gate and fills

up the cavities made by the contraction of the metal in cooling. (Indicated by dotted lines on Fig. 1.)

The particular advantage gained by sloping the bottom of the feeder downward is that there are no angles at the top of the ingot-mold, which cause the metal to chill rapidly at the top of the ingot and prevent the welding of the fluid metal; also, by narrowing the space at the top of the mold beneath the feeder, the heat of the molten metal beneath the feeder is concentrated at the gate and acts to keep the passage open for the inflowing metal in the reservoir to flow down therethrough into the interior of the mold. This peculiar form also reduces the amount of material in the feeder, which thus is more readily heated by the molten metal as it flows into the mold. By thus localizing and concentrating the heat at the gate not only when the mold is full and a portion of the molten metal remains in the reservoir, but also during the entire pouring of the metal into the reservoir and through the said gate, the feeder around the pouring-passage becomes as hot as the molten metal, and by the retention of its heat acts to maintain the fluid condition of the metal left in the reservoir, and also to keep the passage or gate open until all of the metal has flowed into the mold to fill up the pipe.

The form of feeder shown in Fig. 5 is made of suitable refractory material, and is intended to be used in a mold of the ordinary pattern, and is provided with a projecting flange around the top, which rests upon the top of the mold and holds the feeder in position, as indicated in said Fig. 5, the mold being shown by dotted lines.

Having thus described my invention, what I claim is—

1. A feeder for ingot-molds, having a reservoir for molten metal, a gate leading therefrom into the mold, and an inclined bottom sloping outwardly and downwardly from said gate, for the purposes set forth.

2. The combination, with an ingot-mold, of a feeder for said mold, having a reservoir for molten metal, a gate leading therefrom into the mold, and an inclined bottom sloping outwardly and downwardly from said gate, for the purposes set forth.

3. A feeder for ingot-molds, made of a refractory material and having a reservoir for molten metal, a gate leading therefrom into the mold, and an inclined bottom sloping outwardly and downwardly from said gate, for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 15th day of July, 1887.

SIDNEY H. BOUCHER.

Witnesses:
FREDK. C. FRAENTZEL,
FREDK. F. CAMPBELL.