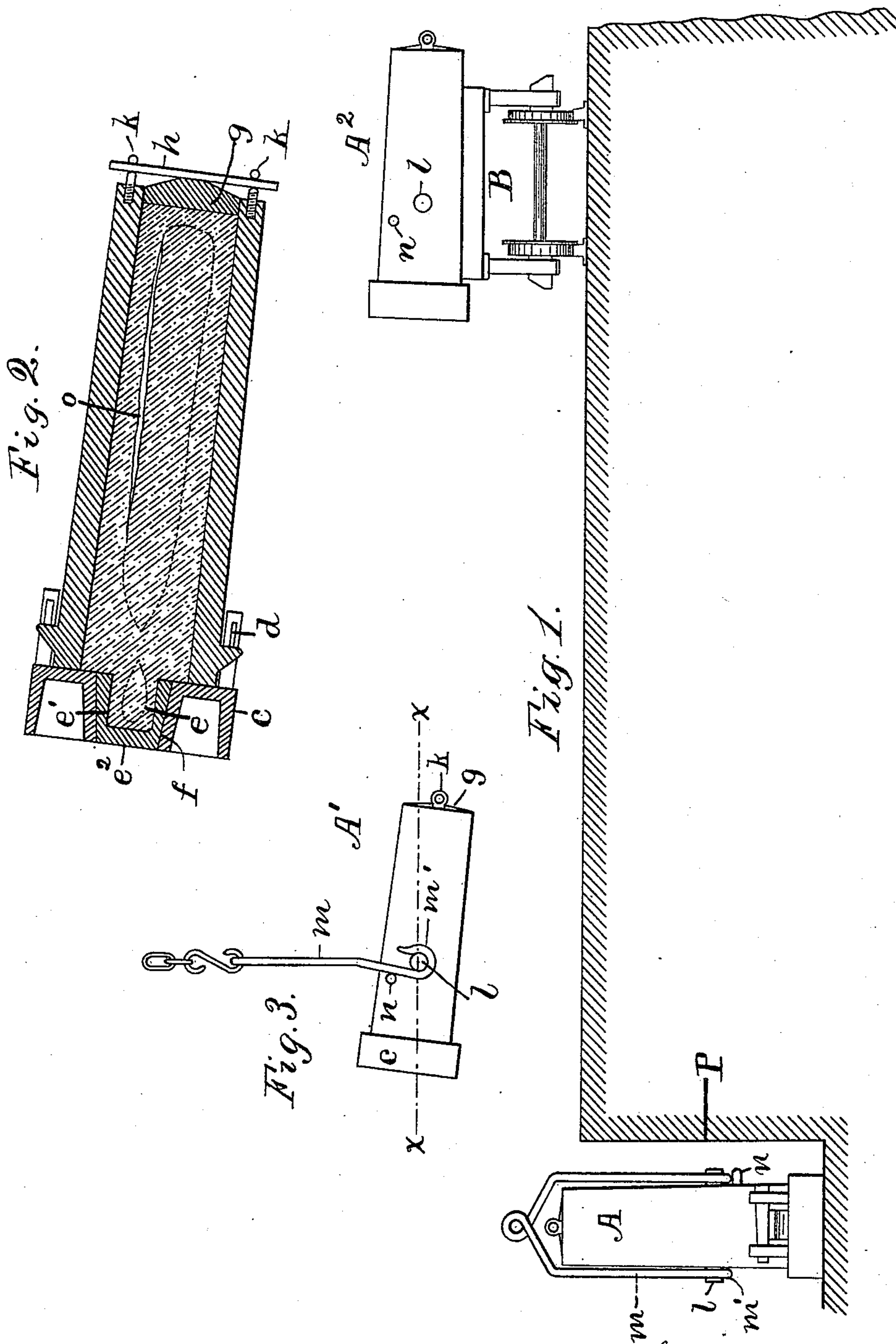


(No Model.)

W. R. HINSDALE.  
PROCESS OF CASTING INGOTS.

No. 448,881.

Patented Mar. 24, 1891.



Attest:  
F. C. Fischer.  
J. Van Hook Jr.

Inventor.  
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per Crane Miller, Atty.



# UNITED STATES PATENT OFFICE.

WILLIAM RUSSELL HINSDALE, OF EAST ORANGE, NEW JERSEY.

## PROCESS OF CASTING INGOTS.

SPECIFICATION forming part of Letters Patent No. 448,881, dated March 24, 1891.

Application filed December 20, 1890. Serial No. 375,292. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM RUSSELL HINSDALE, a citizen of the United States, residing at East Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Processes of Casting Ingots, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention consists in a modification of the process of casting ingots set forth and described in my United States Patent No. 444,381, issued January 6, 1891, and its primary object is to locate the shrinkage-cavity along one side of the ingot, and to make it of long and narrow form, so as to be readily closed in the rolling operation to which such ingots are subjected.

The invention consists in first casting the metal in a mold; secondly, chilling the surface of the metal, and, thirdly, placing the ingot in an inclined position and flowing the metal against such chilled end to distribute the shrinkage-cavity along one side of the ingot.

In the drawings Bessemer molds are shown. Figure 1 represents in section a pit for holding such molds while filling them with metal, a mold in the pit, one upon a car adjacent thereto, and one upon a sling in the transportation to the car. Fig. 2 is a section of one mold in an inclined position, as at A' in Fig. 1.

P is the pit; B, the car adjacent thereto; A, the mold standing upright in the pit; A', the mold held in an inclined position in a sling-carrier, and A<sup>2</sup> the mold lying horizontally upon the car B.

The mold is shown with removable bottom *c*, held by keys *d*, with a cup of refractory material *e*<sup>2</sup>, fitted to a tapering recess *f* in the loose bottom. The cup, as shown in Fig. 2, is formed with a pocket *e'* to receive the shrinkage-cavity, (indicated by dotted lines *e*,) which is formed at the bottom end of the ingot when inverted, as claimed in my former patent; and the cup may be heated before insertion in the mold, to maintain the metal fluid therein to permit it to flow into the mold as the ingot shrinks in cooling. A cap *g* is shown at the mouth of the mold, with a bar *h* inserted through eyes *k*, to hold it in place.

*l* are trunnions on the mold, and *m* a car-

rier or hanger with branches having bearings *m'*, as shown upon the mold A, to embrace the trunnions and sustain the mold movably. The trunnions are placed nearest the bottom of the mold, and a stop-pin *n* is provided on the mold to arrest its motion when turned into an inclined position, as at A', with the mouth of the mold a little lower than the bottom, the line *x x* showing the true level.

*o* is the shrinkage-cavity, of long narrow shape, nearly parallel with the top side of the ingot in Fig. 2, which may be formed, instead of the globular cavity *e*, by placing the ingot in an inclined position after chilling the top of the casting.

When the metal is poured into mold A, the top is chilled by wet sand or by the cap *g*, and the ingot is then turned in an inclined position, while the core remains fluid, as indicated by the dotted lines *o*. If allowed to remain upright, as in Fig. 1, the crust which forms at the top of the ingot is soon ruptured by the subsequent shrinkage, and the air enters the cavity and oxidizes the walls of the same, so that it never perfectly welds up. By inclining the ingot the fluid metal flows to the mouth of the mold and prevents the entrance of air, while the falling of the metal from the upper side of the mold in shrinking distributes the cavity along that side and makes it very slender in its cross-section. Such a cavity is closed up with much less rolling than a globular one near the axis of the ingot, and as its walls are not oxidized they are readily welded together and the product is free from any seam or defect.

Having thus set forth the nature of my invention, what I claim herein is—

The process of forming ingots of cast-steel, which consists in first casting the metal in a mold; secondly, chilling the surface of the metal, and, thirdly, placing the ingot in an inclined position and flowing the metal against such chilled end to distribute the shrinkage-cavity along one side of the ingot.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM RUSSELL HINSDALE.

Witnesses:

THOS. S. CRANE,

FRED C. FISCHER.