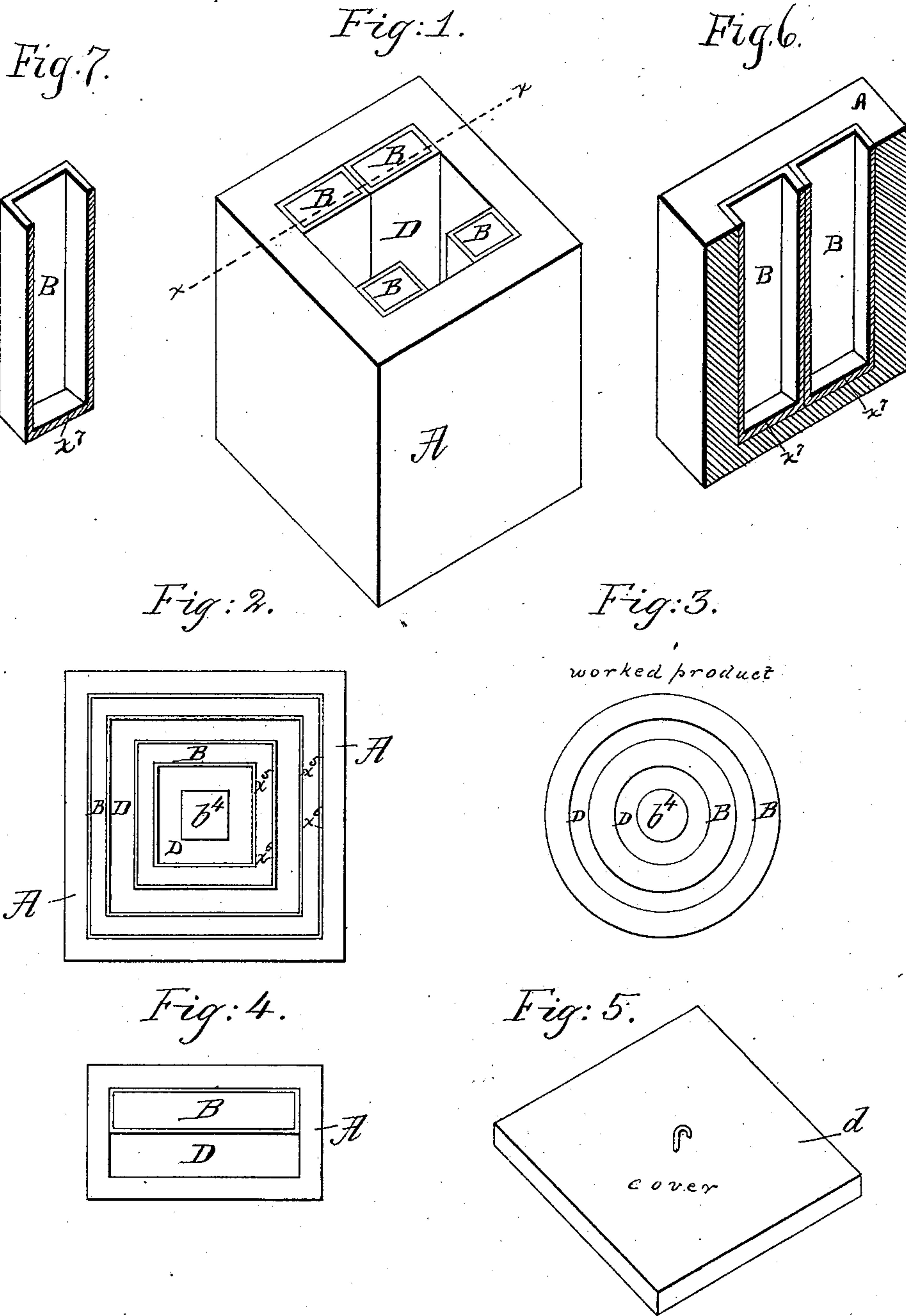


(No Model.)

E. WHEELER.
COMPOUND INGOT MOLD.

No. 363,926.

Patented May 31, 1887.



Witnesses.
Arthur Zippert.
Fred R. Emery.

Inventor.
Eubridge Wheeler
by Crosby Gregory attys.

UNITED STATES PATENT OFFICE.

ELBRIDGE WHEELER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF,
WARE B. GAY, AND GEORGE W. GOGIN, TRUSTEES, ALL OF SAME PLACE.

COMPOUND INGOT-MOLD.

SPECIFICATION forming part of Letters Patent No. 363,926, dated May 31, 1887.

Application filed April 24, 1886. Serial No. 200,023. (No model.)

To all whom it may concern:

Be it known that I, ELBRIDGE WHEELER, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Compound Molds, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a method for producing a compound ingot composed of two or more metals or grades of metal united to form a homogeneous ingot and a mold in which to produce said ingot. The compound ingot composed of two or more metals or grades of metal and produced in accordance with my invention is especially adapted for the production of railroad-rails, shafts, ordnance, and other articles.

My invention is also adapted to be applied to molds of ordinary construction without necessitating any change in the mold itself or in any part of the usual plant.

In accordance with my invention, I purpose to place within a mold of any ordinary construction, and such as is now commonly found in steel-plants, one or more auxiliary molds composed of sheet metal, preferably steel or iron, made in the form of cans and open at one end.

The auxiliary molds referred to may be placed within the primary mold in any desired position to produce an ingot having two or more metals or grades of metal, said metals bearing to each other any desired relative position or proportion.

The invention consists, first, in a form of compound mold, and, second, in a method of casting compound ingots, substantially as hereinafter particularly set forth and claimed.

Figure 1 is an isometric view of an improved compound mold with which to practice my invention. Fig. 2 is a top or end view of a modified form of compound mold; Fig. 3, an end view of the ingot produced in Fig. 2 after being worked over a core; Fig. 4, a top view of a modified form of mold adapted to produce an ingot to be manipulated into a rail, and Fig. 5 shows the bonnet or cap for the outside mold. Fig. 6 is a section of a mold such as shown in Fig. 1, taken on line *xx*; and Fig.

7 is a similar section of one of the cans or auxiliary molds removed.

Referring to Fig. 1, A represents a mold of ordinary construction and composed of any suitable or usual material.

In accordance with my invention, I purpose to place within the mold A one or more auxiliary molds, B, composed of sheet metal, preferably steel or iron, made up in the form of cans open at one end and having the closed bottom *x*. The auxiliary molds B may be of any desired number, herein shown as four; but it is evident said number is limited only by the size of the mold A, and also by the size of the auxiliary molds themselves.

The auxiliary molds B will be of proper thickness to hold the metal cast into them, and at the same time the thickness of the material of the said auxiliary molds will not be such as to prevent the said material from fusing when the metal to complete the ingot is cast into the mold, as will be described.

In operation the metal cast into the molds B will be of a different kind or grade from that cast into the remaining part of the mold A, and marked D. The metal cast into the auxiliary molds may be of the same or different kinds or grades, and when the metal cast into the molds B, (shown in Fig. 1,) is all of one kind or quality it will preferably be cast at one operation into all the said molds.

As soon as the metal of one kind or grade has been cast into the auxiliary molds B the metal which is to form the remaining part of the ingot will be immediately cast into that part of the mold A marked D in Fig. 1. The molten metal cast into the auxiliary molds B will heat such molds to such a degree that when the remaining metal is cast into that part of the mold marked D the latter metal will fuse the surface of the metal of the auxiliary molds B, thereby producing a compound ingot composed of two or more metals or grades of metal united to form a solid ingot.

When the metal to be cast into that part of the mold A marked D is not cast immediately after the metal has been cast into the auxiliary molds, the mold A will be covered with a bonnet or cap, *d*, to exclude the exterior air.

Air, if permitted to have access to the in-

terior of the mold A, would oxidize the surface of the auxiliary molds, which oxidation would prevent a fusion between said auxiliary molds and the metal to be cast into the mold A.

Instead of casting one kind of metal into the auxiliary molds B a different kind or grade of metal may be cast into each separate mold B, in which case, when it is not convenient to pour the metals into the said molds simultaneously, the mold A will be covered by the cap or bonnet *d* after each kind or grade of metal has been cast in its auxiliary mold.

In Fig. 2 I have shown two auxiliary molds B, of the same shape as the mold A, said auxiliary molds being herein shown as placed within the mold A to leave spaces D, into which is cast a different kind or grade of metal from that cast into the said auxiliary molds B B, the said auxiliary molds being herein shown as cans having inner walls, *x*⁵, and outer walls, *x*⁶, the bottom of the said cans resting upon the bottom of the said molds.

The ingot produced in the compound mold shown in Fig. 2 may, if desired, be composed of alternate laminae of metal or grades of metal—such, for instance, as a low and high grade of steel, or soft iron and steel—or each lamina may be of a different kind or grade of metal.

The compound ingot formed in the mold shown in Fig. 2 is adapted to be worked over a core, *b*⁴, in any usual or well-known manner, to produce ordnance, said ordnance being composed of concentric laminae of metal, (shown in Fig. 3,) which may be of different kinds or grades—such, for instance, as alternate laminae of soft iron in the spaces D and steel in the molds B, or of different grades of steel—the core *b*⁴ being placed in the mold before the metal is cast therein and being retained during subsequent reduction of the ingot by compression, hammering, or rolling, the core being then removed.

Referring to Fig. 4, I have shown the mold A as containing only one auxiliary mold B, which is extended the width of the mold or flask A. Such a mold is especially adapted

for the production of a compound ingot from which to produce rails, having a high carbon steel composing the thread, while the web and flange will be of a lower carbon steel.

The method of casting the compound ingots in the molds (shown in Figs. 2 and 4) will be the same as that described above.

It is evident that the mold A may be of any form and size, and that the said auxiliary molds may be placed in the mold A in any desired position with relation to the said mold and to each other.

I claim—

1. A compound mold consisting of an outer flask or mold and an independent auxiliary mold, in the form of a can open at one end and closed at the other and placed within said flask or mold, and into which metal is cast, and constructed of a material which will be incorporated in the ingot by the process of casting, substantially as described.

2. That improvement in the art or method of forming a compound ingot which consists, first, in placing in an outer mold or flask, as desired, a plurality of auxiliary molds; second, casting into each auxiliary mold a different kind or grade of metal; third, covering the outer mold or flask with a cap or bonnet after each cast in each auxiliary mold, and, lastly, casting into the outer mold or flask a metal or grade of metal different from the metals or grades of metal in the auxiliary molds, substantially as described.

3. A compound mold consisting of at least one independent auxiliary mold, formed as a can with a closed bottom to receive one kind or grade of cast metal, and an outer flask or mold to receive another kind or grade of cast metal, the metal cast into the outer flask or mold surrounding the auxiliary mold, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELBRIDGE WHEELER.

Witnesses:

B. J. NOYES,

J. H. CHURCHILL.