Aug. 6, 1929. W. J. GREEN 1,723,345

MOLD FOR CASTING BIMETAL PRODUCTS

Filed Nov. 8, 1926

FIG. 1.

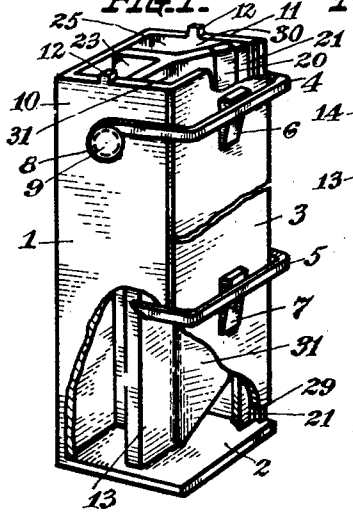


FIG. 2. FIG. 3 FIG. 4. FIG. 5.

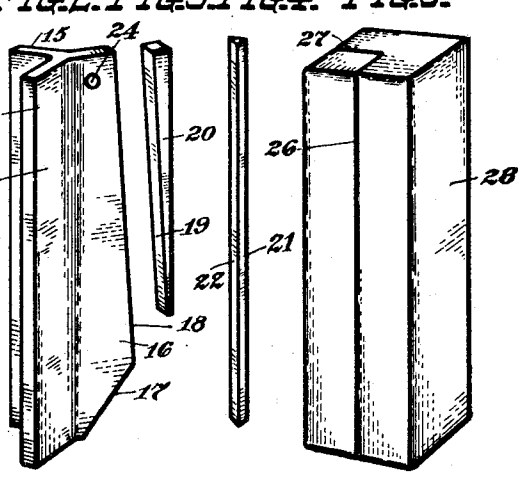


FIG. 6.

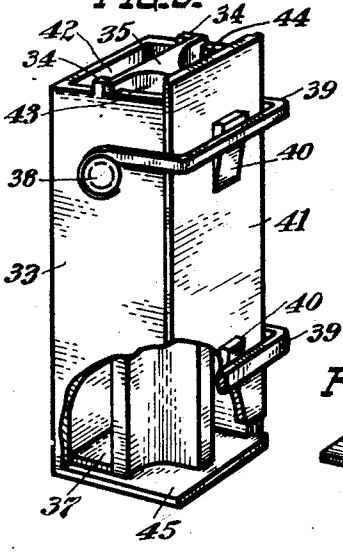


FIG. 7.

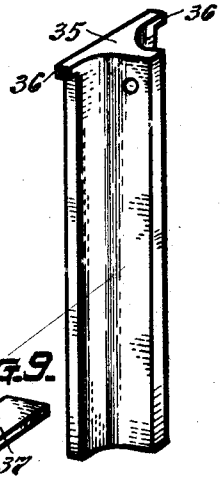


FIG. 8.

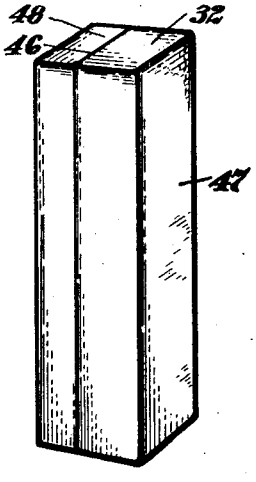


FIG. 9.



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MOLD FOR CASTING BIMETAL PRODUCTS.

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The present invention relates to a method of manufacturing bi-metal products, which usually consist of two metals of different degrees of hardness, and which by the use of my method are inseparably united in adhering relation to each other. When a casting is formed by the present method, the ingot may be subsequently forged, or rolled into bars, plates or sheets, without displacement of the two metals used.

It is seen that this method results in a great saving in the cost of materials, as in the case where a cutting edge is required on a tool, the latter may be formed from a hard-steel while the remaining, or "backing-up" portion of the tool may be formed of soft-steel, thereby cheapening the cost of manufacture, as will be further explained as the description proceeds hereinafter in this specification.

I have also provided in the present invention a means for forming two different forms of ingots, said means consisting of ingot-molds, with accompanying devices of a special character particularly adapted to carry out the above-mentioned method, as will be described below, in proper detail.

In the accompanying drawings forming part of the present specification, I have illustrated two complete molds, each provided with the special parts or devices necessary to their use in the carrying out of my invention, and also two forms of ignots made by such molds.

In the drawings, Figures 1 to 4 inclusive, is shown a mold designed to produce the ingot shown in Figure 5, while in Figures 6, 7 and 9 is illustrated a mold adapted to produce the ignot shown in Figure 8.

Figures 1 to 5 will be described first, and in which the numeral 1 indicates a three-sided mold having preferably an integral bottom 2, while the top is left open as shown in Figure 1. The open side of said mold has a cover-plate or lid 3 which is removable, but is normally held in position on the mold by means of the bent rings 4, 5, and wedges 6, 7, the rings having the downwardly-turned ends 8, 8 adapted to engage over the ears or lugs, 9, 9 formed preferably integral on the walls 10, 11, of the mold as shown in Figure 1.

The mold 1, is provided with two upstanding projections 12, 12 for use in conjunction with certain devices, shown in Figures 7 and 9 of the drawings, as will be described below.

In connection with the foregoing mold 1, a "Y-shaped" casting 13, clearly illustrated in Figure 2 is used, having the three web-plate portions 14, 15 and 16, and having a cut-away portion 17 for a purpose to be described, formed thereon. It will be seen also that the web-plate 16, has a vertically beveled edge 18, formed complementary to the beveled portion or face 19, of the wedge 20. The wedge 20 is of metal, and is of a width corresponding to the thickness of the web-plate 16 of casting 13, on the face 18 of said wedge. The numeral 21 indicates a longitudinal fillet of metal, of triangular cross-section, the face 22 thereof being of a width corresponding to the thickness of the web-plate 16, and the wedge 20, and adapted to be inserted in the corner of the mold 1, as shown in Figure 1 of the drawings.

It will be seen from Figure 1, that the Y-shaped casting 13 is adapted for insertion in the mold 1, after which the fillet 21 can be inserted in the corner of said mold. The wedge 20 can now be inserted between the Y-shaped casting and the fillet 21, and as same is driven downward, the Y-casting or division wall 13 is securely held in position in the mold. The lid 3, it is seen can be tightly held in position against the mold 1, by merely driving the wedges 6 and 7 into the bent rings 4 and 5.

The mold is now ready for pouring in the hot-metal into the cavity or chamber 23, and the hard-steel, or tool-steel metal is poured into said chamber, and allowed to cool or solidify to a certain point, when the wedges 6, 7 are released somewhat, permitting removal of the fillet 21, the wedge 20, and as soon as the metal in chamber 23 is cool enough, so that it has a surface crust sufficient to stand alone, the Y-shaped casting 13 is removed from the mold, preferably by means of the aperture 24, which is adapted to be engaged by a hook of a lifting crane or other similar device.

The lid or door 3 is now tightly wedged against the mold 1 a second time, by means of wedges 6, 7, and softer metal which may be carbon or alloy steel, is poured into the chamber 25, and completely surrounds the hard or tool-steel first poured. The whole ingot is now allowed to cool, and the two metals finally are united in an adhering rela-

tion along the sides 26, 27 of the ingot 28 in one complete and inseparable mass, adapted for rolling, or forging into bars, plates, sheets or the like.

In connection with the pouring of the hard steel into cavity 23, the method followed with my invention is to leave the lid 3 in a raised or lifted position, as indicated at 29, Figure 1, and it will be seen that a draft of air will pass through the two chambers 30, 31, and the cut-away portion 17 of the web-plate 16 permits said circulation to take place, thereby assisting in the cooling of the tool-steel which has been poured in said chamber 23. It will also be seen that by holding the lid 3, slightly elevated that when it is desired to remove the Y-shaped casting, the wedge 13, and the fillet 21 that after the wedges 6, and 7 have been loosened, the falling of the door or lid 3, makes the release of the wedge 20, and fillet 21 more easily accomplished.

The type of mold shown in Figure 6, and suitable to produce an ingot of the kind illustrated in Figure 8, in which the soft steel is shown by numeral 32, and the tool-steel by 48, comprises the three-sided mold 33 similar to that of Figure 1. The lugs 34, 34 similar to those of Figure 1, at 12, 12 now are used as abutments against which the T-shaped casting 35 rests, and it will be noted that the said T-shaped casting is provided with complementary projections 36, 36 adapted to engage against the said mold lugs 34, 34. Within the mold 33, and at the bottom is positioned the flat plate 37, which is used also as an abutment against which the lower end of the T-shaped casting bears as clearly indicated in Figure 6 of the drawings.

As in the case of the mold 1, the present type of mold 33 is provided with ears or lugs 38, bent rings 39, 39, and wedges 40, 40, and for a similar purpose, to wit, to securely hold the lid 41, and T-casting 35 in position on the mold.

The pouring of the hard-metal into chamber 42, is begun with the T-shaped casting in position as shown in Figure 6, and with the lid 41 in raised position, as shown, the latter while in raised position permitting of air circulation in chambers 43, and 44, in order to cool the metal poured in chamber 42 as quickly as possible, and to shield the workmen from the heat, which radiates from the hot metal. After the hard or tool-steel has hardened somewhat the wedges 40, 40 are loosened as before, the lid 41 falls downward to the base plate 45 making the removal of the T-shaped casting more readily accomplished. The soft-steel is now poured in the portion of the mold 43 behind the tool-steel, and when the metals have united along the line 46 of the casting or ingot 47, the mold can be removed from the latter in the ordinary way.

It will be seen from the drawings that the same three-sided mold and door shown in Figure 1, is used in making both types of ingots 28 and 47, the only difference in their use residing in the two styles of interior castings used. This feature of the interchangeable mold used with my invention is seen to be an important feature, thereby reducing the number of molds necessary to produce both types of ingots described.

As before referred to in this specification, it is evident from Figures 5 and 8 of the drawings that the ingots produced by the method in hand, can be readily forged, rolled into various forms used in trade, without displacement of the relative positions of the tool-steel, and the softer metal.

I claim:

1. In an ingot mold, a shaped casting having web plates forming a molten metal chamber and a plurality of cooling chambers within the mold, and means for causing the passage of a cooling medium through the cooling chambers, comprising a cut-away portion formed on one of the web-plates, and a partly opened lid forming a draft aperture with the walls of the mold.

2. In an ingot mold having a chamber for molten metal, and a plurality of cooling chambers adjacent thereto, means for causing a circulation of air through the latter, and means for preventing oxidation of the surface of the molten metal in the process of cooling, comprising a number of web plates adapted to be held in close contact with the metal during the cooling period.

3. In an ingot mold, a number of enclosing walls and a bottom plate, a chamber for molten metal having means for cooling, and prevention of oxidation of the surface of the molten metal, comprising a number of web plates, a cut-away portion formed on one of the web-plates, and a liftable lid adapted to form with the walls and bottom plate, a draft aperture for the cooling chambers of said mold.

In testimony whereof I affix my signature.

WALTER J. GREEN.