No. 695,090. Patented Mar. 11, 1902.

W. R. CLARK & H. & W. G. BOSWORTH.

METAL MOLD FOR FORMING CASTINGS.

(Application filed Feb. 4, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig: 1.

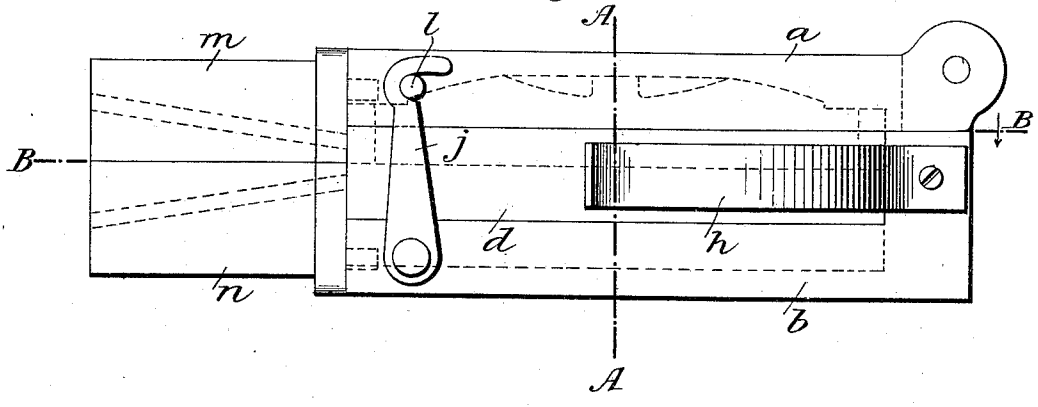


Fig: 2.

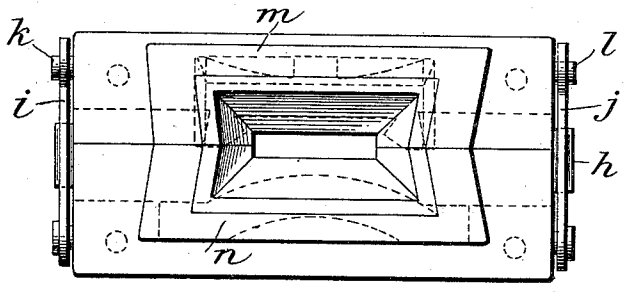
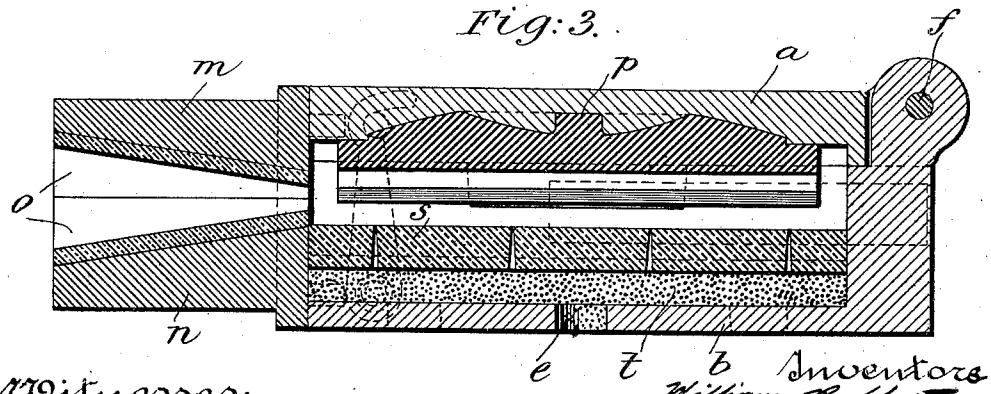


Fig: 3.



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Fig: 4.

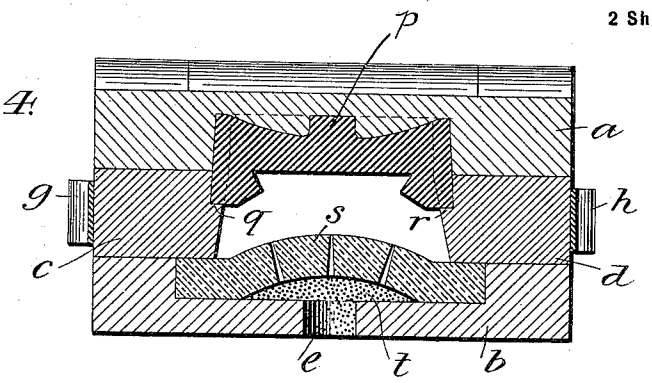


Fig: 5.

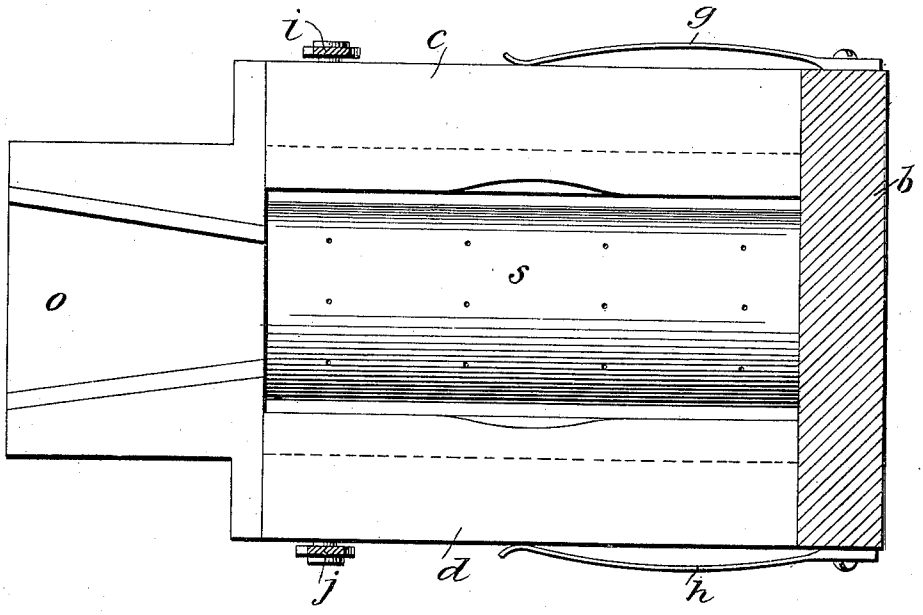
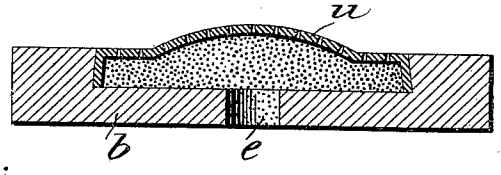


Fig: 6.



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UNITED STATES PATENT OFFICE.

WILLIAM R. CLARK AND HARVEY BOSWORTH, OF PLATTSBURG, AND WILLIAM G. BOSWORTH, OF NEW YORK, N. Y.

METAL-MOLD FOR FORMING CASTINGS.

SPECIFICATION forming part of Letters Patent No. 695,090, dated March 11, 1902.

Application filed February 4, 1901. Serial No. 45,848. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM R. CLARK and HARVEY BOSWORTH, residents of Plattsburg, in the county of Clinton, and WILLIAM G. BOSWORTH, a resident of the borough of Manhattan, in the city of New York, State of New York, citizens of the United States, have invented new and useful Improvements in Metal-Molds for Forming Castings, of which the following is a specification.

Our invention relates to an improvement in metal-molds for forming castings in which the gases generated in the molten metal may be permitted to escape freely through the body of the mold as the metal is poured into the same.

The object of this present invention is to provide metal-molds of the above character in which castings may be formed which will be entirely free from sponginess and gas-holes, which would render them imperfect and unsuitable for the purposes for which they are intended.

A further object is to provide means for producing castings of a more dense nature than has hitherto been possible, thereby making the same stronger and more durable.

Our invention has more particularly for its object to provide molds for casting antifriction-metal bearings onto iron or steel backs placed within the mold to form, for example, the well-known "A B C" journal-bearings.

A further object is to provide certain new and useful features in the construction, form, and arrangement of the several parts of the mold, whereby the backs may be locked securely within the mold while the antifriction metal is being cast onto the said backs.

A still further object is to provide a sprue having a lining of very low heat conductivity—such, for instance, as graphite carbon—whereby the heat units in the molten metal are conveyed very slowly through the said lining, thus permitting the metal to remain in its molten state for a considerable time within the sprue while forming the gate, so that the said molten metal may flow into the mold as the metal therein cools and shrinks, thus insuring a casting of great density.

A practical embodiment of our invention is represented in the accompanying drawings, in which—

Figure 1 is a view in side elevation of the mold in its closed position. Fig. 2 is an end view of the same. Fig. 3 is a vertical central section taken longitudinally through the mold, one of the iron or steel backs of an "A B C" journal-bearing being shown held in position within the mold. Fig. 4 is a transverse section taken in the plane of the line A A of Fig. 1. Fig. 5 is a horizontal section taken in the plane of the line B B of Fig. 1; and Fig. 6 is a transverse vertical section through one of the hinge-sections of the mold, showing a modified form of mold front plate.

The metal-mold comprises top and bottom sections *a b* and removable side sections *c d*. The bottom section *b* is provided with a plurality of perforations *e*, leading from the interior of the mold to the exterior. This bottom section *b* is closed at one end, giving it a general L shape in longitudinal vertical section, and the top of the upturned end portion is hinged at *f* to the top portion *a* of the mold. The removable side sections *c d* are yieldingly held in position to close the opposite sides of the mold by means of flat springs *g h*, secured to the end portion of the bottom section *b* of the mold. These springs *g h* are preferably of such a length that their free ends will bear against the side sections *c d* at about midway their lengths. The top and bottom sections may be held closed against the side sections by latches *i j*, in the present instance hinged to the sides of the bottom section *b* and having hooks at their free ends fitted to engage retaining studs or pins *k l* in the sides of the top section *a* of the mold. The sprue is preferably made of two metal sections *m n*, removably seated in the free ends of the top and bottom sections *a b* of the mold, so that when the mold is closed the pouring-hole in the sprue will be brought in alinement with the open interior of the mold. These sprue-sections *m n* may be conveniently held in position on the free ends of the hinged sections of the mold by means of pins carried by the two sprue-sections, which pins have sliding fits in sockets formed in the outer ends of the hinged sections, or this removable connection

between the sprue-sections and the hinged sections may be made in any other well-known or approved manner. The sprue is provided with a lining *o* of some material having a very low heat conductivity—such, for instance, as graphite carbon—which lining not only presents an antifriction-surface to the molten metal as it is poured through the sprue into the mold, but also removes the heat very slowly from the molten metal, so that the molten metal within the sprue which forms the gate after the mold has been filled will be permitted to flow into the interior of the mold as the metal therein cools and shrinks, thus producing a casting of very dense structure. The hole through the sprue is preferably formed part in one section and part in the other, so that when the two hinge-sections of the mold are swung apart the sprue will be parted along the pouring-opening.

The mold shown in the accompanying drawings is one adapted to casting the journal-bearing generally known as the "A B C" journal-bearing. In this mold the top section is provided with a recess on its inner face adapted to snugly fit the top and a portion of the sides of the back *p* of the bearing, the ends of the back being thus spaced a short distance from the ends of the mold, and the yielding side sections *c* and *d* of the mold are caused to press snugly against the projecting sides of the back. The side sections are further provided with lips *q r*, which overlap the bulging sides of the back at points about midway its ends. The removable front plate for forming the concave surface of the bearing is denoted by *s*, and it is seated in a recess in the inner face of the bottom section *b* of the mold. This front plate is perforated, the perforations preferably flaring from the inner face of the front plate to its outer face. The number of perforations in the front plate may be varied to suit different requirements. We have represented the front plate as being of arched form, and the space between the concave surface of the front plate and the bottom perforated section *b* may be left open or it may be packed with a granular material—as, for instance, dry sand, (denoted by *t*,) which dry sand will readily permit the passage of gases therethrough.

In the form shown in Figs. 1 to 5, inclusive, the front plate is made of an antifriction material—such, for instance, as graphite carbon.

In the form shown in Fig. 6 we have shown the mold provided with a thin metallic perforated front plate, (denoted by *u*.)

The operation of our invention is as follows: The back to which the antifriction-bearing metal is to be attached is placed in position in the section *a* of the mold. The side sections *c d* are then placed in position between the sides of the back *p* and the springs *g h*. The mold is then closed and locked and is set up on end. The molten metal is then poured through the sprue into the interior of the mold, and gases formed in the molten metal are permitted to freely escape through the perforated mold. The ends of the perforations which open into the interior of the mold are small enough to prevent the molten metal from flowing therethrough, but are amply large to permit the entire escape of the gases within the mold as the molten metal is poured thereinto. The molten metal is caused to flow into the spaces between the ends of the back piece and the ends of the mold and also into the shallow dovetailed groove in the back, so that when the molten metal cools the bearing will be rigidly cast onto the back.

What we claim is—

1. A metal-mold comprising top and bottom sections hinged together and a removable perforated front plate located in the bottom section for permitting the free escape of the gases from the interior of the mold.

2. A metal-mold comprising top and bottom sections hinged together, interposed removable side sections and a sectional sprue having one section removably connected with the top section and its other section removably connected with the bottom section whereby the sprue is parted when the mold is opened.

3. In a mold for casting journal-bearing brasses onto iron or steel backs, a pair of sections hinged together, one of the said sections being arranged to receive the back, a front plate located in the other section and interposed side sections arranged to engage the back for holding it in position.

4. In a mold for casting journal-bearing brasses onto iron or steel backs, a pair of sections hinged together, one of the said sections being arranged to receive the back, a front plate located in the other section and interposed spring-actuated side sections arranged to engage the back for holding it in position.

5. In a mold for casting journal-bearing brasses onto iron or steel backs, a pair of sections hinged together, one of the said sections being arranged to receive the back, a perforated front plate located in the other section, and interposed side sections fitted to engage the back for holding it in position within the mold.

6. In a mold for casting journal-bearing brasses onto iron or steel backs, a pair of sections hinged together, one of the said sections being arranged to receive the back, a perforated front plate located in the other section and interposed spring-actuated sections fitted to engage the back for holding it in position within the mold.

7. A perforated metal-mold, a perforated front plate therein, spaced from the mold, and a filling of granular material, such as dry sand located in the space between the front plate and the mold.

8. A metal-mold comprising a pair of sections hinged together, interposed removable side sections and a perforated front plate

seated in one of the sections and forming a space between it and the section and a hole leading from said space to the exterior through the section whereby communication is established between the interior of the mold and the exterior thereof for permitting the free escape of gases.

9. A metal-mold comprising a pair of sections hinged together, interposed side sections, a perforated front plate seated in one of the hinged sections and forming a space between it and the said sections, a hole leading from said space to the exterior through the said hinged section, a filling of some granular material for said space for permitting the rapid escape of the gases from the interior of the mold to the exterior thereof.

10. A perforated graphite-carbon front plate for molds.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 29th day of January, 1901.

WILLIAM R. CLARK.
HARVEY BOSWORTH.
WILLIAM G. BOSWORTH.

Witnesses:
R. B. SEWARD,
C. S. SUNDGREN.