No. 695,091. 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.

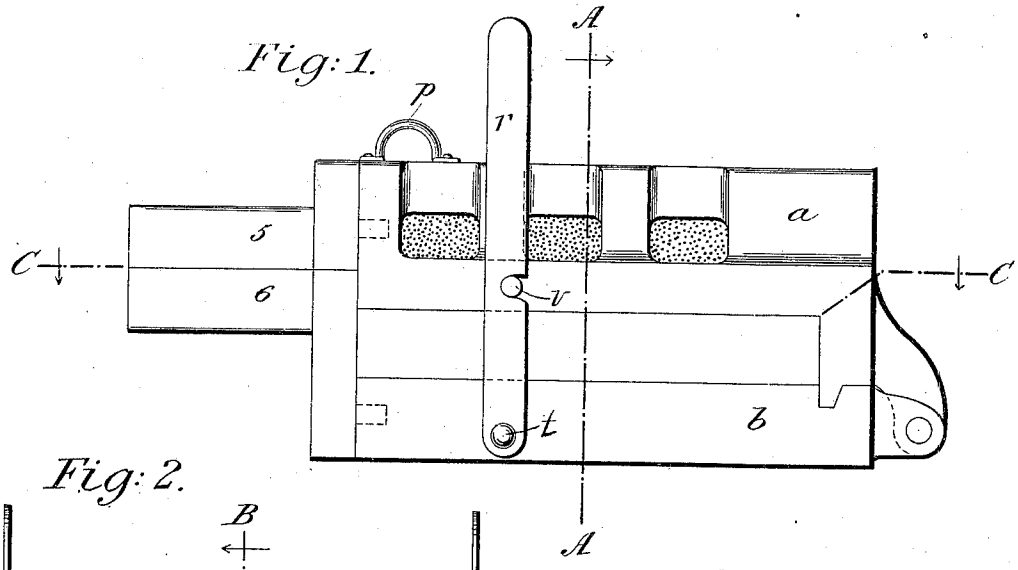


Fig: 2.

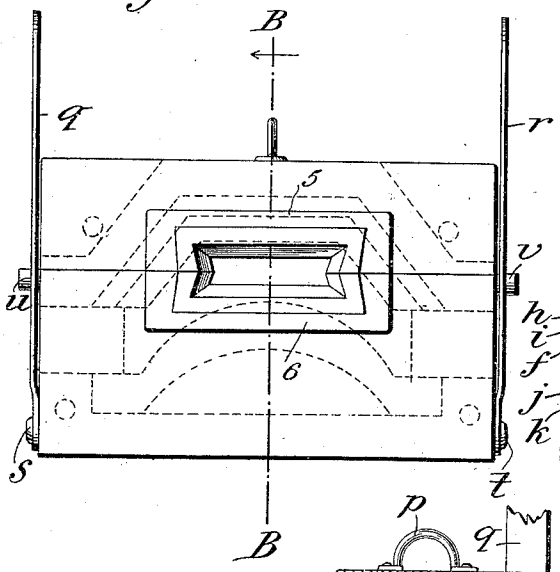


Fig: 3.

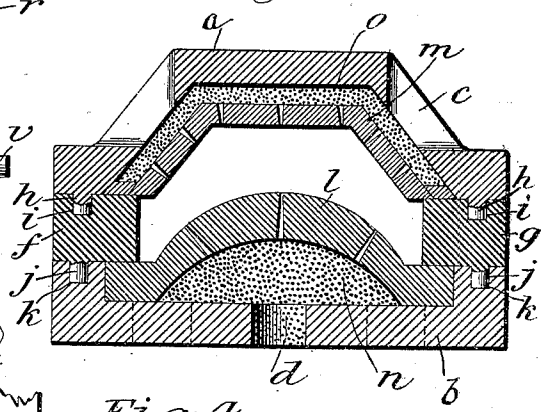
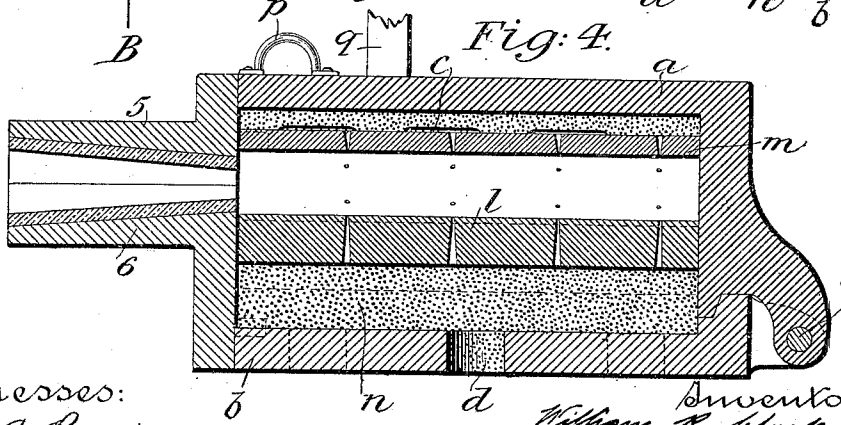


Fig: 4.



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Fig: 5.

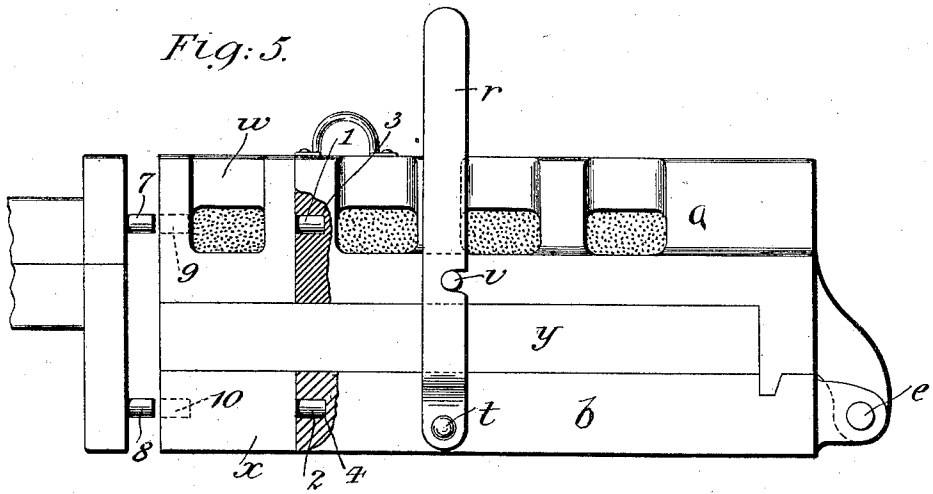


Fig: 6.

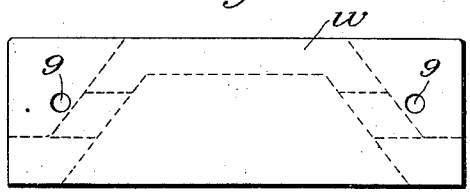


Fig: 7.

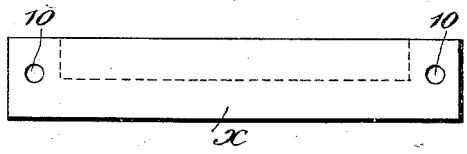
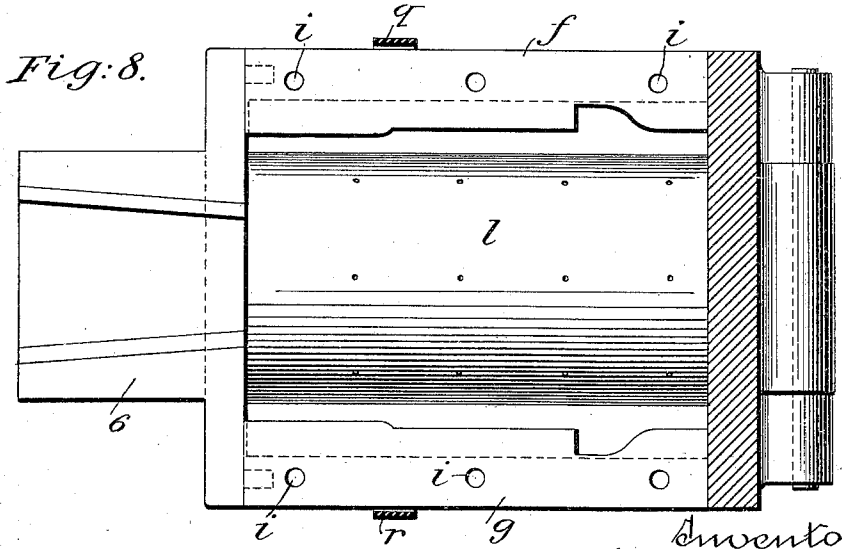


Fig: 8.



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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. 695,091, dated March 11, 1902.

Application filed February 4, 1901. Serial No. 45,849. (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 adjustable metal-molds of the above character in which castings of varying sizes may be produced 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.

Our invention has more particularly for its object to provide an adjustable mold for casting antifriction-metal bearings of varying sizes—such, for instance, as the different sizes of the well-known "Master Car-Builders'" journal-bearing.

A further object is to provide a mold in which the front and back plates are formed of some rapid heat-conducting material—such, for instance, as iron—so that the heat units in the molten metal may be rapidly conveyed therefrom, and at the same time providing a sprue with a lining of some low heat-conducting material—such, for instance, as graphite carbon—so that when the casting is being formed the molten metal which is located within the sprue and which forms the gate after the mold has been filled will be retained in its molten state for a considerable length of time, so that as the metal within the mold cools and shrinks the molten metal within the gate will be permitted to flow into the interior of the mold and fill the space thus formed by the cooling of the metal within the mold. This will produce a casting of great density, durability, and strength.

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 transverse vertical section taken in the plane of the line A A of Fig. 1 looking in the direction of the arrow. Fig. 4 is a longitudinal vertical section through the mold, taken in the plane of the line B B of Fig. 2 looking in the direction of the arrow. Fig. 5 is a view in side elevation of the mold, showing the removable supplemental and additional sections attached thereto for producing a casting of a larger size, certain of the parts being broken away to show one form of a removable connection between the said additional parts and the top and bottom main sections of the mold. Fig. 6 is an end view of the upper additional section. Fig. 7 is an end view of the lower additional section, and Fig. 8 is a horizontal section taken in the plane of the line C C of Fig. 1 looking in the direction of the arrow.

The metal-mold is constructed as follows: The top section *a* is hinged at one end to a bottom section *b*. Said sections are perforated, the perforations in the top section being denoted by *c* and the perforations in the bottom section by *d*.

The hinged end of the mold is closed by a downwardly-extended portion of the top section *a*, which engages the inner face of the rear end of the bottom section *b*. This downwardly-extended portion of the top section *a* is hinged at *e* to the bottom section. Removable side sections *f g* are interposed between the inner faces of the sides of the top and bottom sections, so as to complete the closing of the mold except at its outer end. In the present instance we have shown this removable connection between the side sections *f* and *g* and the top and bottom sections *a* and *b* by means of dowels *h*, provided on the inner face of the top section *a*, having a sliding engagement with sockets *i* in the corresponding faces of the side sections *f* and *g*, and by dowels *j* on the opposite faces of the said side pieces, which have a sliding engagement with sockets *k* in the inner face of the bottom section *b*. It is to be understood, how-

ever, that any other well-known or approved form of removable connection may be used in place of that herein set forth.

In the mold shown in the accompanying drawings we have shown the top section *a* as being of angular arched form to produce a large space within the mold.

The interior of the mold is arranged to cast a predetermined-shaped casting by providing a removable perforated front plate *l*, seated in the inner face of the bottom section *b*, and a perforated back plate *m*, held in position by the top plate *a* and the side sections *f g*.

When it is desired to cast a journal-bearing of the well-known Master Car-Builders' type, the perforated front plate *l* is of curved arch form with its convex surface projecting inwardly, and the perforated back plate *m* is of angular arched form with its concave surface toward the interior of the mold.

The front and back plates of the mold may be perforated to a greater or less degree, as may be desired, and the perforations therein preferably flare from the inner faces of the said front and back plates outwardly to their outer faces. The removable front and back plates are preferably made of some rapid heat-conducting material—such, for instance, as iron—and the spaces between the front plate and bottom section and between the back plate and top section may be packed with some granular material—such, for instance, as dry sand—*n o*, which will not only convey the heat from the front plate and back plate to the mold, but will also permit the ready passage of the gases therethrough, which may be liberated from the molten metal within the mold.

For ease in handling the mold the top section *a* thereof may be provided with a suitable handle *p*. The several sections of the mold may be locked in their closed position by means of latches *q r*, hinged at *s t* on the sides of the bottom section *b* and provided with hooks arranged to swing into engagement with studs *u v*, projecting from the sides of the top section *a*.

When it is desired to adapt the mold for casting a longer article than could be cast in the main sections of the mold, we provide additional top and bottom sections *w x* of the required length and supplemental side sections *y*, one only of which is shown in the accompanying drawings, which supplemental side sections are used in the place of the original side sections *f* and *g*. These additional top and bottom sections are removably mounted on the ends of the main top and bottom sections *a b* to form extensions of the same, the connection, in the present instance, being by means of dowels 1 2, which project from the inner faces of the sections *w* and *x* and have sliding engagement with sockets 3 4 in the outer ends of the sections *a b*. A front plate *l* and back plate *m* of the required length and shape to produce the required casting are inserted into the built-up mold thus formed, and the inner sides of the supplemental side pieces *y* may be provided of the required shape that it is desired to make the sides of the casting. The sprue is removably secured to the end of the mold and is herein shown in two sections 5 and 6, which serve to close the outer end of the mold except at the point where the hole passes through the sprue. The means for removably attaching the sprue to the outer end of the mold is herein shown as a dowel-and-socket connection, the dowels 7 and 8 being shown as projecting inwardly from the inner face of the sprue-sections and having a sliding fit either in the sockets 3 4 in the outer ends of the main sections *a b* or in the sockets 9 10 in the outer faces of the additional sections *w x*. The sprue is provided with a lining of some material having a low heat conductivity—such, for instance, as carbon graphite—so that the heat units in the molten metal will be taken away very slowly. This carbon graphite also serves to present a smooth surface, through which the molten metal is poured into the mold.

The operation of our invention is as follows: The perforated front plate and back plate and the side sections of the required size and shape are placed in position, and the top section of the mold is swung down into its closed position and there locked to hold the parts against movement. The mold is then set up on end and the molten metal poured through the sprue into the interior of the mold. The gases formed in the molten metal are permitted to freely escape through the perforated mold. The ends of the perforations which are opened into the interior of the mold through the front plate and back plate are small enough to prevent the molten metal from flowing therethrough, but are of sufficient sizes to permit the complete escape of the gases within the mold as the molten metal is poured into the same.

It will be seen that by the use of the removable front plate and back plate, the supplemental side sections, and the additional top and bottom sections we are enabled to cast articles of greatly-varying sizes and shapes in a single mold, thus doing away with the necessity of providing a mold for each article. Also by perforating the mold we are enabled to permit the complete escape of the gases, thus insuring a casting which will be entirely free from sponginess and air-holes. This is very important, especially in the casting of journal-bearings, as it materially increases the durability and strength of the same.

What we claim is—

1. A metal-mold comprising a pair of perforated sections hinged together and a removable perforated front plate carried by one of the sections.

2. A metal-mold comprising a pair or perforated sections hinged together, a removable

perforated front plate carried by one section and a removable perforated back plate carried by the other section.

3. A metal-mold comprising a pair of perforated sections hinged together, a perforated front plate and a perforated back plate carried by the said sections and spaced therefrom.

4. A metal-mold comprising a pair of perforated sections hinged together, a perforated front plate and a perforated back plate carried by said sections and spaced therefrom, and a granular filling for the said spaces for conveying the heat from the back plate and front plate to the perforated hinged sections but permitting the free escape of gases from the interior of the mold to the exterior.

5. A metal-mold comprising a pair of sections hinged together, a sprue, and additional mold-sections interposed between the sprue and the first-named sections.

6. A metal-mold comprising a pair of mold-sections hinged together, a sprue, a pair of additional mold-sections interposed between the sprue and the first-named mold-sections and a pair of removable side sections interposed between the mold-sections.

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:
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C. S. SUNDGREN.