April 13, 1926. 1,580,689

R. J. SHOEMAKER ET AL

ART OF CASTING METALS

Filed April 6, 1925

Fig. 1.

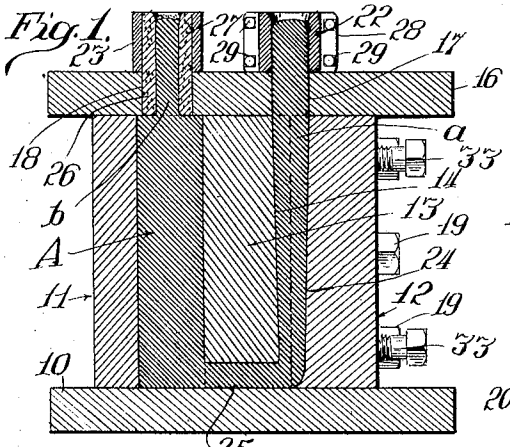


Fig. 2.

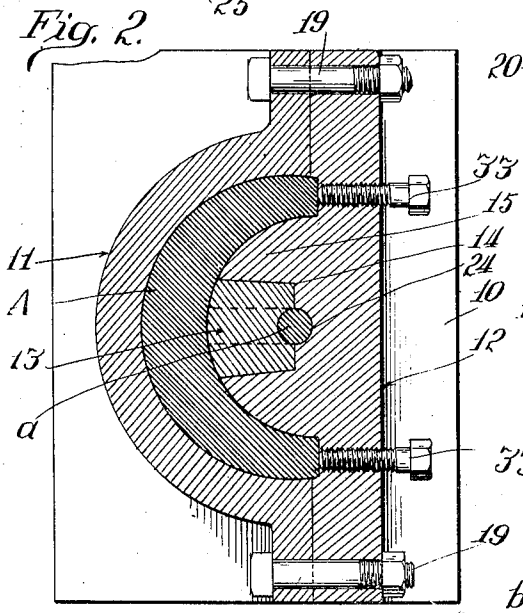


Fig. 7.

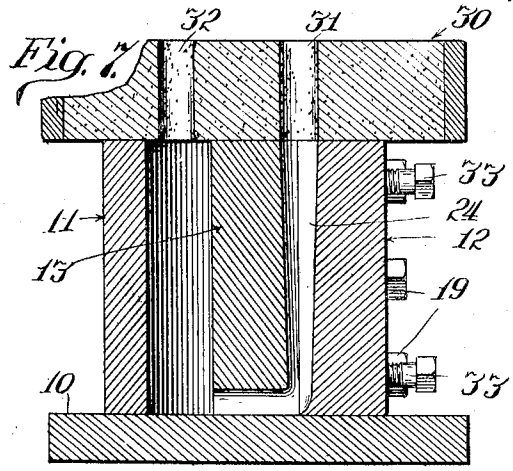


Fig. 3.

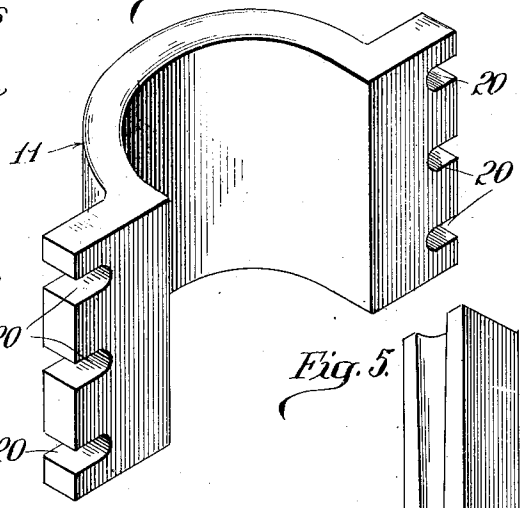


Fig. 5.

Fig. 4.

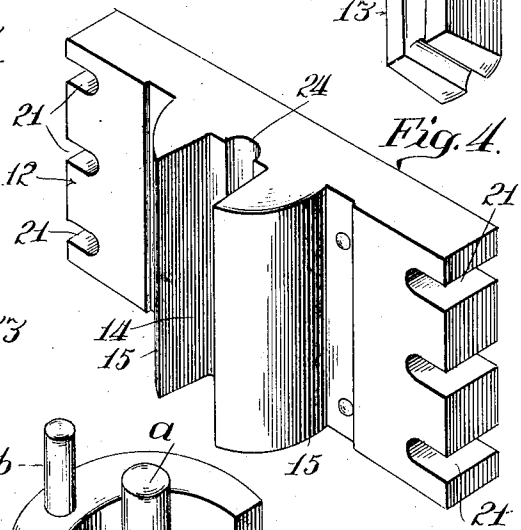
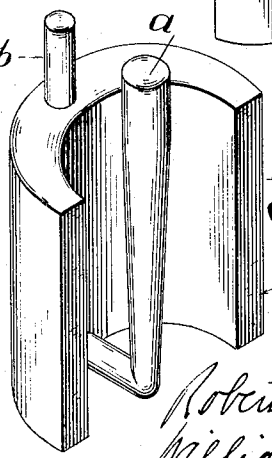


Fig. 6.



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UNITED STATES PATENT OFFICE.

ROBERT JAY SHOEMAKER AND WILLIAM H. CROFT, OF CHICAGO, ILLINOIS.

ART OF CASTING METALS.

Application filed April 6, 1925. Serial No. 21,095.

To all whom it may concern:

Be it known that we, ROBERT J. SHOEMAKER and WILLIAM H. CROFT, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Art of Casting Metals, of which the following is a specification.

Our invention relates to the art of casting metals and more especially the art of casting metals such as alloys or mixtures of copper and lead or copper, lead and tin, in the manufacture, for example, of bearings, bushings or the like.

If alloys or mixtures of metals of this type are cast in sand the slow cooling is likely to result in segregation of the constituent metals and also contamination of the casting with particles of the molding sand. This latter is objectionable because of the abrasive character of the sand. Hence it has been proposed to use metal molds. If such molds, however, are gated in the usual manner the molten metal on striking the bottom of the mold is likely to develop gases which give the casting an undesirable porous character. One of the objects of our invention is to obviate this objection by improved gating arrangements. Another object is to provide for escape of developed gases by an improved form of cope. A further object is to so construct the mold that the casting may be readily removed therefrom.

The invention has in view, specifically, the casting of approximately semi-cylindrical bearings for locomotive drivers, and a specific object is to provide a novel form of mold for this purpose.

In the drawing:

Fig. 1 is a vertical sectional view of a mold embodying one form of the invention shown with the casting therein.

Fig. 2 is a cross sectional view of the same on a larger scale.

Fig. 3 is a view in perspective of what will be termed, somewhat arbitrarily, the front mold section.

Fig. 4 is a similar view of the back mold section.

Fig. 5 is a similar view of a wedge mold section forming part of but removable from the back section.

Fig. 6 is a similar view of the casting before removal of the sprue; and

Fig. 7 is a view similar to Fig. 1 of a modified form of mold.

Referring first to Figs. 1 to 6 inclusive, 10 designates a base plate, 11 the front mold section, 12 the back section, 13 a wedge section adapted to fit into a wedge-shaped channel 14 in a substantially semi-cylindrical portion 15 of the back section, and 16 a cope having a pouring opening 17 and an opening 18 for escaping gases above the mold cavity, which in the drawing is shown as occupied by the casting A. The mold parts above referred to are of cast iron or other suitable metal and the front and back sections are adapted to be connected together by bolts 19 passing through slots 20, 21 of said sections. Cups 22, 23 may be arranged on the cope over the openings 17 and 18 to increase the head of molten metal and allow for shrinkage.

The vertical portion 24 of the ingate of the mold (shown as occupied by sprue *a*) is formed in part in the back section and in part in the wedge 13. The ingate has a relatively long horizontal portion or branch 25 leading from the lower end of the vertical portion 24 into the bottom of the mold cavity. As a result of this the gases freed from the molten metal as it strikes against the bottom of the mold have a chance to escape through the mold cavity and opening 18 before being trapped by the inflow of metal to the mold cavity. The development of gases is greatest when the pouring starts and the mold is cold. In order to prevent freezing of the metal in the opening 18 and to facilitate the escape of gases this opening is lined with suitable material such as molder's sand as indicated at 26 and in such case cup 23 may consist of a metal tube also lined with sand as indicated at 27. Cup 22 may be made of two metal sections having flanges 28 secured together by bolts 29.

In the modification shown in Fig. 7 a sand cope 30 is provided, formed with openings 31 and 32 over the ingate 24 and mold cavity.

To remove the casting from the mold bolts 19 are taken out and the front section taken away from the casting and back section, which may be easily done. Two series

of screws 33, 33 are provided in the back section aligning with the edges of the casting. These screws are now turned down and as a result the casting, and with it the wedge 13, is forced from the back section, the wedge lying between the main body of the casting A and sprue *a*. The wedge can be readily removed, the sprue *a* cut off and also the riser sprue *b* and the casting machined in the usual manner.

Though showing an apparatus designed for a particular type of casting, we wish to be understood as intending to cover the improvements of our invention generically, in the sense of the appended claims. By "wedge" is meant such configuration of the element 13 that it can readily be freed from the correspondingly formed channel in the back section in which it normally lies. By "vertical" as applied to the ingate 24 and by "horizontal" as applied to the connecting passage 25 is meant substantially vertical and horizontal, respectively.

We claim:

1. Metallic mold for casting metals comprising two sections providing between them a mold cavity, one having a wedge shaped channel, and a wedge in said channel.

2. Metallic mold for casting metals comprising two sections providing between them a mold cavity, one having a wedge shaped channel, and a wedge in said channel, said last named section and wedge providing an ingate having a portion extending around the inner end of the wedge.

3. Metallic mold for casting metals comprising two sections providing between them a mold cavity, one section having a wedge shaped channel, a wedge in said channel and pressure exerting means extending through said last named section for forcing the casting and wedge therefrom.

4. Metallic mold for casting metals comprising two sections providing between them a mold cavity, one having a wedge shaped channel, a wedge in said channel, said last named section and wedge providing an ingate having a portion extending around the inner end of the wedge, and pressure exerting means extending through said last named section for forcing the casting and wedge therefrom.

5. In a mold the combination of front and back sections, one having a cavity and the other a projection to extend into said cavity formed with a channel having opposite diverging sides, and a wedge in the channel conformable in its cross section to the cross section of the channel.

6. In a mold the combination of front and back sections, one having a cavity and the other a projection extending into said cavity formed with a channel having opposite diverging sides, a wedge in the channel conformable in its cross section to the cross section of the channel, said mold being formed to provide a vertical ingate between said back section and the rear face of said wedge, and a connecting passage under the lower end of said wedge leading to the mold cavity.

7. In a mold the combination of front and back sections, one having a cavity and the other a projection extending into said cavity formed with a channel having opposite diverging sides, a wedge in the channel conformable in its cross section to the cross section of the channel, and means extending through the back section adapted to exert pressure against the edges of the casting.

8. In a mold, the combination of front and back sections, one having a cavity and the other a projection extending into said cavity formed with a channel having opposite diverging sides, a wedge in the channel conformable in its cross section to the cross section of the channel, and screws extending through the back section adapted to exert pressure against the edges of the casting.

9. In a mold, the combination of front and back sections, one having a cavity and the other a projection extending into said cavity formed with a channel having opposite diverging sides, a wedge in the channel conformable in its cross section to the cross section of the channel, said mold being formed to provide a vertical ingate between said back section and the rear face of said wedge and a connecting passage under the lower end of said wedge leading to the mold cavity, and means extending through the back section adapted to exert pressure against the edges of the casting.

10. In a mold, the combination of front and back sections, one having a cavity and the other a projection extending into said cavity formed with a channel having opposite diverging sides, a wedge in the channel conformable in its cross section to the cross section of the channel, said mold being formed to provide a vertical ingate between said back section and the rear face of said wedge and a connecting passage under the lower end of said wedge leading to the mold cavity, and screws extending through the back section adapted to exert pressure against the edges of the casting.

11. In a mold, the combination of front and back sections, one having a cavity and the other a projection extending into said cavity, and means extending through the back section adapted to exert pressure against the edges of the casting.

12. In a mold, the combination of front and back sections, one having a cavity and the other a projection extending into said cavity, and screws extending through the back section adapted to exert pressure against the edges of the casting.

13. In a mold for casting metals, the combination of a base, front and back sections

all of metal, one having a substantially semi-cylindrical cavity and the other a projection to extend into said cavity formed with a wedge-shaped channel, a metallic wedge in said channel, said back section and rear face of said wedge formed to provide a vertical ingate, and the base and wedge formed to provide a passage leading from the bottom of the ingate to the mold cavity, screws extending through the back section against the edges of the casting, and a metallic cope formed with an opening above the ingate and a sand lined opening above the mold cavity.

14. In a mold for casting metal, the combination of a base, front and back sections all of metal, one having a substantially semi-cylindrical cavity and the other a projection to extend into said cavity formed with a wedge-shaped channel, a metallic wedge in said channel, said back section and rear face of said wedge formed to provide a vertical ingate and the base and wedge formed to provide a passage leading from the bottom of the ingate to the mold cavity, screws extending through the back section against the edges of the casting, and a sand cope formed with an opening above the mold cavity.

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