Jan. 2, 1923. 1,440,923.

A. W. LEMME.

DIE CASTING MOLD.

FILED JULY 2, 1921.

3 SHEETS—SHEET 1.

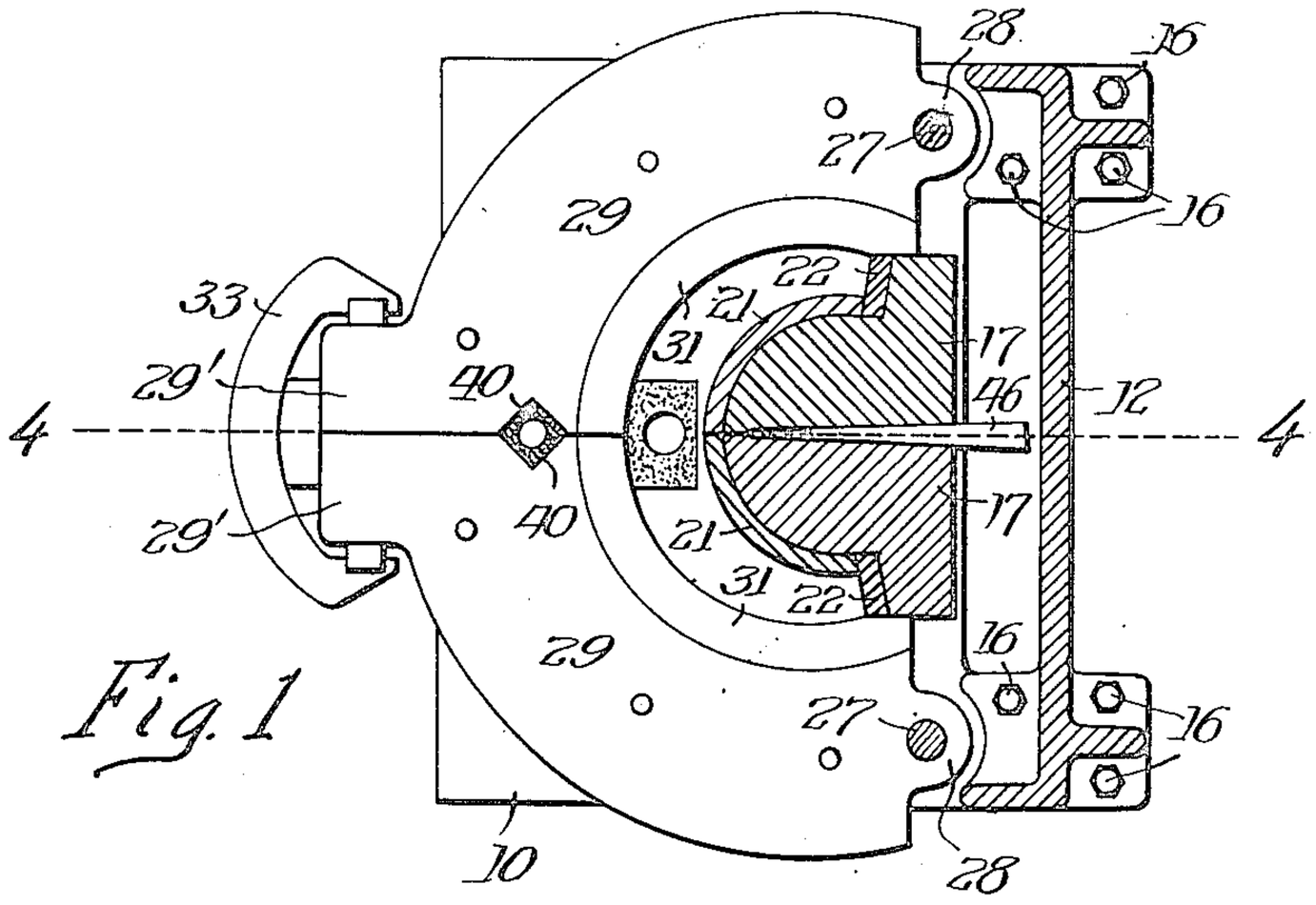

Fig. 1

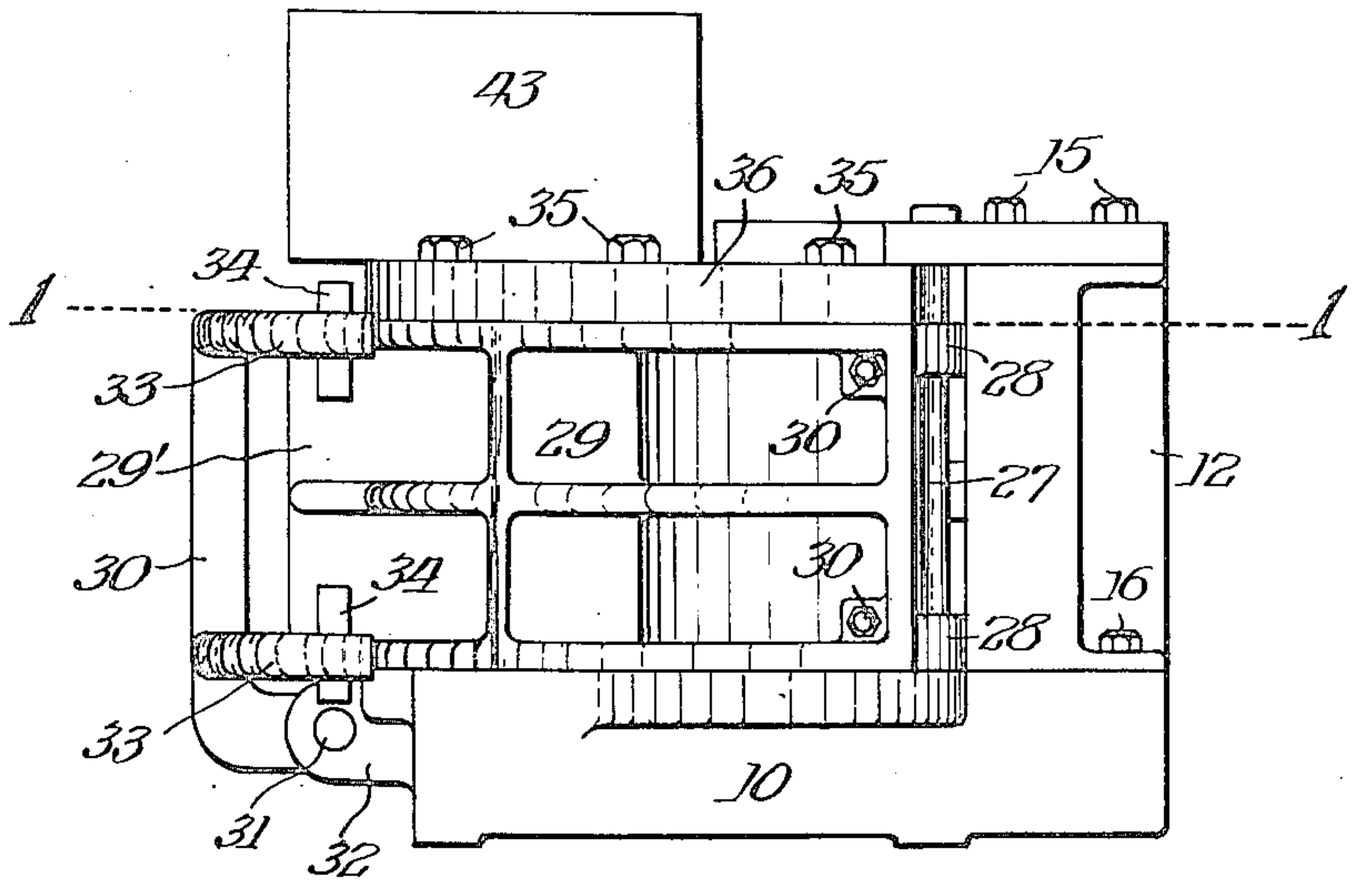

Fig. 2

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3 SHEETS—SHEET 2.

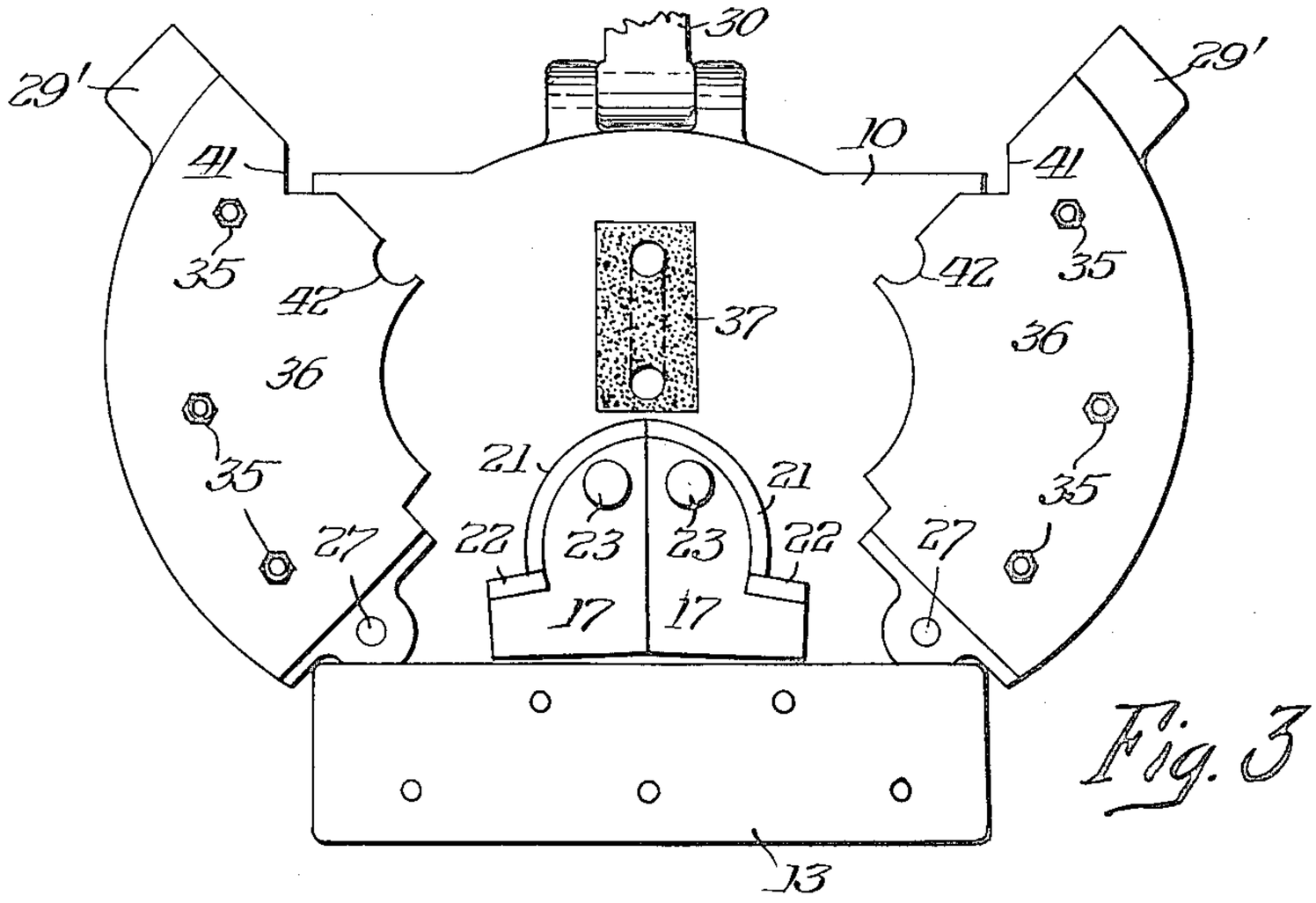

Fig. 3

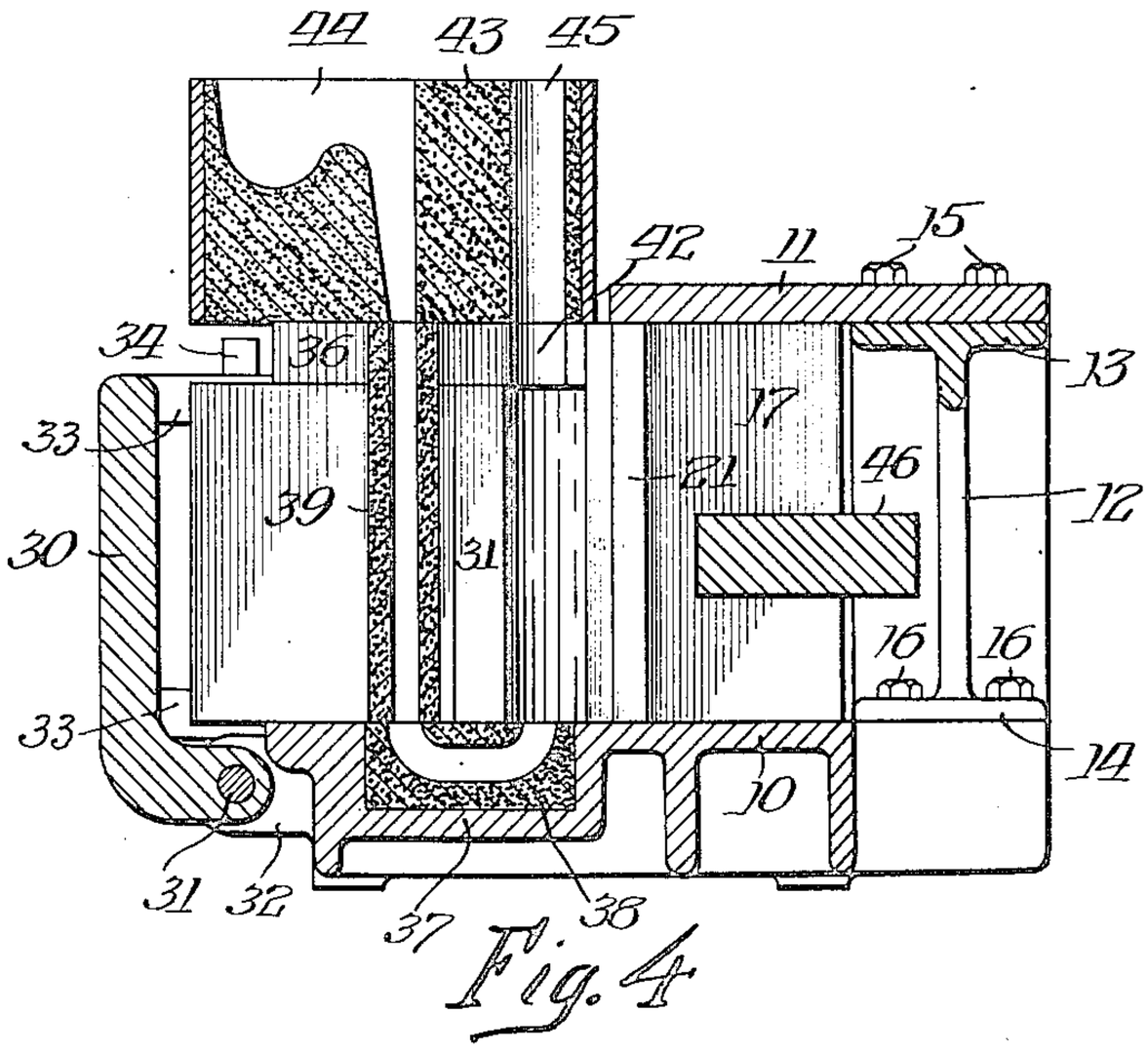

Fig. 4

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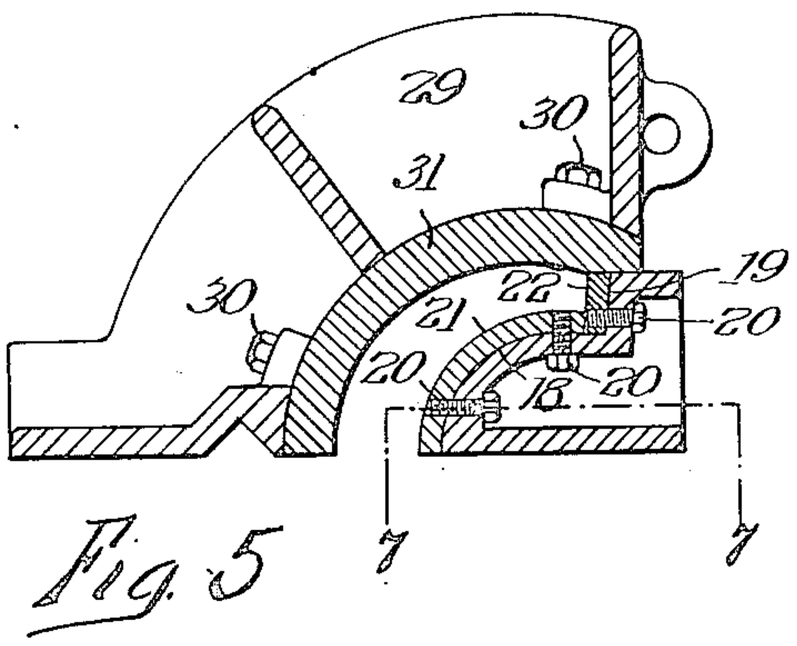

Fig. 5

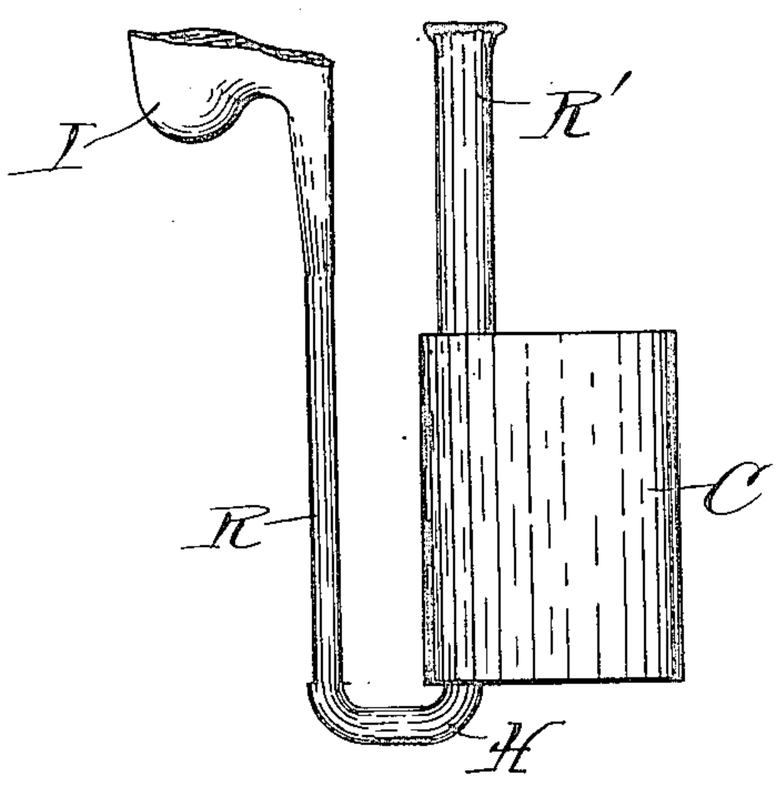

Fig. 6

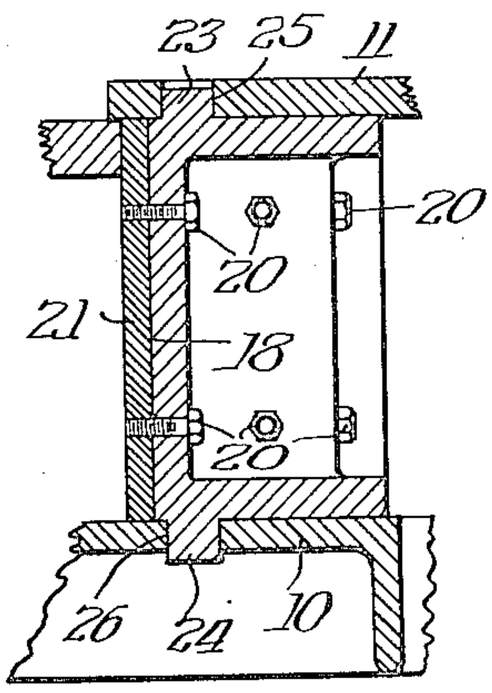

Fig. 7

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Patented Jan. 2, 1923. 1,440,923

UNITED STATES PATENT OFFICE.

ADOLPH W. LEMME, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHICAGO BEARING METAL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DIE-CASTING MOLD.

Application filed July 2, 1921. Serial No. 482,007.

To all whom it may concern:

Be it known that I, ADOLPH W. LEMME, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Die-Casting Molds, of which the following is a specification.

This invention relates to improvements in molds, and has reference more particularly to improvements in that class of machine molds designed to produce articles in the nature of die castings. Where the product of such molds has a circular or partly circular form, it is often removed from the mold or die cavity only with considerable difficulty owing to the fact that in cooling the metal shrinks and contracts on the inner or core member of the die mold and is not easily separated therefrom. One object of the present invention is to produce an improved die casting mold free from the fault above mentioned. Other objects of the invention are, to provide a mold for casting half bearings of journals and like articles which will produce a more densely grained and consequently tougher, stronger and more durable product than can be produced in an ordinary sand mold; to provide a mold adapted, through the use of interchangeable die members, to produce articles of the same general form but varying in size and specific shape; and to provide, in a die casting mold, an improved gate system or arrangement which insures a more perfect and complete filling of the mold cavity.

Other objects and advantages of the invention will be apparent to persons skilled in the art as the same becomes better understood by reference to the following detailed description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a horizontal section of the machine, taken on the line 1—1 of Fig. 2;

Fig. 2 is a side elevation, viewed from the lower side of Fig. 1;

Fig. 3 is a top plan view of the machine in open position, with the stationary top plate removed and showing the location of the horn gate in the bottom of the frame;

Fig. 4 is a central vertical section on the line 4—4 of Fig. 1;

Fig. 5 is a horizontal section through the dies and pivoted die carriers on one side of the machine, taken in a plane below that of Fig. 1, and showing the means for detachably securing the die plates to the hinged carriers;

Fig. 6 shows in side elevation the product as it comes from the mold, including the sprues; and

Fig. 7 is a vertical section, taken on the line 7—7 of Fig. 5.

Referring to the drawings, 10 designates a heavy base plate, 11 a top plate, and 12 a rear skeleton casting formed with top and bottom flanges 13 and 14 attached to the top plate 11 by screws 15 and to the base plate 10 by screws 16. Located side by side inwardly of the rear casting 12 between the top and base plates 11 and 10 are a pair of generally quadrantal hollow mold blocks 17, each formed with a convex face 18 and a narrow substantially radial flat face 19. To these faces are attached, by screws 20 (Figs. 5 and 7) curved and flat mold plates 21 and 22. On the upper and lower ends of each mold block, near its front side, are integral hinge pintles 23 and 24 (Figs. 3 and 7) engaged in holes 25 and 26 in the top and base plates 11 and 10, respectively.

Mounted in and between the top and base plates are vertical hinge pintles 27, on which are mounted, by hinge lugs 28, a pair of generally quadrantal mold frames 29, to the inner concave sides of which are attached, by screws 30, curved mold plates 31; these latter with the mold plates 21 and 22, constituting the side walls of the generally semi-cylindrical cavity, best shown in Fig. 7.

The mold frames 29 are formed at their free ends with radially directed extensions 29′ having flat meeting faces that are locked together by means of a vertical locking bar 30 pivoted at 31 to lugs 32 on the base plate 10 and carrying a pair of horizontal clamp yokes 33 that, when the locking bar 30 is raised straddle the mold frame extensions 29′, as shown in Fig. 1, and wedges 34 driven between the overlapping end of the yokes 33 and the sides of the mold frame extensions 29′. To the tops of the mold frames 29 are attached by screws 35, a pair of flat top plates 36, the inner portions of which, when the mold frames are in closed position, lie against the upper edges of the inner mold plates 21 and 22, and constitute the top wall of the mold cavity.

Describing next the gating system, in the base plate 10 is formed a seat 37 (Fig. 4) in which is fitted a horn gate 38, one end of

the passage of which communicates with the lower end of the mold cavity, while its other end communicates with the passage of a vertical runner gate 39 that is stepped on the horn gate 38 and is disposed in the median transverse plane of the machine. To accommodate the runner gate 39 and hold the same rigidly in position the meeting faces of the frames 29 are notched, as shown at 40 in Fig. 1, and the meeting edges of the top plates 36 are similarly notched as shown at 41 in Fig. 3. The meeting edges of the top plates 36 are also formed with semi-circular notches 42 which together form the lower portion of a riser gate. Removably mounted on the top plates 36 when the latter are in closed position is a block 43 in which is formed an ingate 44 for the pour and a riser gate 45 constituting a continuation of the riser gate 42 and communicating with the upper end of the mold cavity.

The adjacent walls of the inner mold block 17 do not lie in contact when the mold blocks are receiving a pour, but are slightly divergent, as clearly shown in Fig. 1, and between them is driven a wedge 46.

The molding apparatus herein shown and described has been designed more especially for the die casting of phosphor-bronze half-bearings for the journals of locomotive drivers, and similar bearings; and briefly describing the mode of operation, with the hinged mold members closed and locked as shown in Figs. 1 and 2, and the wedge 46 driven between the inner mold blocks 17 to expand the same, and with the several gates positioned as shown in Fig. 4, the metal is poured into the ingate 44 flowing directly through the runner gate 39 and the horn gate 37 into the bottom of the mold cavity. As the metal enters the latter, the cavity is freely vented through the riser gate 45, and the pour is continued until the metal rising in the latter shows that the mold cavity is completely filled. As the metal cools and hardens, the semi-cylindrical casting shrinks transversely and grips the inner molds or core members 17 under considerable pressure. By knocking out the wedge 46, however, the inner molds 17 are freed from the casting, and, of course, the outer molds 29 are readily freed by unlocking them and swinging them apart, whereupon the casting with the gates and sprues can be readily lifted out of the machine.

Fig. 6 shows the complete casting as it comes from the machine, C designating the casting proper formed in the mold cavity, I the ingate sprue, R the runner sprue, H the horn sprue, and R′ the riser sprue.

The notable advantages of the described molding apparatus are, briefly stated, as follows: In the first place, it greatly accelerates the operation of making castings of this character by making it possible to instantly free the casting without any difficulty on account of the latter sticking in the mold. In the second place, as compared with ordinary sand molds, it has practically no yield, and produces a very dense and close grained casting having much greater toughness, durability and longevity than the ordinary sand casting; and in the third place, it permits considerable variation in the sizes and specific shapes of the half bearings to be effected by merely interchanging the mold plates 21, 22 and 31, substituting thicker or thinner plates, or plates having different degrees of curvature.

Manifestly, the apparatus as shown and described may be considerably modified and varied in respect of details without altering its substantial character or sacrificing any of the merits and advantages inherent therein. Hence I reserve all such variations and modifications as fall within the spirit and purview of the appended claims.

I claim:

1. In a molding machine of the character described, the combination of a stationary frame structure, a pair of inner mold elements vertically hinged in said frame structure, a pair of outer mold elements also vertically hinged in said frame structure to swing toward and from said inner mold elements, means for clamping said outer mold elements in closed position, and wedge means for spreading apart said inner mold elements prior to pouring the metal.

2. In a molding machine of the character described, the combination of a stationary frame structure, a pair of generally quadrantal inner mold elements vertically hinged adjacent to their front ends in said frame structure, a pair of generally quadrantal outer mold elements also vertically hinged in said frame structure at their rear ends to swing toward and from said inner mold elements, means for clamping said outer mold elements in closed position, and wedge means for laterally expanding said inner mold elements prior to pouring the metal.

3. In a molding machine of the character described, the combination of a stationary frame structure, a pair of vertically hinged mold blocks mounted in said frame structure, a pair of vertically hinged mold frames mounted in said frame structure to swing toward and from said mold blocks, mold plates on the adjacent faces of said mold blocks and mold frames, means for clamping said mold frames in closed position, and a removable wedge insertible between said mold blocks.

4. In a molding machine of the character described, the combination of a stationary frame structure, a pair of generally quadrantal mold blocks vertically hinged adja-

cent to their front ends in said frame structure, a pair of generally quadrantal mold frames vertically hinged at their rear ends in said frame structure to swing toward and from said mold blocks, mold plates attached to the adjacent faces of said mold blocks and mold frames, means for clamping said mold frames in closed position, and a removable wedge insertible between the adjacent sides of said mold blocks.

5. In a molding machine of the character described, the combination of a stationary frame structure including horizontal top and base plates, a pair of generally quadrantal mold blocks disposed side by side and each having near its front ends upper and lower pintles by which it is pivoted in and between the top and base plates of said frame structure, a pair of generally quadrantal mold frames pivoted at their rear ends between the top and base plates of said frame structure opposite to said mold blocks and adapted to swing toward and from the latter, mold plates removably attached to the adjacent faces of said mold blocks and mold frames, means for clamping said mold frames in closed position, and means for laterally expanding said mold blocks prior to pouring the metal.

6. In a molding machine of the character described, the combination with a frame structure, and inner and outer substantially semi-circular complementary mold elements mounted therein and forming the side walls of a vertical mold cavity, of an ingate mounted on said frame, a runner gate in said frame behind said outer mold element and beneath and communicating with said ingate, and a horn gate in the bottom of said frame structure communicating with said runner gate and the bottom of said mold cavity.

7. In a molding machine of the character described, the combination with a frame structure, and inner and outer substantially semi-circular complementary mold elements mounted therein and forming the side walls of a vertical mold cavity, of an ingate mounted on said frame, a runner gate in said frame behind said outer mold element and beneath and communicating with said ingate, a horn gate in the bottom of said frame structure communicating at one end with said runner gate and at its other end with the bottom of said mold cavity, and a riser gate on said frame structure communicating with the top of said mold cavity.

ADOLPH W. LEMME.