E. C. WASHBURN.

RISER LINING FOR MOLDING DEVICES.

APPLICATION FILED DEC. 13, 1909.

969,015. Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

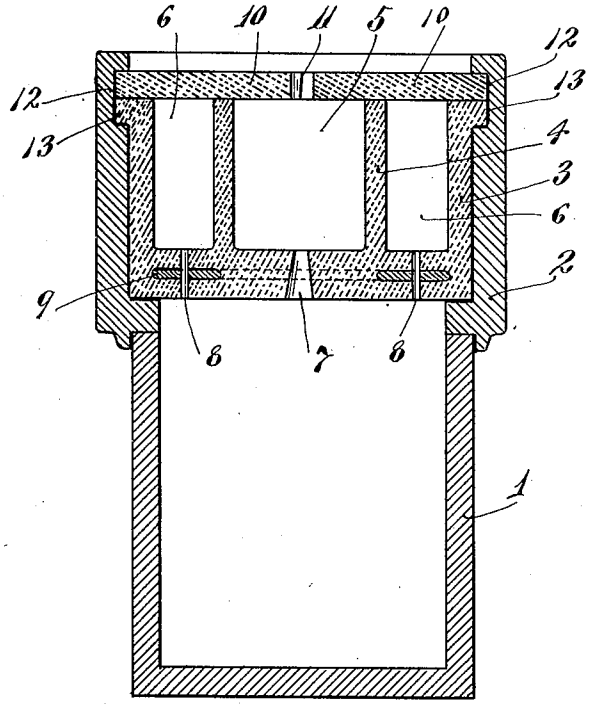
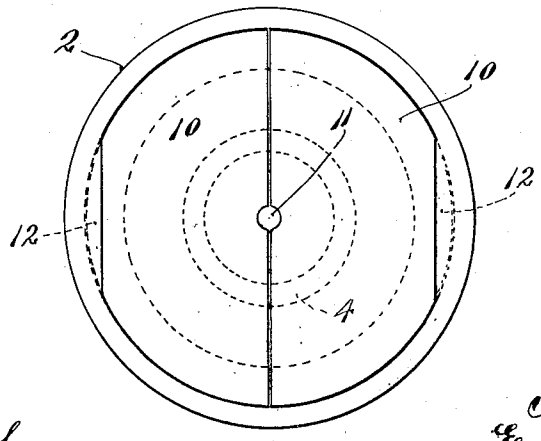


Fig. 2.



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 3

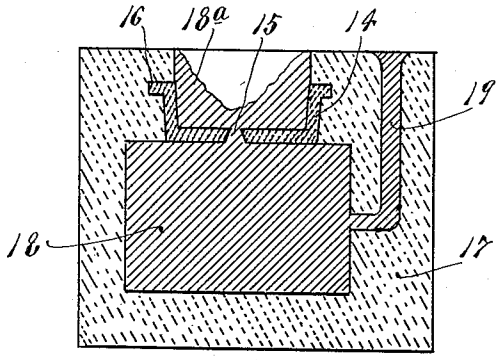


Fig. 8

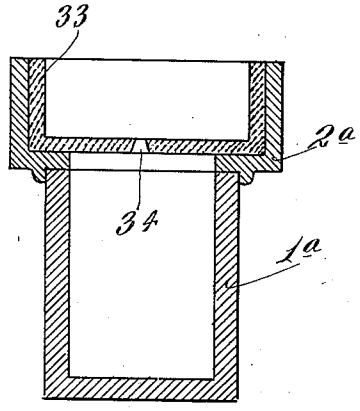


Fig. 9.

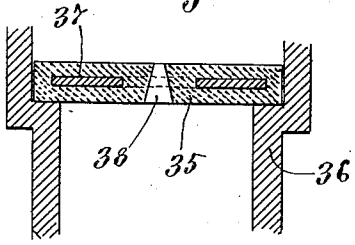


Fig. 6

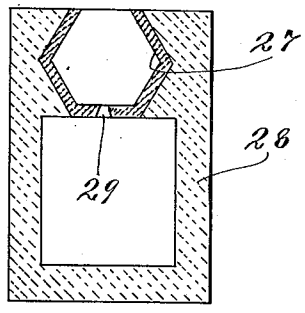


Fig. 4

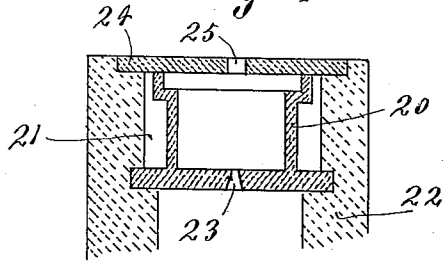


Fig. 7

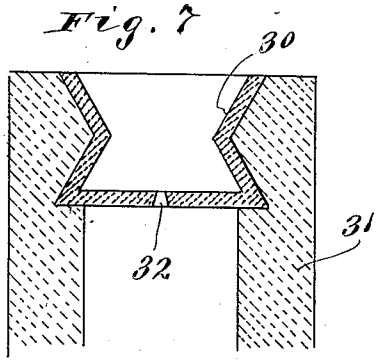
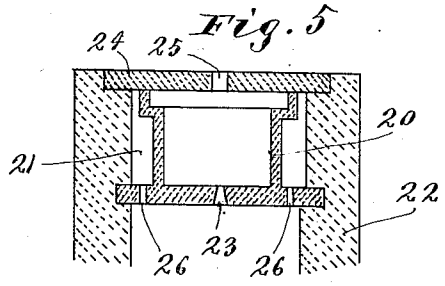


Fig. 5



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By his Attorneys
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UNITED STATES PATENT OFFICE.

EDWIN C. WASHBURN, OF MINNEAPOLIS, MINNESOTA.

RISER-LINING FOR MOLDING DEVICES.

969,015. Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed December 13, 1909. Serial No. 532,755.

To all whom it may concern:

Be it known that I, EDWIN C. WASHBURN, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Riser-Linings for Molding Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates particularly to apparatus for molding large and heavy castings, and is directed to the provision of an improved "riser", whereby certain improved results are obtained, and especially this invention is designed as an improvement on the riser-lining disclosed and claimed in my prior Patent, No. 900,970, of date October 13th, 1908.

The purpose of the riser-lining of the general character herein disclosed is fully set forth in the said prior patent, and may, therefore, be here briefly stated as follows: The so-called riser-lining of baked clay or other material, which will not be fused to any considerable extent by molten steel or other metal and which, furthermore, is a poor conductor of heat and, hence, will not cause chilling or rapid cooling of the metal in contact therewith, is placed in the riser chamber and is provided with a small passage through which the metal may flow from the main cavity of the mold into the cavity of the riser and vice versa, thereby leaving a very small neck, which may be easily broken, as a connection between the main body of the casting and the body of metal, which is permitted to harden in the riser chamber.

Several forms of the improved riser-lining are illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a vertical section taken through a metallic mold and showing my improved riser applied thereto; Fig. 2 is a plan view of the parts shown in Fig. 1; and Figs. 3 to 9 inclusive are sectional views, showing modified constructions and arrangements of the riser-lining and its association with molds of different forms.

The mold may, of course, be of any suitable form and may be of sand, or it may be a metal mold, such as used in casting ingots.

Referring first to the construction shown in Figs. 1 and 2, the numeral 1 indicates a metallic mold provided with a supplemental detachable rim section 2. The riser-lining 3, shown in said views (Figs. 1 and 2), is cup-shaped, rests in a suitable seat formed in the mold section 2 and is, as shown, provided with an inner cylindrical web or partition 4 that divides the cavity of the riser-lining into a central chamber 5 and a surrounding outer chamber 6. A downwardly flaring metal passage 7 opens through the bottom of the riser-lining 3 from the central chamber 5. The purpose of this downward flare or upward taper of the metal passage 7 will be hereinafter noted. Relatively small metal passages 8 open through the bottom of the riser-lining 3 from the outer chamber 6 and, as shown, these passages 8 lead also through a metallic reinforcing ring 9, which is embedded in the bottom of the said riser-lining. In this arrangement of the riser-lining, the central chamber 5 and the passage 7 are adapted to serve as a gate through which metal may be poured into the mold 1 as well as a riser permitting the metal to flow backward from the mold into the said chamber 5, and the outer chamber 6 serves as an auxiliary riser. Both chambers of the riser-lining are adapted to be closed by a two-part disk-like cover 10, having a hole 11 that opens from the central chamber 5. At diametrically opposite points, the edges of the cover 10 are adapted to be inserted into segmental notches 12 formed in the upper side portions of the supplemental mold section 2, and the riser-lining 3 itself is provided with diametrically opposite outturned flanges 13, that are also normally seated in the notches 12 so that the riser-lining is interlocked to said mold section 2 and, hence, held against accidental uplifting.

The molten metal, from which the casting is to be formed, is poured into the mold through the cover hole 11, central chamber 5 and passage 7, and sufficient metal is poured to completely fill the mold and to partly fill the chambers 5 and 6. When the metal cools and contracts, a supply of the molten metal may flow back from the chambers 5 and 6 and compensate for shrinkage and thus prevent flaws in the casting. The cover 10, which is also preferably of baked

clay or similar non-fusible heat-insulating material, prevents rapid radiation and cooling of the metal in the chambers 5 and 6.

After the casting is cooled, the riser-lining may be broken and then the metallic neck portions, cast in the passages 7 and 8 and which connect the main body of the casting with the residue left in the chambers 5 and 6, may be easily broken off. The relatively small neck portions, formed in the passages 8, will be very easily broken and there will be little or no liability of making depressions in the main body of the casting by the breaking thereof from the casting. The relatively large neck portions 7, however, if broken directly from the main body of the casting, would be very likely to make a depression or imperfection in the surface thereof and, for this reason, it is made smaller at its upper end so that it will break primarily from the cast residue in the central chamber 5 and may thereafter be readily ground down to the surface of the body of the casting.

In the construction illustrated in Fig. 3, the riser-lining 14 is cup or pot shaped, has a downwardly flaring central metallic passage 15 and an out projecting anchoring flange 16 at its upper edge, which latter is embedded in the sand of a mold 17, so that the riser-lining will be anchored in the sand. In this view, the numeral 18 indicates the body of the casting and 18^a the metal which is hardened in the riser. The numeral 19 indicates the metal which is hardened in the gate of the mold, the riser proper in the illustrated arrangement being distinct features.

In the construction illustrated in Fig. 4, the riser-lining 20 is an upwardly extended cylindrical flange that is spaced apart from the wall of the riser, so as to form an air chamber 21 in the said riser surrounding the lining. The disk-like bottom of the riser is extended and anchored in the sand 22 of the mold and, at its central portion, is provided with a downwardly flaring metal passage 23. A disk-like cover 24, having a central metal passage 25, is placed on top of the cylindrical flange of the riser 20 and is seated in the sand 22.

The construction illustrated in Fig. 5 is identical with that shown in Fig. 4, except that the projecting portion of the bottom of the riser-lining 20 is provided with a multiplicity of small metal passages 26, that lead downward from the air chamber 21 so that the molten metal may rise from the mold into the said chamber 21.

In Fig. 6, the riser-lining 27 is formed with outwardly bulging walls that anchor the same in the sand 28 of the mold, and, at its bottom, the said lining is provided with a downwardly flaring metal passage 29.

In the construction illustrated in Fig. 7, the riser-lining 30 is formed with inwardly bulging walls that anchor the same in the sand 31 of the mold, and, at its bottom, the said lining is provided with a downwardly flaring metal passage 32.

In the construction illustrated in Fig. 8, a metal mold 1^a is provided with a detachable upper end section 2^a (which parts 1^a and 2^a correspond to the parts 1 and 2 of the construction shown in Figs. 1 and 2), and the cup or pot shaped riser-lining 33 is fitted in said section 2^a and, at its bottom, is provided with a downwardly flaring metal passage 34.

In the construction illustrated in Fig. 9, the riser-lining is in the form of a simple or plain disk 35, which fits in a shouldered upper portion or riser section of a mold 36. This disk-like body 35 is provided with a reinforcing metal ring 37 embedded therein and, at its central portion, it is formed with a downwardly flaring metal passage 38.

By reference to Fig. 1 it will be noted that when metal is poured into the metal receiving chamber 5 and flows into the mold through the flow-hole 7 the air will find an independent escape through the vent hole 8 and outer chamber 6. In practice, this important discovery has been made, to wit, that the metal in cooling will pull apart or sever the small neck which is cast within the flow-hole 7 thus leaving the large slug which is cast within the chamber 5 completely disconnected from the ingot or main casting within the mold. This seems to be due to the fact, first, that the metal in the mold and within the metal receiving or overflow chamber 5 will become quite hard at a time when the metal in the neck 7 has not solidified so as to have much of any strength, and, second, it is due to the fact that the riser lining or bottom is so anchored or fixed in respect to the mold that it cannot move toward the mold to compensate for the shrinkage of the metal.

The term "riser" is herein used for the sake of convenience, but, of course, it will be understood that the mold device may be applied at any and all places where molten metal is to be run into a mold, and the illustrations above given make it clear that the so-called riser may, in some instances, be used as a gate through which metal is to be poured into the mold. The so-called riser might be made from asbestos or other suitable material.

What I claim is:

1. The combination with a molding apparatus having a riser or gate opening into the mold, of a riser-lining constructed with a multiplicity of chambers, at least one of them having a metal passage opening into the mold.

2. The combination with a molding apparatus having a riser or gate opening into

the mold, of a riser-lining having a multiplicity of chambers and said chambers having metal passages opening into the mold.

3. The combination with a molding apparatus having a riser or gate opening into the mold, of a riser-lining having a multiplicity of chambers and passages opening into the mold, and a cover for said riser arranged to close the said chambers.

4. The combination with a molding apparatus having a riser or gate opening into the mold, of a riser-lining constructed of brittle non-fusible material and having embedded therein metallic reinforcement.

5. The combination with a molding apparatus having a riser or gate opening into the mold of a riser lining or bottom having a reinforcing rib around the opening from the riser into the mold.

6. The combination with a molding apparatus having a riser or gate opening into the mold of a riser lining or bottom of non-fusible material having an upwardly tapered flow hole and a reinforcing rib around said flow hole.

7. The combination with a mold apparatus having a riser or gate opening into the mold, of a riser lining or bottom having an anchoring flange and thin plate like bottom with a reinforcement around an upwardly tapered flow hole through its bottom.

8. A device for casting ingots having a mold cavity and a metal feeding reservoir formed with a seat resting upon and fitting over the upper portion of the said mold device and provided with a non-fusible bottom having a flow passage opening into the mold cavity.

9. The combination with a molding apparatus having a riser or gate opening into the mold, of a riser lining constructed of non-fusible material and having a reinforcement of different material embedded therein.

10. The combination with a mold apparatus having a riser or gate opening into the mold, of a riser lining having a metal feeding entrance to the mold, and one or more other chambers having air exhaust vents from the mold.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN C. WASHBURN.

Witnesses:

MARIE E. LA PALME,

HARRY D. KILGORE.