July 7, 1942. S. L. CONNER ET AL 2,288,608

SEAL FOR CENTRIFUGAL MOLDS

Filed July 19, 1941

Fig-1-

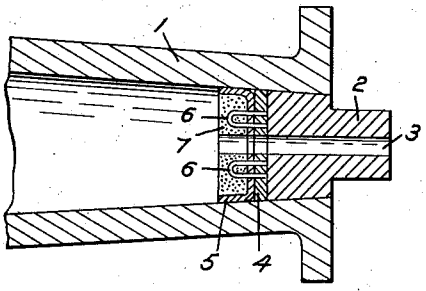


Fig-4-

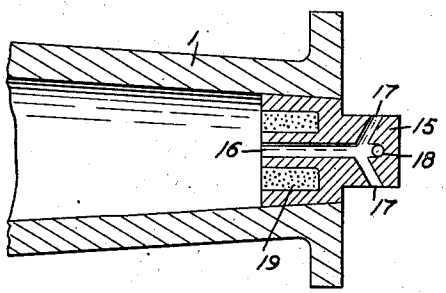


Fig-2-

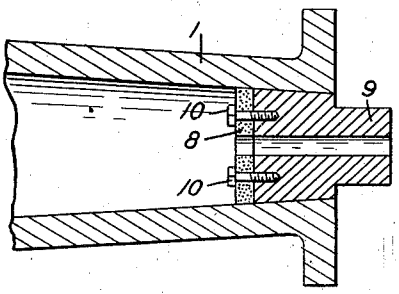


Fig-5-

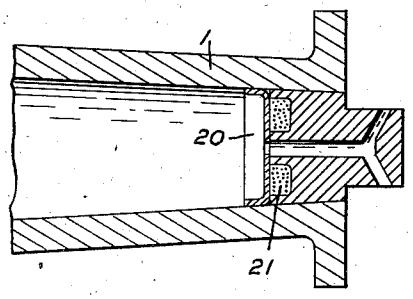


Fig-3-

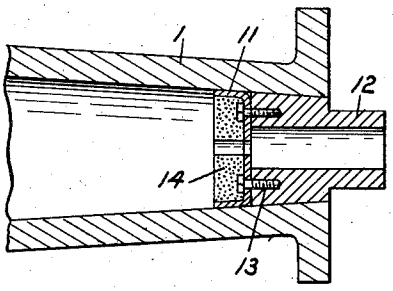
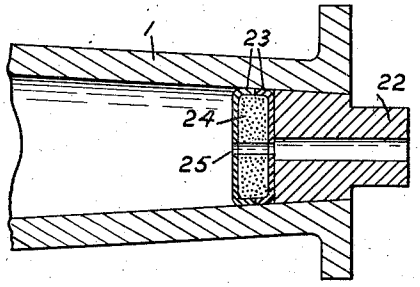


Fig-6-



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SEAL FOR CENTRIFUGAL MOLDS

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7 Claims. (Cl. 22—65)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to chill molds for centrifugal casting, and in particular to sealing units therefor.

It is customary to provide in tubular chill molds, tapered or otherwise, end plugs to limit longitudinal flow of the metal, one plug forming a vent for the gases and the other an adapter to receive the pouring spout. It is an object of this invention to provide units forming a protection for these plugs against the molten metal.

To these and other ends, the invention consists in the construction, arrangement and combination of elements described hereinafter and pointed out in the claims forming a part of this specification.

A practical embodiment of the invention is illustrated in the accompanying drawing wherein:

Figure 1 is an elevational view, in section, of the venting end of a centrifugal chill mold with plug and seal.

Figures 2 to 6 are similar views showing modifications of the plug and seal.

Referring to the drawing by characters of reference there is shown in Figure 1 a tapered chill mold 1 and nested stopper 2 having an axial bore 3. The seal and protector unit is composed of a plate 4, cup 5, gagger irons 6 and refractory filling 7. The bore 3 of the stopper 2 is continued through the seal unit, including the refractory. The cup 5 has a slight clearance from the walls of the mold 1 and on heating will expand into sealing engagement therewith. The use of refractory material tends to preserve the entire stopper assembly and maintain a constant size vent hole. Likewise, the use of materials of low thermal conductivity produces a beneficial effect on the resulting structure of the solidified casting.

While the drawing shows a seal unit at the vent end of a mold, it will be understood that similar units may be employed at the pouring end for similar purposes.

In Figure 2 is shown a simple but highly successful type of seal wherein a disk of preformed refractory 8 is fixed to a stopper 9 by means of bolts 10.

In Figure 3 a sealing cup 11, fixed to a stopper 12 by bolts 13 is loaded with refractory 14, a central opening being maintained in the cup and refractory.

In Figure 4 is shown a stopper 15 having an axial bore 16 terminating within the stopper. Oblique branch bores 17 and a transverse bore 18 help to carry off the gases by centrifugal action. In addition the transverse bore 18 may be utilized to receive a pin or other device for handling. An annular channel 19 in the inner face of the stopper is filled with refractory which serves to hinder chilling of the molten metal which might otherwise foul the bore 16.

In the stopper of Figure 5 a sealing cup 20 is provided to cover an annular refractory insert 21.

In Figure 6 is shown a stopper 22 of conventional design with a sealing member composed of two sealing cups 23 welded together and holding between them a body of refractory material 24. The latter inhibits chilling of splashed metal, and the small passage 25 in the sealing unit limits the amount of errant metal gaining the vent passage in the stopper.

We claim:

1. A self-sealing stopper for the open end of the bore of a centrifugal chill mold comprising a main body portion having an axial vent passage, and an axially perforated mold-sealing portion fixed to a face of the body portion for resisting the longitudinal thrust of the molten metal thereagainst, said sealing portion comprising a heat expanding metallic cup member conforming to the wall of the mold and lined with a refractory, and anchor means in the cup portion for holding the refractory in place.

2. A self-clamping stopper for the open end of the tapered bore of a centrifugal chill mold comprising a frusto-conical main body portion adapted to be seated in the small end of the bore and having an axial vent passage, a facing of refractory on one end of said stopper and sized to span the mold, and means holding said facing to said stopper.

3. A self-sealing stopper for the open end of the bore of a centrifugal chill mold comprising a main body portion having an axial vent passage, a mold sealing heat expanding metallic cup disposed with its base on a face of said stopper for resisting the longitudinal thrust of the molten metal, removable means holding said cup to said stopper, refractory material in said cup, and through openings in said cup and said refractory aligned with the vent passage in the stopper.

4. In a self-sealing stopper for a centrifugal chill mold having an axial bore open at one end, a faced portion on said stopper, an annular channel in said faced portion concentric with said

bore, said channel adapted to promote circumferential expansion of the stopper from the thermal influence of the molten metal on the stopper whereby radial pressure is exerted on the mold, and refractory material in said channel.

5. A stopper as in claim 4 in combination with a centrally perforated cup-shaped member seated on said faced portion and of a size to seal the chill mold when heated.

6. A self-sealing stopper for the open end of the bore of a centrifugal chill mold comprising a main body portion having an axial bore for venting and a faced portion normal to the bore, a heat-expanding mold sealing member on said faced portion conforming to the wall of the mold comprising cup-shaped metallic elements joined at their rim portions, refractory material in the space confined by said elements and a through opening in said sealing member coaxial with said bore.

7. A self-sealing stopper for the pouring end of the bore of a centrifugal chill mold comprising, a main body portion having an axial vent passage, a mold sealing heat expanding metallic cup disposed with its base on a face of the stopper for resisting the longitudinal thrust of the molten metal, refractory material in the cup, and through orifices of reduced diameter in the cup and refractory aligned with the vent passage for shaping the fluid stream being poured therethrough.

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