

[54] **AIR BREATHING FLASK FOR FOUNDRY MOLD**

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[73] Assignee: Full Mold Process, Inc., Lathrup
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[22] Filed: Aug. 10, 1970

[21] Appl. No.: 62,730

Related U.S. Application Data

[62] Division of Ser. No. 689,363, Dec. 11, 1967, Pat. No. 3,572,421.

[52] U.S. Cl. 164/383, 164/237, 164/379,
164/34, 164/246

[51] Int. Cl. B22c 21/14

[58] Field of Search 164/235, 237, 34,
164/16, 410, 376, 383, 379-382; 249/141

References Cited

UNITED STATES PATENTS

644,425 2/1900 Harrison 164/410

1,369,182	2/1921	Moore	164/376
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3,098,268	7/1963	Zifferer	164/16 X
3,157,924	11/1964	Smith	164/34
3,189,958	6/1965	Newbold	164/410 X
3,259,677	7/1966	Zwick	249/141 X
2,830,343	4/1958	Shroyer	164/34

FOREIGN PATENTS OR APPLICATIONS

789,769 1/1958 Great Britain 164/34

Primary Examiner—J. Spencer Overholser

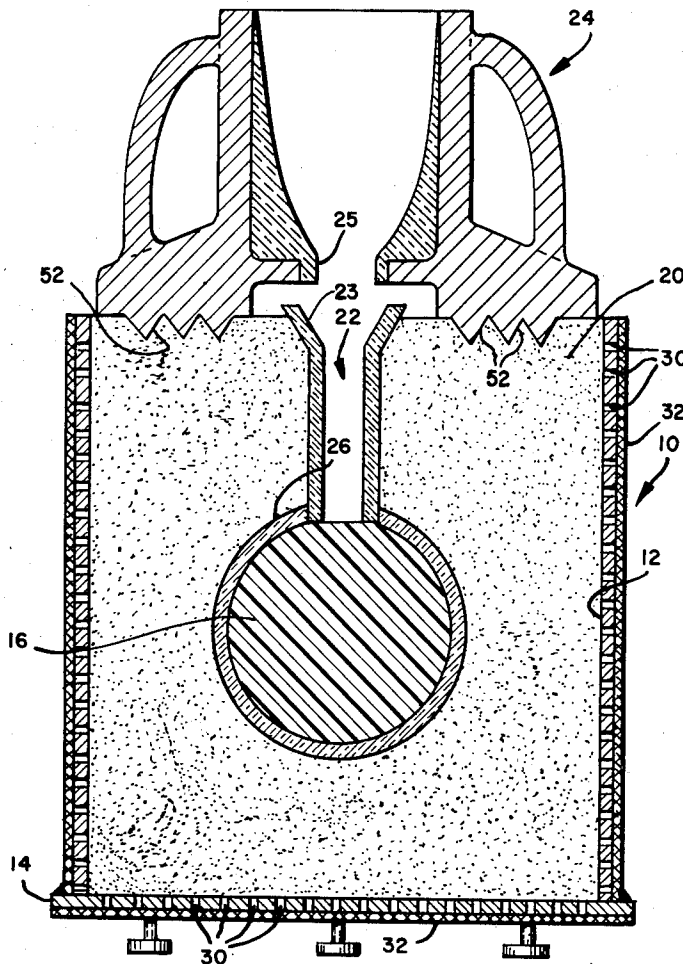
Assistant Examiner—V. K. Rising

Attorney—Dale R. Small

[57] ABSTRACT

Disclosed herein is a flask and pouring apparatus for casting molten metals using vaporizable patterns wherein the flask has air breathing walls that are provided with a permeable layer, slotted vents, or screen vents.

3 Claims, 7 Drawing Figures



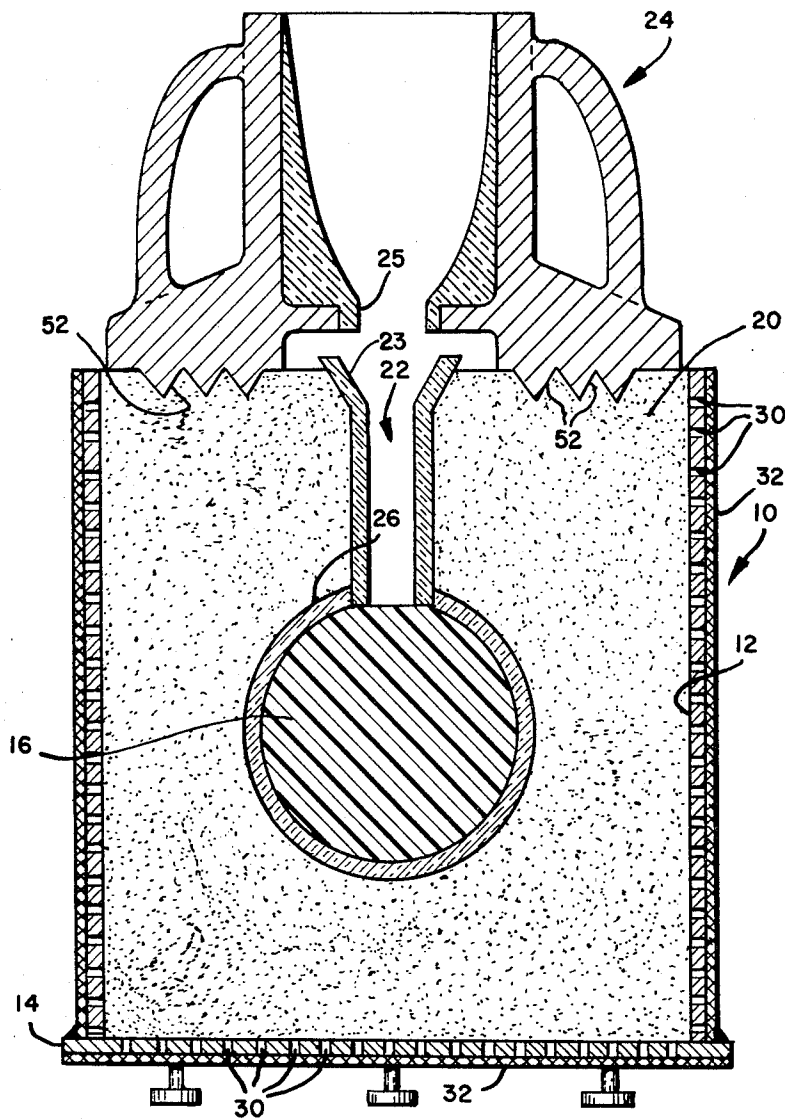


FIG. 1

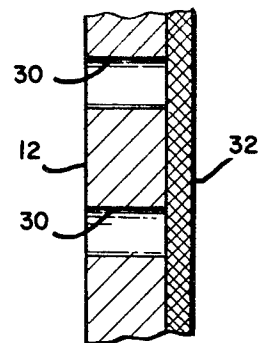


FIG. 2

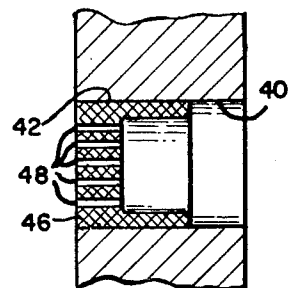


FIG. 4

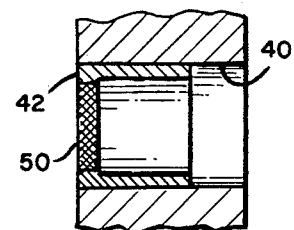


FIG. 4A

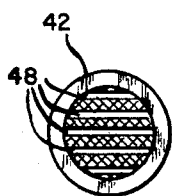


FIG. 5

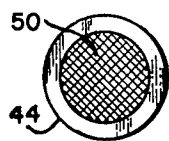


FIG. 6

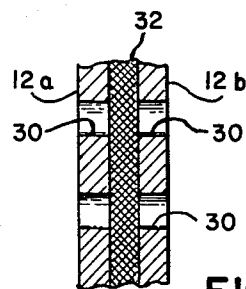


FIG. 3

AIR BREATHING FLASK FOR FOUNDRY MOLD

This application is a division of copending application, Ser. No. 689,363, filed Dec. 11, 1967 now U.S. Pat. No. 3,572,421.

BACKGROUND OF THE INVENTION

When using vaporizable patterns such as disclosed in Shroyer U.S. Pat. No. 2,830,343, a pattern is embedded in a mold forming material and is vaporized by the heat of the molten casting charge as the charge is poured into the mold. The gases created on vaporization of the pattern by the heat of the molten casting charge must be dispersed through the mold forming material in order to clear the cavity left by the vaporization of the pattern. The gases that penetrate the mold forming material are often prevented from escaping to the atmosphere due to the presence of the solid walls of the flask. In any type casting this can become quite serious since a large amount of gases are created on vaporization of the pattern which must be vented to the atmosphere to allow for the rapid and steady flow of molten material into the mold. The gases, if prevented from escaping rapidly to the atmosphere, may retard the flow of molten material into the cavity in the mold as well as adversely effecting the surface finish of the casting.

SUMMARY OF THE INVENTION

The present invention overcomes the above disadvantages by providing a flask for casting molten metals which allows the gases created on vaporization of a cellular plastic pattern to escape rapidly to the atmosphere. The walls of the flask are provided with a number of openings or perforations to vent the gases to the atmosphere. The openings or perforations are covered with a permeable layer or are closed by gas permeable inserts to prevent the mold forming material from flowing out of the flask through the openings. The layer may be made from asbestos or other similar material which is gas permeable. The gas permeable inserts are made with slots or are covered with a permeable screen to obstruct the flow of mold forming material from the mold while allowing the gases in the mold to escape to the atmosphere. In either instance the gases created on vaporization of the pattern will be free to flow through the mold forming material and out through the perforations in the walls of the flask, without disturbing the molding medium.

Other objects and advantages will become apparent from the following detailed description when read in connection with the following drawings in which:

FIG. 1 is a side view in section of a mold showing a vaporizable pattern embedded within the mold forming material.

FIG. 2 is an enlarged view in section of a perforated side wall of the mold of FIG. 1.

FIG. 3 is an enlarged view of a section of a modified type wall for a mold.

FIG. 4 is a view of another modified wall for a mold having inserts in the perforations in the side wall.

FIG. 4a is a view of the wall for a mold having a modified insert positioned in the perforations.

FIG. 5 is a front view of one of the inserts for the wall of FIG. 4.

FIG. 6 is a front view of another insert for the wall of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1 of the drawing, a mold 10 is shown with a flask or container 12. A pattern 16 is embedded within a mold forming material 20 in the flask with a sprue 22 (See FIG. 1) connected to the pattern 16 and extending upward to the open end of the flask. The sprue is lined with a cardboard or paperboard sleeve 23. A polystyrene or ceramic sleeve may also be used with this casting arrangement.

A combination pouring basin and mold weight 24 made from cast iron or steel is placed on the top or open end of the flask with the opening 25 of the basin located above the sprue 22. This is the general arrangement of the mold prior to pouring a molten casting charge into the pouring basin 24. The weight of the pouring basin must be sufficient to hold the mold forming material within the flask during the pouring operation.

The pattern 16 is made of a cellular plastic material, i.e. polystyrene or polyurethane, which has been cut or molded to the shape of the article to be cast. This pattern material is vaporizable substantially without residue upon subjection to the heat of molten casting charge. A coating or refractory material 26 is applied to the outer surface of the pattern and must be gas permeable and must remain solid at the temperature of the molten casting charge to allow the gases created upon vaporization of the pattern to escape into the mold forming material.

The mold forming material 20 includes a conventional molding sand, having a binder, or can be of a loose free-flowing material such as dry, unbonded sand. The pouring basin-mold weight 24 is placed on the top of the mold forming material in the flask with the opening 25 in the mold forming material on the bottom of the basin aligned with the paperboard tube or sleeve 23 in the sprue 22 in the mold forming material. When the molten casting charge is poured into the pouring basin-mold weight, it will flow through the cardboard sleeve 23 and will contact the pattern. The heat of the molten casting charge will vaporize the pattern 16. The gases created on vaporization of the pattern will pass through the coating of refractory material and will be diffused into the mold forming material. These gases must be allowed to escape rapidly to the atmosphere or they will adversely affect the casting formed in the cavity left by the vaporized pattern.

In FIG. 1 the walls 12 and bottom 14 of the container or flask are shown with a number of perforations 30 which are used to vent the gases to the atmosphere. The mold forming material will have a tendency to flow through these perforations 30 unless some gas permeable means is used to prevent the mold forming material from flowing out of the flask. To prevent this a gas permeable layer 32 is used to cover the perforations 30. The layer 32 may be secured to the outside of the flask or mold wall, FIG. 2, or the layer may be placed within the walls 12a and 12b, as seen in FIG. 3. In the embodiment shown in FIG. 3, the layer is built into the wall 12a and 12b in a sandwich arrangement.

The layer may be formed from an asbestos cloth, stainless steel screen or any fine mesh material that is gas permeable and capable of withstanding the temperature of the gases at the walls of the flask. Gases escaping through the mold forming material will flow

through the perforations 30 in the wall of the flask and bottom board out to the atmosphere through the layer. The layer is particularly important if a loose free flowing material such as unbonded sand is used for the mold forming material since this material will have a greater tendency to flow out through the perforations 30.

In FIG. 4 a modified wall arrangement for the flask 12 is shown having perforations 40 which are larger than perforations 30. This type of a wall is used where large castings are being made and large amounts of gases are created on vaporization of the pattern. The perforations 40 are closed by gas permeable means such as the slotted plugs or inserts 42 or the screened plug or inserts 42, FIG. 4a. All of the perforations 40 may be filled with one or the other of the plugs or inserts. In FIG. 5 the front 46 of the slotted inserts 42 is shown with a number of parallel slots 48 that pass through the front of the plug. In FIG. 6 the center of the plug is shown filled with a fine mesh wire screen 50 that will allow gases to flow out of the flask and at the same time prevent any loss of the mold forming material.

When the mold 10 is being prepared for use, an initial amount of mold forming material 20, such as unbonded sand is poured into the flask and the pattern 16, which has a refractory coating 26, is placed in position. More of the mold forming material is poured into the flask to substantially completely cover the pattern and is rammed or vibrated so that the same settles firmly about the pattern. The cardboard or paperboard sleeve 23 for sprue 22 is placed in communication with the pattern in the flask and the flask completely filled with the mold forming material.

The combination pouring basin and mold weight 24 is placed on the top or open end of the flask with the grooves or serrations 52 firmly embedded in the mold

forming material to prevent any movement or shifting of the pouring basin during the casting operation. Opening 25 in the pouring basin should be aligned with the sprue 22, as seen in FIG. 1. When the molten casting charge is poured into the pouring basin, it will flow through the cardboard or paperboard sleeve lining the sprue 22 into contact with the pattern. The heat of the molten charge will vaporize the pattern and the molten charge will fill the space left by the vaporized pattern. The gases created on vaporization will be diffused into the mold forming material and will flow out through perforations 30 and layer 32 to the atmosphere.

Although only a few embodiments of the present invention have been shown and described, it should be apparent that various changes and modifications can be made herein without departing from the scope of the appended claims.

What is claimed is:

1. The combination of a cellular plastic pattern having the shape of an article to be cast embedded in a mold forming material for vaporization by the heat of a molten casting charge, said mold forming material being in a flowable state, a container having an open top, said container having double perforated walls and gas permeable closure means layer disposed between said walls covering said perforations for preventing the flow of mold forming material out through said perforations while allowing for the free flow of gases through said perforations.

2. Structure as set forth in claim 1 wherein the gas permeable closure means is fine wire mesh.

3. Structure as set forth in claim 1 wherein the gas permeable closure means is asbestos cloth.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,766,969 Dated October 23, 1973

Inventor(s) CHARLES C. MEZEY and ANGELO PAOLI

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Under "UNITED STATES PATENT [19]" change "Mezby et al."
to read -- Mezey et al. --

At the line "[75] Inventors: Charles C. Mezby, Lake Orion;
Angelo Paoli, Troy, both of
Mich."

the following change should be made:

-- Charles C. Mezey --

Signed and sealed this 23rd day of April 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents