

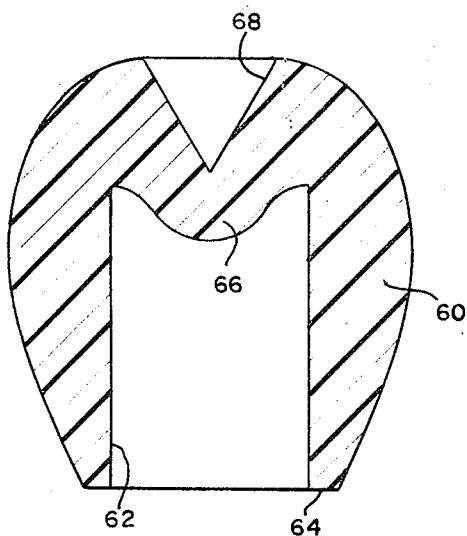
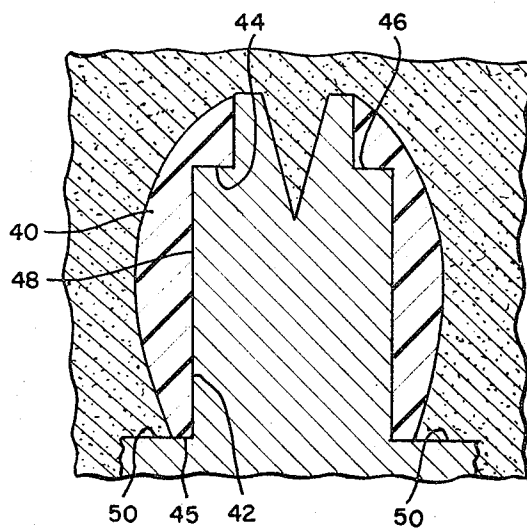
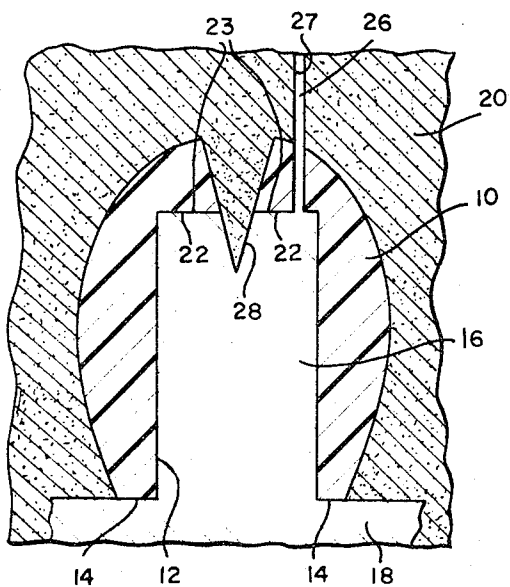
July 1, 1969

A. WITTMOSER

3,452,806

GASIFIABLE FEEDERS WITH CAVITY FILLING MANDRELS

Filed Dec. 19, 1966



INVENTOR
ADALBERT WITTMOSER

By RONALD E. BARRY
Attorney

1

3,452,806

GASIFIABLE FEEDERS WITH CAVITY FILLING MANDRELS

Adalbert Wittmoser, Matthias-Grünwald Strasse 8,
Lampertheim, Hessen, Germany

Filed Dec. 19, 1966, Ser. No. 602,712

Int. Cl. B22c 7/10, 9/10, 23/00

U.S. Cl. 164—246

7 Claims

ABSTRACT OF THE DISCLOSURE

The combination of a riser for a casting pattern and a mandrel located on the pattern at a predetermined area of shrinkage. The riser comprises a cellular plastic material which is gasifiable substantially without residue upon subjection to the heat of a molten casting charge, and has a substantially spherical configuration. A cavity is formed in the riser and extends more than halfway therethrough and has an inner surface configuration substantially identical to the outer configuration of the mandrel. When the riser is disposed on the mandrel, the mandrel substantially fills the cavity with the inner surface being in engagement with the outer surface of the mandrel, whereby mold forming forces will be absorbed by the contact area of the riser with the pattern and the mandrel.

This invention relates to the casting of metals and is particularly concerned with expendable risers that are used with conventional or expandable patterns.

Expendable feederheads or risers of various shapes are being used extensively in the casting of metals to compensate for shrinkage in remote areas of the casting. Their use has been limited principally to castings made in molds that have patterns embedded in the molds which are made of substantially the same material. However, when this type of riser is used in conjunction with hollow type molds using conventional solid type patterns, certain disadvantages are encountered that are not present when using expendable type patterns. High molding pressures are used in forming the molds about the solid pattern causing an elastic deformation of the expendable cellular plastic riser. When the pressure on the mold is released, the compressed cellular plastic riser has a tendency to expand often cracking the mold to such an extent that it is not usable.

Efforts to overcome this problem are exemplified in application Ser. No. 398,472, filed Sept. 14, 1964, now Patent No. 3,295,175, issued Jan. 3, 1967, and assigned to the same assignee, where a cavity is provided in the bottom of the riser. The thickness of the wall in the lower part of the riser is thereby made very small so that the lower part of the riser is permanently deformed in the area of the ring-shaped frontal surface when the molding material is compressed.

It has become apparent, however, that in some cases, plastic deformation of the lower surface of the riser alone cannot completely eliminate the named disadvantage. Because of the relatively small quantity of material at the lower end of the riser, the resilience of the remaining expanded plastic material of the riser, the mass of which is considerably higher, cannot be completely absorbed at the lower surface. The remaining re-expansion force in the riser is still sufficient to cause damage to the mold forming material.

The primary object of the present invention is to overcome the above disadvantage.

Another object of the present invention is to provide an improved spherical type riser.

A still further object is to provide an expendable riser

2

for a hollow mold that can be readily located on the pattern.

The above objects are achieved by providing a cavity in the bottom of a cellular plastic riser which runs from the bottom surface upward at least half way through the riser so that only a part of the riser is exposed to the molding pressure during the mold forming process. The riser is then mounted on a solid mandrel which substantially fills the cavity or recess in the riser. Since the center of the cellular plastic riser is now removed, only the walls will be compressed and the walls will have a minimum of re-expansion force.

Other objects and advantages will become more readily apparent from the following detailed description when read in connection with the accompanying drawing in which:

FIG. 1 is a view in section of a spherical riser shown mounted on a pattern projection and embedded in a mold forming material.

FIG. 2 is a view similar to the view in FIG. 1 with a modified riser mounted on a mandrel for the pattern.

FIG. 3 is a view in section of another modified type riser.

Referring to FIG. 1 of the drawings, the riser 10 consists of a spherical body of expanded plastic. Either polystyrene or polyurethane have been foamed to make the riser. A cavity or recess 12 is made in the bottom 14 of the riser with the cavity extending upward at least half way from the bottom to the top of the riser. The riser is placed on a mandrel 16 that projects upward from pattern 18 with the mandrel substantially filling the cavity or recess in the bottom of the riser. The bottom surface 14 of the riser will take the form of a thin ring which rests on the top of the pattern. The pattern and riser are embedded in a mold forming material 20 such as sand and a binder with the riser located at the top of the pattern. The upper surface 22 of the cavity will overlie or rest on the top surface 23 of the mandrel.

When pressure is applied to the molding material, the forces usually are vertical or from above the riser pushing it down toward the pattern. The upper surface 22 located on the inside of the recess in the riser will be forced downward against the top of the mandrel and the bottom surface 14 will be forced against the top of the pattern. Any deformation of the riser will occur at either of these two surfaces. Any side forces against the riser will be absorbed by the remaining portion of the riser which is quite small. In view of the small volume of material in the walls there will be little expansion force from the side walls. Since the area of possible deformation is limited to these two areas there will be little likelihood of re-expansion after the pressure is removed.

Also shown in FIG. 1 is a vent rod 26 which forms an extension of the mandrel and projects upward through the mold forming material. When the pattern is removed a degasification channel 27 will be left in the mold forming material. It should be remembered that the mold forming material used in a cavity type mold has a greater amount of binder and is, therefore, less pervious to gas. Since gases are created on gasification of the riser an air vent is considered necessary for the venting of these gases. An air core 28 formed from the mold forming material is also provided in the top of the riser and mandrel which acts to reduce the tendency of the molten metal to adhere to the top of the riser cavity. The air core also reduces the area of surface 22 to a ring like surface as shown on the bottom surface 18 of the riser. The vertical molding forces will then cause a deformation of the riser at these two small surfaces only. On release of the molding pressure, if the surfaces have been deformed, the only expansion force remaining will be in the wall of the riser.

In FIG. 2, a riser 40 is shown which has a spherical

outer configuration and a central cavity or recess 42 extending through the entire riser. A ledge 44 is provided on the inside surface of the recess which is designed to rest on the top 50 of the pattern. When the pattern and riser are embedded in the mold forming material, the molding pressures will be absorbed by the ledge and the ring forming the lower surface 45 at the bottom of the riser. As indicated above, only the thin walls of the riser will be subjected to the full mold forming pressure and will not have sufficient re-expansion force to exert any pressure on the mold forming material.

In FIG. 3, another modification of the invention is shown in which the riser 60 consists of an expanded plastic material having a spherical outer configuration with a cylindrical cavity or recess 62. The cavity extends upward approximately two-thirds of the distance from the bottom of the riser to the top forming a ring like contact surface 64 at the bottom of the pattern. The top of the cavity is closed off by a ball-cup shaped wall 66 having an air core opening 68 in the top. When this riser is placed on a mandrel, the ball shaped surface of wall 66 will rest on top of the mandrel. The molding pressure which is applied to the mold forming material after the riser and pattern have been embedded in the mold forming material will push the riser downward. The only contact surfaces that will be subjected to deformation will be the ring shaped surface at the bottom of the riser and the ball shaped surface in the cavity. Thus all of the re-expansion forces present in a solid type riser will be substantially eliminated.

Although only a few embodiments of the present invention have been shown and described other modifications can be made herein without departing from the scope of the appended claims.

What is claimed is:

1. The combination of a riser for a casting pattern and a mandrel located on said pattern at a predetermined area of shrinkage,

said riser consisting of a cellular material which is gasifiable substantially without residue upon subjection to the heat of a molten casting charge, and having a substantially spherical outer configuration, a cavity in said riser extending more than half way through said pattern and having an inner surface configuration substantially similar to the outer configuration of the mandrel,

said mandrel filling said cavity when said riser is disposed on said mandrel, with an end surface of the cavity being in engagement with an end surface of the mandrel,

whereby on placing said riser on said mandrel the mold forming forces will be absorbed by the contact area of the riser with the pattern and mandrel.

2. The combination according to claim 1 wherein said cavity extends through the entire pattern, and wherein ledges are provided in the walls of said cavity to engage the outer surface of said mandrel.

3. The combination of a riser for a casting pattern and

a mandrel located on said pattern at a predetermined area of shrinkage,

said riser consisting of a cellular plastic material which is gasifiable substantially without residue upon subjection to a molten casting charge,

a cavity in said riser extending at least half way through said riser,

said cavity having substantially the same inside dimensions as the outside dimensions of the mandrel,

an end wall forming the closed end of said cavity, and substantially comprising a spherical section, said mandrel filling said cavity when said riser is disposed on said mandrel, with the end surface of the cavity being in engagement with an end surface of the mandrel,

whereby on subjecting said riser to the mold forming pressures the end wall will be permanently deformed by the mold forming pressures.

4. The combination according to claim 3, wherein said end wall is provided with an air core on its opposite side.

5. The combination of a riser for a casting pattern and a mandrel located at a predetermined area of shrinkage on the pattern,

said riser consisting of a cellular plastic material which is gasifiable substantially without residue upon subjection to a molten casting charge,

a cavity in said riser extending upward at least half way through said riser,

said cavity having substantially the same inside dimensions as the outside dimensions of the mandrel, and

a force absorbing surface means at the top of said cavity which deforms upon application of pressure downward on said riser, said mandrel filling said cavity when said riser is disposed on said mandrel, with said surface means of the cavity being in engagement with an end surface of the mandrel.

6. The combination according to claim 5 including an air passage through the top of the riser.

7. The combination according to claim 5 wherein said surface means comprises substantially a spherical section projecting downwardly to the center of said cavity engaging the top of said mandrel.

References Cited

UNITED STATES PATENTS

2,830,343	4/1958	Shroyer	164—34
3,295,175	3/1967	Krzyzanowski	164—34

FOREIGN PATENTS

1,376,868	9/1964	France.
-----------	--------	---------

J. SPENCER OVERHOLSER, *Primary Examiner.*

R. D. BALDWIN, *Assistant Examiner.*

U.S. Cl. X.R.

164—360, 410