

Nov. 1, 1966

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3,281,904

STOPPER FOR A LADLE OR SIMILAR RECEPTACLE

Filed Sept. 8, 1958

3 Sheets-Sheet 1

Fig. 1.

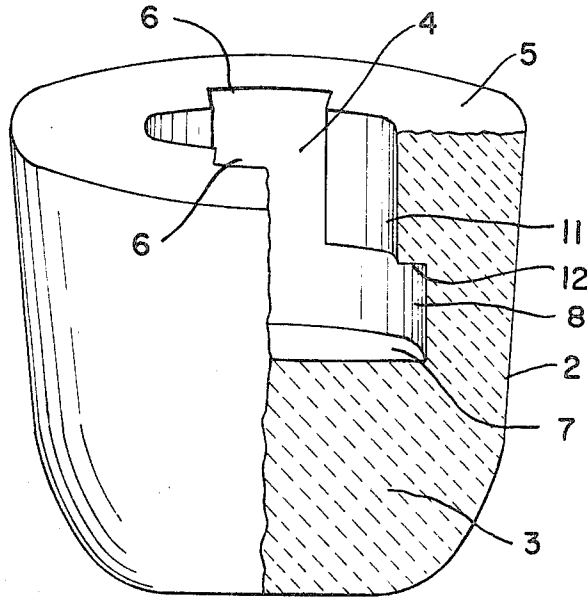


Fig. 2.

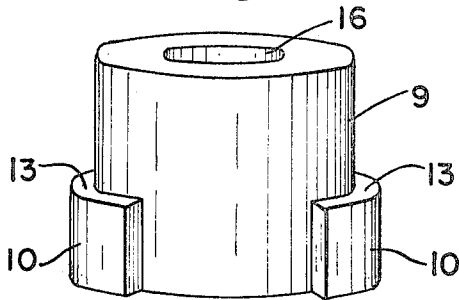
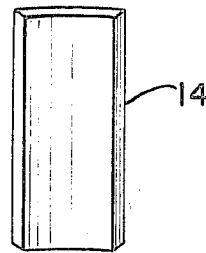


Fig. 3.



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Fig. 4.

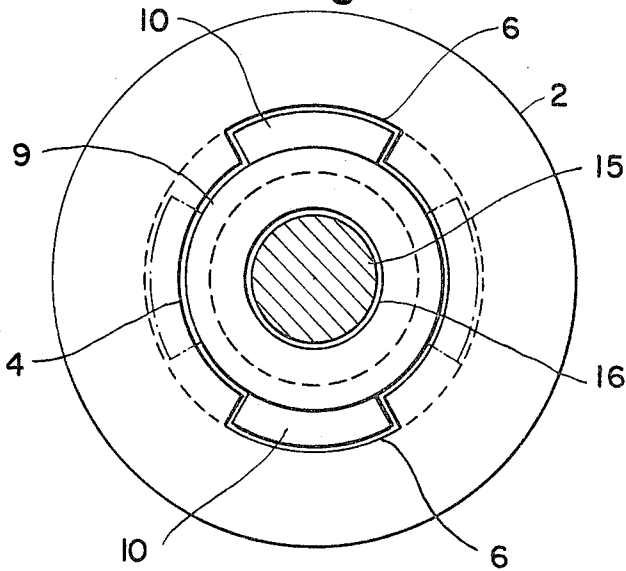
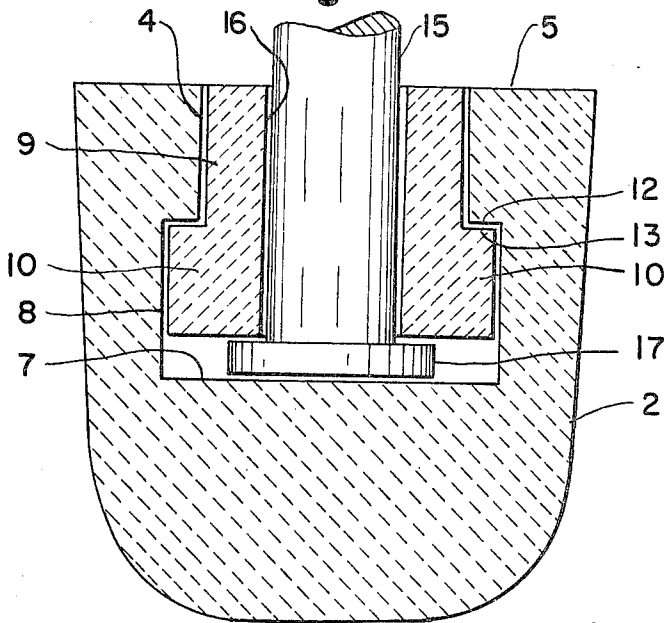


Fig. 5.



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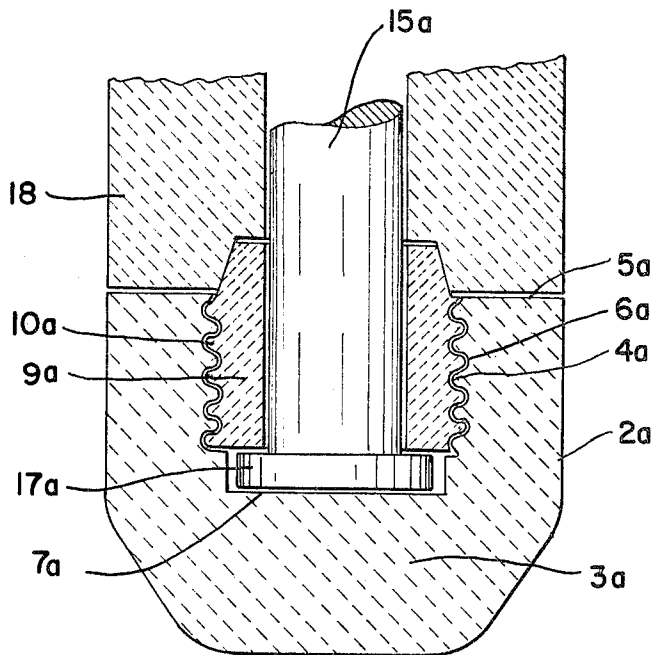
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Fig. 6.



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3,281,904
**STOPPER FOR A LADLE OR SIMILAR
 RECEPTACLE**

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Filed Sept. 8, 1958, Ser. No. 759,670
 2 Claims. (Cl. 22-85)

This invention relates to a stopper for a ladle or similar
 receptacle and has to do particularly with the manner of
 attachment of the stopper rod to the stopper head.

Many different proposals have been made for fastening
 stopper rods to stopper heads but each has had disadvan-
 tages. It is undesirable to apply the stopper rod through
 the bottom of the stopper head as then the opening in the
 bottom of the stopper head must be plugged and the plug
 is liable to fall out. Various provisions for applying the
 stopper rod to the top of the stopper head have been sug-
 gested but these have for the most part involved intricate
 or impractical structures. They have generally involved
 so-called "one piece" or permanently assembled stopper
 rod and head combinations requiring breaking the stopper
 head to disconnect the rod from the head for replace-
 ment of one or the other.

I provide a stopper for a ladle or similar receptacle
 which obviates the disadvantages of the expedients hereto-
 fore employed by those skilled in the art for attaching
 ladle stopper rods to the stopper heads. I provide a
 stopper for a ladle or similar receptacle comprising a
 refractory head having a well extending downwardly there-
 into, a rod having a lateral projection at its bottom insert-
 able downwardly into the well and means applicable to
 the head and rod into position to overlie at least a por-
 tion of the lateral projection at the bottom of the rod and
 thereby block withdrawal of the rod from the well where-
 by to attach the rod to the head, said means being the
 sole means overlying the lateral projection at the bottom
 of the rod. Such means are preferably also insertable
 downwardly into the well above the lateral projection at
 the bottom of the rod into position to overlie at least a
 portion of the lateral projection at the bottom of the rod
 and thereby block withdrawal of the rod from the well
 and connected with the head whereby to attach the rod
 to the head.

I further provide a stopper for a ladle or similar recep-
 tacle comprising a refractory head having a well extending
 downwardly thereinto, a rod having a lateral projection
 at its bottom insertable downwardly into the well and
 means at least largely surrounding the rod above the
 lateral projection thereon applicable to the head into posi-
 tion to overlie at least a portion of the lateral projection
 at the bottom of the rod and thereby block withdrawal of
 the rod from the well whereby to attach the rod to the
 head. I preferably employ preformed refractory means
 which are applicable to the head and rod into position to
 overlie at least a portion of the lateral projection at the
 bottom of the rod and underlie a portion of the head.

The well of my refractory stopper head preferably has
 a portion of its wall relatively remote from its bottom
 of smaller transverse dimension than a portion of its
 wall less remote from its bottom, forming a shoulder
 facing toward the bottom of the well, and I preferably pro-
 vide means interposed between said shoulder and the later-
 al projection at the bottom of the rod blocking withdraw-
 al of the rod from the well whereby to attach the rod to
 the head. Such means are preferably preformed refrac-
 tory means. I desirably employ cooperating preformed
 elements fitting together to at least largely surround the
 rod above the lateral projection thereon applicable to the
 head into position to overlie at least a portion of the

lateral projection at the bottom of the rod and thereby
 block withdrawal of the rod from the well whereby to
 attach the rod to the head. The well may be internally
 threaded and preformed externally threaded preferably
 refractory means may be provided which are adapted to
 be threaded into the well into position to overlie at least
 a portion of the lateral projection at the bottom of the
 rod; or the well may have at a portion of its periphery
 a shoulder facing toward the bottom of the well and
 means may be employed which are insertable downwardly
 into the well into position to overlie at least a portion
 of the lateral projection at the bottom of the rod and
 turnable to a position in which a part thereof underlies
 the shoulder to block withdrawal of the rod from the
 well and thereby attach the rod to the head. Desirably
 means are provided holding the last mentioned means
 against turning out of the position in which a part thereof
 underlies the shoulder to block withdrawal of the rod
 from the well.

Other details, objects and advantages of the invention
 will become apparent as the following description of
 certain present preferred embodiments thereof proceeds.

In the accompanying drawings I have shown certain
 present preferred embodiments of the invention in which

FIGURE 1 is an isometric view of a ladle stopper head
 with a portion cut away;

FIGURE 2 is an isometric view of a lugged insert ring;

FIGURE 3 is an isometric view of a locking member;

FIGURE 4 is a horizontal cross-sectional view of an
 assembled stopper head and stopper rod utilizing the struc-
 tures shown in FIGURES 1, 2 and 3, the cross-section
 being taken through the stopper rod just above the head
 and looking downwardly toward the head, the lugged insert
 ring being shown in full lines in the position in which
 it is initially inserted into the well in the stopper head and
 in dotted lines in its holding position turned through an
 angle of 90° from the initial position;

FIGURE 5 is a vertical cross-sectional view through
 the assembled stopper head and stopper rod utilizing the
 structures shown in FIGURES 1, 2, 3 and 4 but with the
 lugged insert ring in its holding position; and

FIGURE 6 is a vertical cross-sectional view through
 a modified form of structure.

Referring now more particularly to the drawings and
 especially to FIGURES 1-5, there is shown a refractory
 head 2 of a stopper for a ladle or similar receptacle. The
 bottom portion 3 of the stopper head 2 is solid and im-
 perforate. The stopper head has a well designated gener-
 ally by reference numeral 4 extending downwardly
 thereinto from the top surface 5 thereof. The well 4 is
 of generally circular shape but having opposed outwardly
 projecting portions 6 each of which is connected adjacent
 the bottom 7 of the well 4 with a circumferentially ex-
 tending cut out portion 8.

FIGURE 2 shows a lugged insert ring the body of
 which is designated generally by reference numeral 9 and
 which has projecting outwardly therefrom at the lower
 portion thereof opposed lugs 10. The lugged insert ring
 is adapted to surround the stopper rod as will presently
 be described and to pass downwardly within the well 4
 with the lugs 10 moving within the outwardly projecting
 portions 6 of the well. When the lugged insert ring
 reaches the position in which the lugs 10 are in lateral
 alignment with the circumferentially extending cut out
 portions 8 of the head 2 the lugged insert ring is turned
 about its axis through an angle of 90° to position the
 respective lugs underneath portions 11 of the stopper
 head, which portions overlie the cut out portions 8. As
 will be understood from the above description, the well
 4 has a portion of its wall defined by the inner surface
 of the portion 11 of the stopper head relatively remote
 from its bottom 7 of smaller transverse dimension than

a portion 8 of its wall less remote from its bottom 7 forming a shoulder 12 facing toward the bottom of the well. Actually there are two such shoulders at diametrically opposed portions of the stopper head. They coact with the upper surfaces 13 of the lugs 10 to hold the lugged insert ring against movement out of the well 4. When the lugged insert ring has been turned to the position in which the lugs 10 are underneath the shoulders 12 a locking member 14 shown in FIGURE 3 is dropped into one of the outwardly projecting portions 6 of the well to prevent turning of the lugged insert ring back to its initial position since the locking member 14 lies in the path of one of the lugs 10. While one locking member 14 is all that is required two such locking members are preferably used for added locking safety.

FIGURE 5 shows a stopper rod 15 assembled with a head 2 and a lugged insert ring as shown in FIGURE 2. The stopper rod 15 extends through a bore 16 in the lugged insert ring as shown in FIGURE 5, and the stopper rod has a lateral projection 17 at its bottom. As shown the lateral projection 17 is circular and coaxial with the rod 15. Its diameter is less than the diameter of the well 4 intermediate the portions 6 so that the stopper rod may be insertable downwardly into the well.

Before the stopper rod 15 is inserted downwardly into the well of the stopper head the lugged insert ring is applied over the stopper rod so as to rest upon the upper surface of the lateral projection 17. The lower portion of the stopper rod with the lugged insert ring thereabout and resting upon the lateral projection 17 is inserted downwardly into the well 4, the lugs 10 of the lugged insert ring moving downwardly through the portions 6 of the well. When the bottom of the rod seats upon the bottom of the well the upper surfaces 13 of the lugs 10 will be slightly below the level of the shoulders 12. Thereupon the lugged insert ring will be turned through an angle of 90°, more or less, and the locking members 14 inserted as above described to maintain the assembly. The lugged insert ring cannot be removed from the well of the stopper head because the lugs 10 underlie the shoulders 12. The stopper rod is held in place by the lugged insert ring acting upon the upper surface of the lateral projection 17.

FIGURE 6 shows a modified construction including a refractory stopper head 2a the bottom portion 3a of which is solid and imperforate. The stopper head has a well designated generally by reference numeral 4a extending downwardly thereinto from the top surface 5a thereof. The well 4a is of generally circular shape and internally threaded as shown at 6a. The bottom of the well is designated 7a and is of somewhat smaller diameter than the threaded portion thereof. The stopper rod is designated 15a and has at its bottom a lateral projection 17a. Surrounding the lower portion of the stopper rod 15a above the lateral projection 17a is a preformed refractory collar 9a which is externally threaded as shown at 10a so that the collar may be screwed down into the well 4a with the threads 10a of the collar meshing with the threads 6a of the well as shown in FIGURE 6. The collar 9a may be a solid completely circular collar or it may consist of cooperating preformed elements fitting together to at least largely surround the rod. For example, the collar 9a may be made in two halves which may be applied to the rod from opposite sides so that when applied the effect is the same as a solid collar and the sectional collar may be screwed down into the well of the stopper head just the same as a solid collar. Each of the threads 6a of the well 4a constitutes a portion of the wall of the well relatively remote from its bottom of

smaller transverse dimension than the space underlying it which is less remote from the bottom of the well so that the lower portion of each thread forms a shoulder facing toward the bottom of the well. Those shoulders act to maintain the collar 9a in place and the collar in turn acts against the upper surface of the lateral projection 17a to block withdrawal of the rod 15a from the well and thereby attach the rod to the head. A rod protecting sleeve is shown at 18; the sleeve may be of conventional form.

The lugged insert ring 9 and the collar 9a are preformed of refractory material which may be the same as the refractory material of the stopper head so as to have the same coefficient of thermal expansion. In both the form of FIGURES 1-5 and the form of FIGURE 6 the preformed refractory member or means is the sole means overlying the lateral projection at the bottom of the rod. My stopper is very easy to assemble and disassemble, is inexpensive and gives long service life.

Subject matter disclosed but not claimed herein is claimed in my copending continuation application Serial No. 410,863, filed November 13, 1964.

While I have shown and described certain present preferred embodiments of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well, the well being internally threaded, and externally threaded means threaded into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well, the well being internally threaded, and externally threaded means threaded into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head, said externally threaded means being the sole means overlying the lateral projection at the bottom of the rod.

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