# United States Patent [19]

**Althabegoity**

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[54] **APPARATUS FOR VACUUM DEZINCING LEAD**


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[52] **U.S. Cl.** ..... **266/24,** 75/78, 266/33 R

[51] **Int. Cl.** ..... **C22b 13/06**

[58] **Field of Search** ..... 75/63, 77, 78, 88; 266/24, 33 R, 37



[56] **References Cited**

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[57] **ABSTRACT**

A conventional kettle for the vacuum dezincing of lead is conventionally provided with an outer bearing flange for supporting the kettle on a frusto-conical frame. This apparatus is further provided with a ring-shaped space outside the kettle which extends from the top of the kettle to the bearing flange and which is closed to the ouside of the kettle but open to the inside of the kettle through an annular clearance. This ring-shaped space reduces the tendency of the kettle to crack between its upper edge and the bearing flange, and thereby increases the useful life of the kettle.


**7 Claims, 2 Drawing Figures**

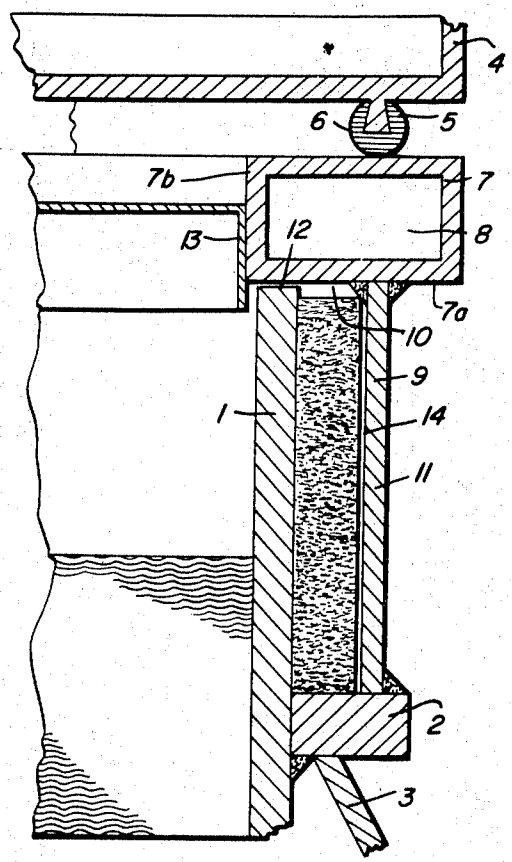


FIG. 2

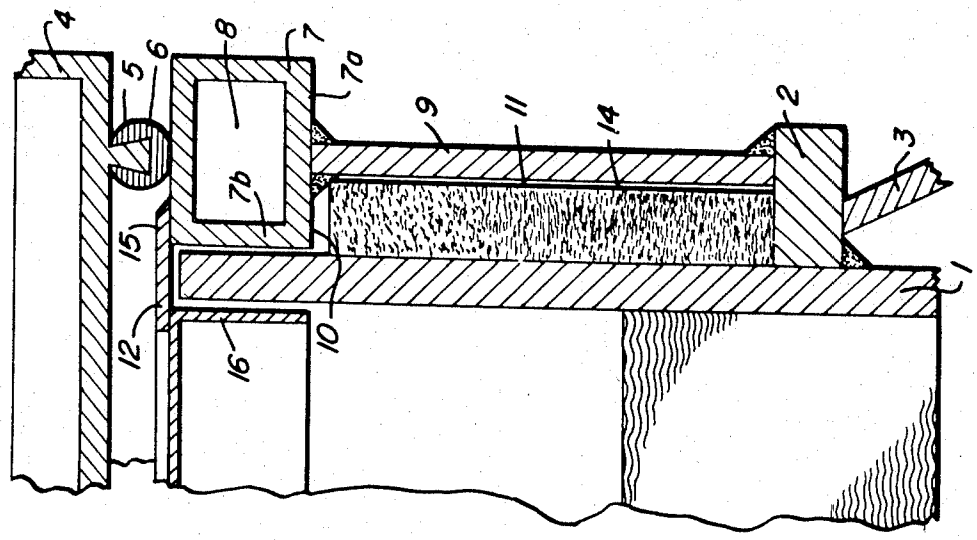
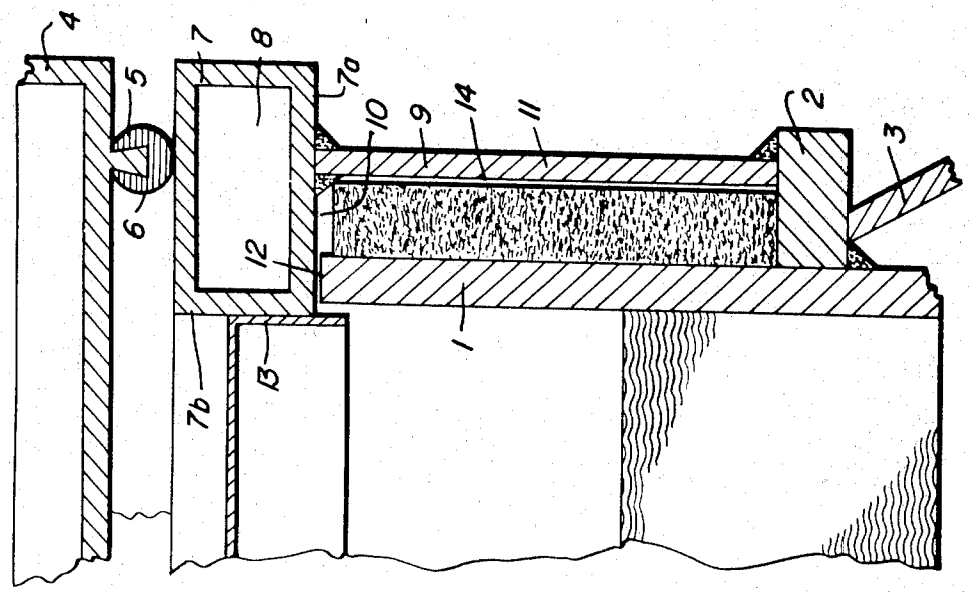



FIG. 1



# APPARATUS FOR VACUUM DEZINCING LEAD

This invention relates to an apparatus for refining impure lead to remove zinc therefrom and, more particularly, to an apparatus for vacuum dezincing of lead. It is known that this process consists in bringing the metal to a temperature of approximately 600°C. in a vacuum-tight kettle and maintaining it under a vacuum of 100 microns Hg for instance. The zinc contained in the lead distills under the effect of vacuum and temperature and condenses on the inner surface of the water-cooled cover of the kettle.

The kettles which are used for carrying out this method are generally provided with an outer bearing flange. The latter rests on the upper edge of a frusto-conical frame which, in turn, leans on the basement of the installation and limits to a ceraain extent the stresses resulting from the thermal dilatation.

Such a kettle is also provided at its upper edge with a water-cooled ring-shaped jacket on which the periphery of its cover can rest with interposition of a vacuum-tight o-ring.

The main drawback of these known devices lies in the fact that cracks appear rapidly in the wall of the kettle between its upper edge and the bearing flange through which it rests on the basement. A result of this phenomenon is that the life of the kettle is shortened, which increases markedly the working expenses.

Now, one objective of the present invention is to provide an improved kettle for vacuum dezincing of lead with a longer average life than the known devices.

Another objective of the invention is to provide such an improved kettle in a simple and inexpensive way.

One more object of the invention is to provide such an improved kettle which can result from the transformation of an existing one.

These objects, and others which will appear further below, are reached by the kettle for vacuum dezincing of lead according to the invention, wherein a ring-shaped space is provided between its upper edge and its bearing flange, said space being air-tight with respect to the outside of the kettle and connected with the inside through an annular clearance. Preferably, said ring-shaped space is filled with a thermal insulation product of any known type, like for instance asbestos or rock wool.

Preferably, the outside part of said annular space is formed by a cylindrical sleeve with the same vertical axis as the kettle which is integral with the bearing flange, at its lower end, and with the supporting surface for the cover, at its upper end. Generally said supporting surface consists, in a known manner, in the flat upper part of an annular passage with a rectangular cross-section through which water circulates. According to the usual terminology, such a passage will be called a "jacket" hereinbelow.

In one embodiment of the invention, said cylindrical sleeve is integral with the annular jacket along its base, and this base of the jacket overhangs the upper edge of the kettle with a clearance which is sufficient for connecting the annular space according to the invention with the inside of the kettle.

In another embodiment, the cylindrical sleeve is also integral with the annular jacket along its base, but the upper wall of this jacket is now substantially at the same level as the upper edge of the kettle. The clearance connecting the annular space according to the invention and the inside of the kettle is, in this case, provided for between the outer wall of the kettle and the internal side wall of the jacket.



The invention and the manner in which it can be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings, among which:

FIG. 1 shows in axial cross-section, a partial and highly schematic view of one embodiment of the apparatus according to the invention;

FIG. 2 shows on the same manner a view of another embodiment of the apparatus according to the invention.

In FIG. 1, reference numeral 1 shows the vacuum dezincing kettle itself surrounded by a bearing flange 2 which is welded to the wall of the kettle. The weight of the latter is transferred to a basement (not shown) by a frusto-conical frame 3. Means are provided (not shown) for bringing the metal contained in kettle 1 to the suitable temperature.

The device comprises also a cover 4 the lower side of which is integral with a dove-tailed fixation ring 5 embedded in a vacuum-tight o-ring 6. This o-ring rests on an annular hollow jacket 7 with a rectangular cross-section through which cold water can be allowed to flow. The lower wall 7*a* of jacket 7 is welded to the upper edge of a cylindrical sleeve 9 which surrounds kettle 1 at a distance of 5 cm, for example. The lower edge of sleeve 9 is in turn welded to bearing flange 2.

O-ring 6 is preferably on the vertical above sleeve 9, approximately along a median circumference of annular jacket 7.

The annular space 10 thus provided between outer surface of kettle 1, lower wall 7*a* of jacket 7, internal surface of sleeve 9 and bearing flange 2 is filled with a thermal insulation product 11 like rock wool. It communicates with the inside of kettle 1 by a clearance 12 provided between the edge of kettle 1 and the lower wall 7*a* of jacket 7. Of course, the diameter of internal wall 7*b* of jacket 7 must be slightly smaller than the internal diameter of kettle 1.

Internal wall 7*b* of jacket 7 is preferably provided with a downwardly extending protection sleeve 13 which covers the clearance 12 and the upper part of kettle 1 and prevents molten metal from entering annular space 10. Moreover, a cylindrical metal sheet 14 can be mounted in annular space 10 to leave a free space between thermal insulation 11 and sleeve 9.

Preferably, the surface of the molten metal pool in kettle 1 is located about 20 cm under the lower wall 7*b* of jacket 7.

On the embodiment of FIG. 2, the members identical to those of FIG. 1 have been shown by the same reference numerals.

In this embodiment, the internal face 7*b* of jacket 7 surrounds the upper part of kettle 1, the upper face of this jacket being substantially at the same level as the upper edge of the kettle.

Clearance 12 is now provided between said internal face 7*b* and the external surface of kettle 1. The protection sleeve is now replaced by an annular plate 15 welded by its outer edge on the flat upper surface of jacket 7 in order to cover the wall of kettle 1 without contacting it. Said annular plate 15 can be provided internally with a protection sleeve 16 extending downwardly in kettle 1 and analogous to protection sleeve 13 of FIG. 1.

I claim:

1. An apparatus for the vacuum dezincing of lead comprising in combination: a kettle; an annular bearing flange rigidly mounted on the outer surface of said kettle; means for supporting said bearing flange on the ground; means for heating said kettle; a cylindrical sleeve coaxial with the kettle extending upwardly from said bearing flange and rigidly mounted on it substantially along its external edge; an annular water-cooled jacket with a rectangular cross-section fixedly mounted by its base along the upper edge of said sleeve, said annular water-cooled jacket, the outer wall of said kettle, said annular bearing flange and said cylindrical sleeve cooperating to form an annular space, said jacket positioned so that a clearance is maintained between the inside of said kettle and the annular space; a thermal insulating material in said annular space; a water-cooled cover for said kettle; and an annular sealing member detachably mounted on the lower face of said cover and resting on the upper face of said jacket.

2. An apparatus as claimed in claim 1, wherein the inner part of the lower face of said jacket overhangs with a clearance the inner edge of said kettle.



3. An apparatus as claimed in claim 2, wherein said jacket further comprises an internal protection sleeve downwardly extending from the inner face of said jacket.

4. An apparatus as claimed in claim 2 further comprising a cylindrical partition coaxial with said kettle and mounted on the upper face of said bearing flange between said thermal insulating product and said sleeve.

5. An apparatus as claimed in claim 1, wherein the internal face of said jacket surrounds with a clearance the top of said kettle.

6. An apparatus as claimed in claim 5, wherein said jacket further comprises an internally extending annular plate fixedly mounted on the jacket upper face and a downwardly extending protecting cylindrical wall coaxial with the kettle and mounted along an inner portion of said annular plate.

7. An apparatus as claimed in claim 5, further comprising a cylindrical partition mounted on the upper face of said bearing flange coaxial with said kettle between said thermal insulating product and said sleeve.

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