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EVAPORATOR FOR CRYSTALLISED ALUMINATE LIQUORS

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(71) Applicant(s)
AKTSIONERNOYE OBSHCHESTVO OTKRYTOGO TIPA VSEROSSIYSKY ALUMINIEVO-MAGNIEVY INSTITUT (AO VAMI)

(72) Inventor(s)
VLADILEN MITROFANOVICH TYRTYSHNY

(74) Attorney or Agent
FISHER ADAMS KELLY , GPO Box 1413, BRISBANE QLD 4001

(56) Prior Art Documents
EP 65332
SU 1725939
SU 1605319

(57) Claim

1. An evaporator for crystallised aluminate liquors having a cylindrical housing with inputs for liquor and heating steam and outputs of evaporated liquor, secondary steam and condensate, and a coaxial heating chamber, with a boiling chamber located above a central beam of a plurality of heating pipes, a solution chamber and separator, characterised by a connection pipe connecting a lower part of the solution chamber and the boiling chamber, and wherein the ratio of the diameter of the connection pipe and the diameter of the heating pipe is in a range from between 2.0 to 5.0.

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Regulation 3.2

AUSTRALIA

Patents Act 1990

ORIGINAL

COMPLETE SPECIFICATION

STANDARD PATENT

Invention Title: **EVAPORATOR FOR CRYSTALLISED ALUMINATE LIQUORS**

The following statement is a full description of this invention, including the best method of performing it known to us:

THIS INVENTION provides for operation of the unit under conditions of rapid sedimentation of salt crystals. Crystals and scale particles are removed from lower part of the solution chamber through a pipe. Continuous upward slurry flow inside pipe is created due to different densities of the liquor columns outside boiling chamber and the boiling liquor inside it.

The invention is related to alumina production, in particular to evaporators used in chemical, metallurgical and other industries.

The aim of the invention is to provide for workability of the apparatus under conditions of increased sedimentation of salt crystals during evaporation of aluminate liquors.

Lay-out of the evaporation unit is shown on Figure.

The evaporator consists of a vertical cylindrical housing 1, coaxial heating chamber with a plurality of heating tubes 2 arranged therein, boiling chamber 3, separator 4, the lower part of a solution chamber 5, a connection pipe 6, inputs 7 and 8 for liquor and heating steam, and outputs 9, 10 and 11 for

evaporated liquor, secondary steam and heating steam condensate.

The evaporator operates as follows:

Initial liquor is fed through input 7 into upper solution chamber, goes down the heating pipes to lower chamber 5. Then due to upward flow it goes through central heating pipes to boiling chamber 3, where it starts boiling because of low pressure in boiling chamber, thus steam is formed outside heating surface. The density difference between boiling and non-boiling liquors creates circulation forces. Due to this the liquor circulates and salt crystals are sucked through connection pipe 6 from lower part of the chamber 5 to chamber 3. Evaporated liquor is discharged through output 9, secondary steam - through output 10. Heating steam is supplied to heating chamber 2 through input 8, heating steam condensate is removed through output 11.

Connection pipe 6 between boiling chamber 3 and lower chamber 5 eliminates accumulation of salt crystals in the solution chamber and provides for stable circulation of the liquor.

The claims defining the invention are as follows:

1. An evaporator for crystallised aluminate liquors having a cylindrical housing with inputs for liquor and heating steam and outputs of evaporated liquor, secondary steam and condensate, and a coaxial heating chamber, with a boiling chamber located above a central beam of a plurality of heating pipes, a solution chamber and separator, characterised by a connection pipe connecting a lower part of the solution chamber and the boiling chamber, and wherein the ratio of the diameter of the connection pipe and the diameter of the heating pipe is in a range from between 2.0 to 5.0.

2. An evaporator for crystallised aluminate liquors substantially as hereinbefore described with reference to the accompanying drawings.

3. A method for evaporation of crystallised aluminate liquors whenever carried out in an evaporator according to either one of claims 1 or 2.

4. A method for evaporation of crystallised

aluminate liquors substantially as hereinbefore described with reference to the accompanying drawings.

DATED this Third day of February 1998.

5

AKTSIONERNOYE OBSHCHESTVO OTKRYTOGO TIPA

VSEROSSIYSKY ALUMINIEVO-MAGNIEVY INSTITUT (AO vami)

By their Patent Attorneys

FISHER ADAMS KELLY

ABSTRACT

An evaporator for crystallised aluminate liquors comprises a chamber having inlet ports for the aluminate liquor and heating steam as well as outlet ports for evaporated liquor secondary steam and condensate. A conduit communicates between the lower part of the evaporation chamber and the boiling chamber to remove crystalline precipitates from the lower part of the evaporation chamber to prevent an accumulation of crystalline material in the lower part of the evaporation chamber which might otherwise interfere with circulation of liquor within the chamber.

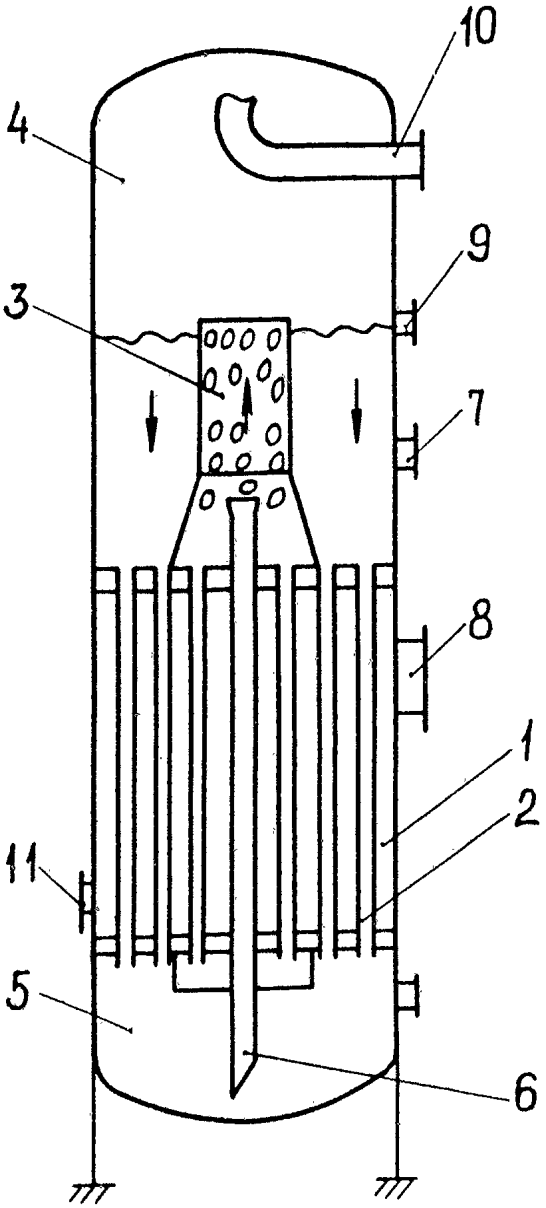

FIG 1