April 20, 1926. 1,581,545

C. PRACHE

PROCESS OF PREVENTING INCRUSTATION OF PIPES

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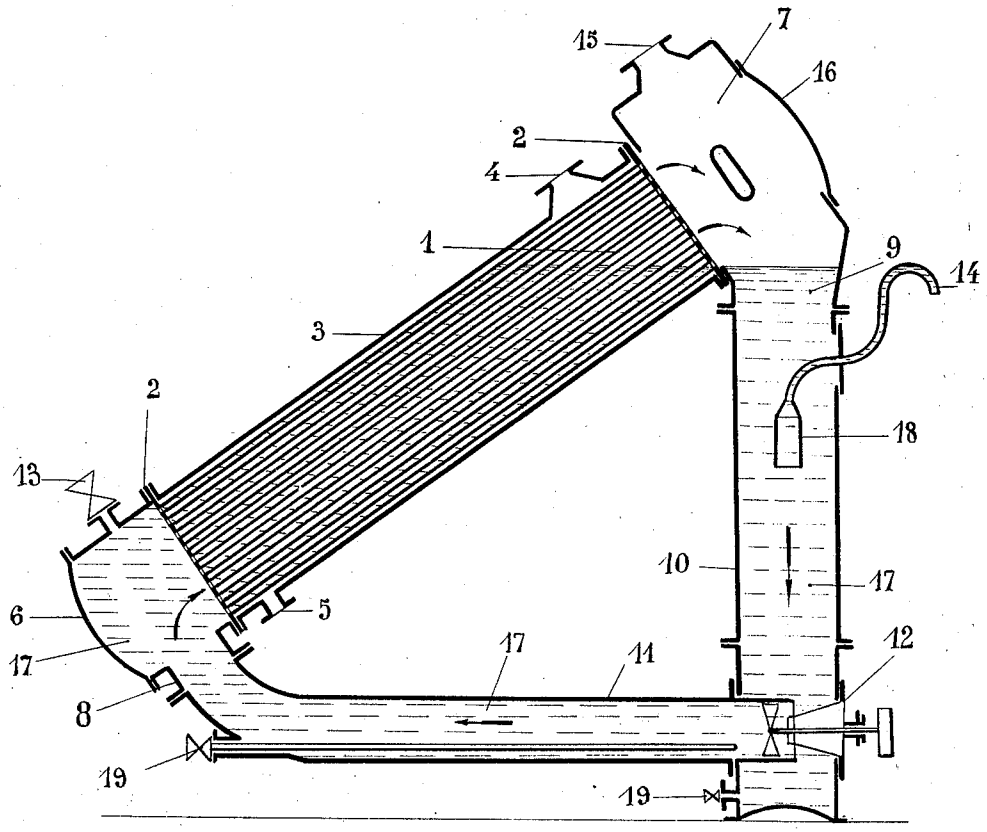

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UNITED STATES PATENT OFFICE.

CHARLES PRACHE, OF PARIS, FRANCE.

PROCESS OF PREVENTING INCRUSTATION OF PIPES.

Application filed October 24, 1919. Serial No. 332,903.

To all whom it may concern:

Be it known that I, CHARLES PRACHE, of 106 Boulevard Haussmann, Paris, France, engineer, have invented new and useful Improvements in Processes of Preventing Incrustation of Pipes, which improvements are fully set forth in the following specification.

It is known that the evaporating apparatus employed in industry for the evaporation of liquids or for the distillation of water become inefficient owing to the deposit of calcium and other salts upon the heating surfaces. Such deposits besides affecting the efficiency of the apparatus cause frequent stoppages for cleaning purposes which is always a difficult and imperfect operation.

This invention has for its object a method for use in connection with evaporating apparatus by which these difficulties are avoided and incrustation prevented by automatically and continuously cleaning the heating surface.

According to this invention cleaning is effected by the aid of a powder such as sand or glass or other equivalent substance having no chemical action upon the liquid to be evaporated, the substance is added to the solution which is circulated at a speed such that the substance is drawn by the solution into contact with the heating surface.

The apparatus capable of use in carrying out the invention is illustrated in the accompanying drawing which is a vertical section.

The apparatus comprises a number of parallel tubes 1 so arranged that they can be heated on the outside and within which the liquid to be concentrated circulates. The tubes are carried by two plates 2 and are arranged within a casing 3 which forms the heating chamber; heating steam is admitted through the tube 4 and condensed steam passes out through the tube 5.

6 and 7 are chambers fixed to the plates 2. Into the bottom of the lower chamber leads a tube 8 which is connected to a tube 9 leading from the upper chamber 7 by pipes 10 and 11; a displacer such as a pump or screw 12 or its equivalent and driven by a belt or electric motor is located near to the bottom of the apparatus for the purpose of continuously forcing liquid in the pipe 10 through the pipe 11 towards the chamber 6.

Liquid to be concentrated is led into the apparatus through a tube 13 while an overflow 14 allows continuous outflow of the concentrated liquid and regulates the level of liquid in the apparatus.

The apparatus operates as follows:

The apparatus is filled with liquid to be concentrated through the tube 13 until liquid overflows through the overflow 14.

A certain quantity of fine sand or its equivalent is introduced through a door 16 and falls into the liquid through the tube 10; the door is then closed and the circulating pump 12 put into action; liquid circulates in the direction indicated by the arrows 17 and owing to the rapidity of the circulation the sand remains in suspension in the liquid and circulates through the apparatus while intimately mixed with it. When circulation is established steam is admitted through the tube 4; the steam condenses around the tubes and passes out as water through the tube 5 while a weight of water substantially equal is evaporated from the liquid circulating in the evaporating apparatus. The resulting steam passes out through the tube 15.

The sand maintained in suspension in the liquid keeps the tubes perfectly clean by frictional contact and removes any deposits of lime which tend to fix themselves on the tubes.

While the apparatus is at work liquid to be concentrated is continuously introduced into the apparatus through the tube 13 in order to compensate for the weight of the water evaporated and in order to cause the outflow of concentrated liquid through the overflow 14.

In order to prevent sand passing out through the overflow 14, the inlet provided, consists of a portion 18 of a size sufficient to reduce the speed of the rising liquid to a speed such that the grains of sand are not drawn upwards.

When after a stop the apparatus is again set in action, steam is first injected through the tube 19 with the object of placing any sand which has deposited at the bottom in suspension in the liquid.

Claim:

The process of preventing incrustation of pipes through which a liquid, containing solids in solution, to be evaporated circulates which consists in introducing into the

liquid an abrasive in comminuted form, said abrasive being insoluble and chemically neutral with respect to the liquid, in maintaining the abrasive in suspension in the liquid so as to circulate with it through the pipes by rapidly propelling the liquid and abrasive mechanically under the influence of heat, and in replenishing the liquid to compensate for evaporation of same and to expel concentrated solution from the circulating system while retaining the abrasive therein.

In testimony whereof I have signed this specification.

CHARLES PRACHE.