Nov. 29, 1938. O. KREISSLER 2,138,455

MEANS FOR CIRCULATING LIQUOR IN PULP COOKERS

Filed Dec. 10, 1934 2 Sheets-Sheet 1

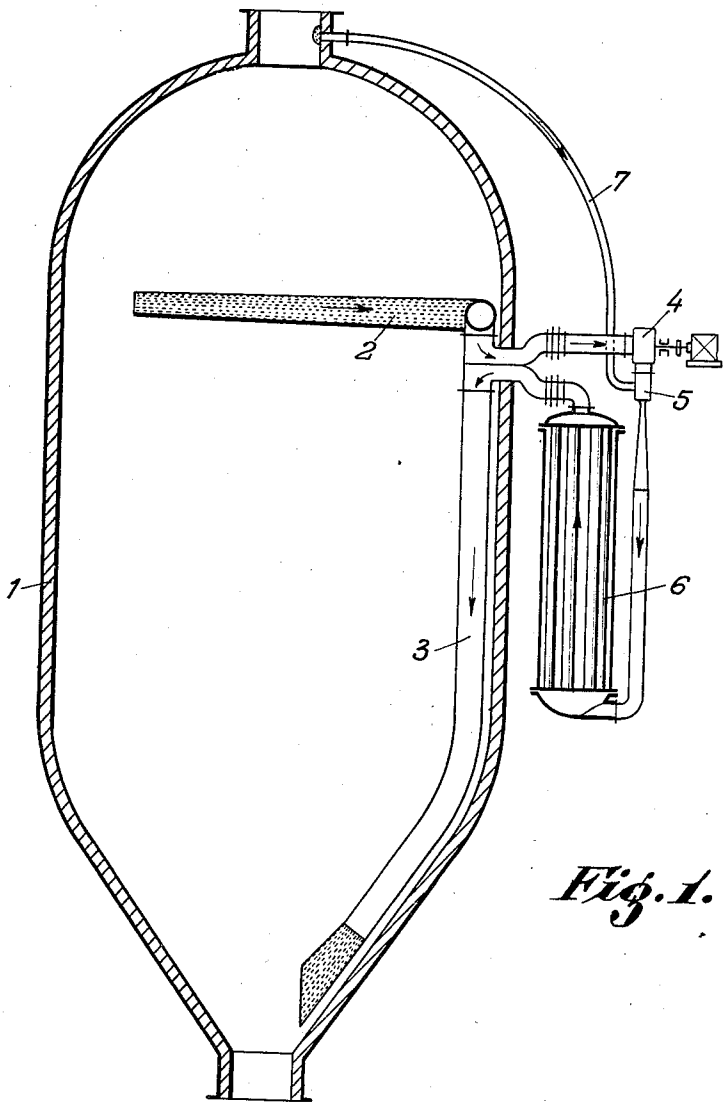


Fig. 1.

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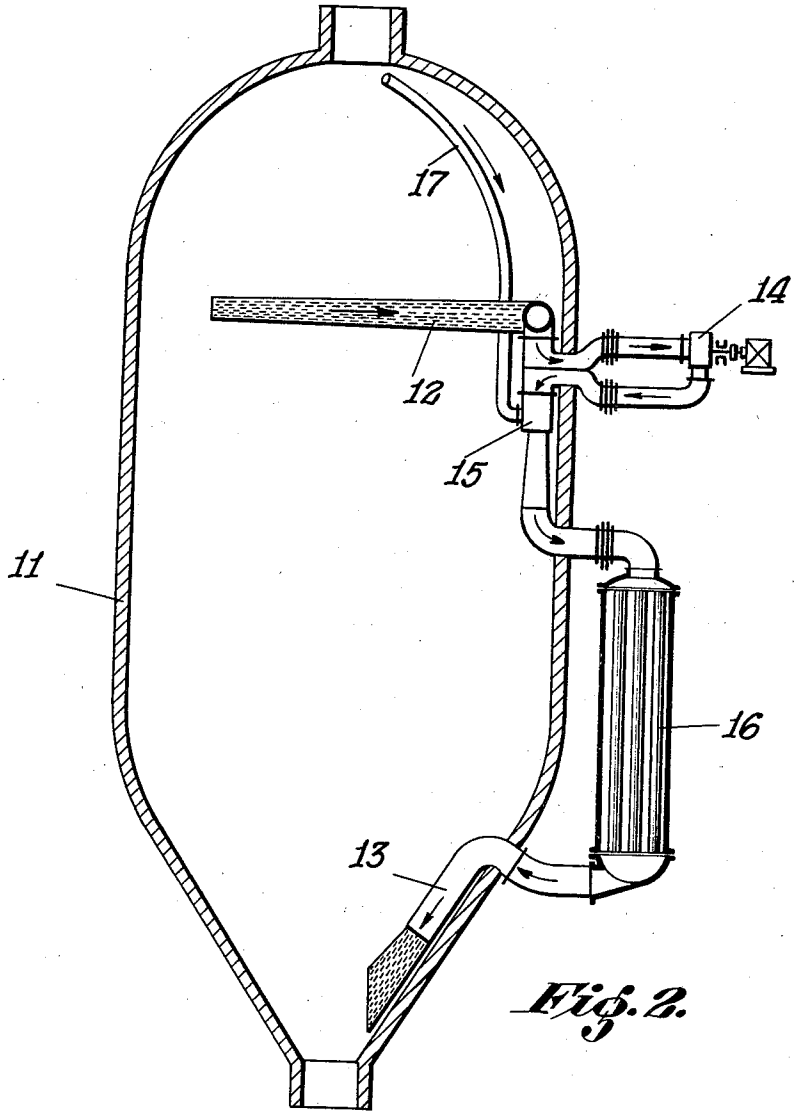


Fig. 2.

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MEANS FOR CIRCULATING LIQUOR IN PULP COOKERS

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2 Claims. (Cl. 92—7)

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This invention relates to a method of circulating liquor in pulp cookers.

In circulating the liquor in pulp cookers in which the liquor is heated indirectly by means of an external heating apparatus ("calorizer"), it has transpired that incrustations of gypsum occur during the passage of the circulating liquor through the calorizer, thereby greatly impeding heat transmission and necessitating frequent interruptions in the work for the purpose of removing the incrustations in the tubes. This formation of gypsum is due to the fact that, during the heating of the liquor in its passage through the calorizer, sulphur dioxide gases are disengaged from combination with the calciferous liquor, so that the lime necessarily becomes deposited on the walls of the tubes.

It is the object of the present invention to prevent the deposition of gypsum on the walls of the calorizer tubes, by supplying the circulating liquor, prior to its entry into the calorizer with sulphur dioxide or other suitable gases, in recognition of the fact that, by reason of the preenrichment of the liquor with SO_2 gases, no formation of gypsum can occur during the heating of the liquor in its passage through the calorizer. By this means, the further advantage is obtained of a constantly uniform transmission of heat, and stoppages for cleaning the apparatus are avoided.

To this end, the method of the present invention comprises interposing, in front of the calorizer, an injector, actuated by the circulating liquor, in such a manner that the liquor is pumped out of the cooker at the point of lowest pressure and is brought into association only in the delivery pipe of the pump—that is, at a pressure exceeding that obtaining in the cooker—with the gases which prevent the deposition of gypsum in the calorizer, and have been drawn in by the injector, from the upper part of the cooker, or from other sources. In this manner, the method of the present invention differs fundamentally from known proposals, according to which the liquor is pumped from the lower part of the cooker, and therefore at the point of highest pressure, and is passed, through an injector and the calorizer, into the upper part of the cooker. In the known instances, the SO_2 gases disengaged in the intake pipe of the pump, and also the gases drawn in through the injector, cannot be absorbed in sufficient amount by the liquor but, on the contrary permeate the liquor, in the form of small bubbles, with the result that, when it reaches the calorizer, the liquor contains less SO_2 than before and has an increased tendency to deposit gypsum therein. Owing to the fact that in the case of the known proposals, the injector is situated in the intake pipe of the pump, the pressures in the injector are substantially lower than in the method of the present invention, so that the tendency of the liquor to give off sulphur dioxide in the form of gas bubbles, during its flow from the injector to the pump, is greatly facilitated. On the other hand, with the method of the invention, in which the liquor leaves the cooker at the point of lowest pressure, and therefore where it has the lowest SO_2 content, the liquor is first subjected to higher pressure by the pump and only then is passed into the injector, so that the pressure obtaining at the entry of the liquor into the calorizer is substantially higher than the pressure in the lower part of the cooker. Consequently, the liquor is able to absorb a considerable amount of sulphur dioxide and in this manner the deposition of gypsum during the heating of the liquor in the calorizer is reliably prevented.

In order more clearly to understand the invention, reference is made to the accompanying drawings which illustrate diagrammatically and by way of example, two preferred embodiments of apparatus suitable for carrying out the method thereof.

Referring now more particularly to Fig. 1 of the drawings the pulp cooker 1 contains the liquor circulating pipe 2, 3, with the externally situated circulating pump 4, injector 5 and calorizer 6 serving for the indirect heating of the circulating liquor. Between the injector 5 and the upper part of the cooker 1 is interposed a gas exhaust pipe 7, through which SO_2 gases are drawn out of the cooker by the injector 5 and mixed with the liquor prior to its entry into the externally disposed calorizer 6.

Of course, there in nothing to prevent the gas exhaust pipe 7 from being located inside the cooker 1 and passed to the outside only at the level of the external injector 5, for the purpose of attaching it to the latter. The injector 5 may also be located inside the cooker 1. In such event the circulation pipe for the liquor may be led out through the wall of the cooker, in the rear of the internally disposed injector, and attached to the externally located calorizer, being then led back into the cooker again, whilst there is no need for the gas exhaust pipe to pass outside the cooker at all.

An apparatus of this character having the gas exhaust pipe and the injector located within the

cooker, is illustrated in Fig. 2. In this modified embodiment, a pulp cooker 11 is provided with liquor circulating pipes 12 and 13 arranged therein. Pipes 12 and 13 are connected with an external circulating pump 14 and a calorizer 16, which is adapted to indirectly heat the liquor. An injector 15 is connected in between pump 14 and calorizer 16 and has a gas exhaust pipe 17 associated therewith, both the injector and the gas exhaust pipe being arranged within the cooker. In view of the similarity of construction, the operation of this modified embodiment will be readily understood by those skilled in the art, without any further explanation.

For preventing gypsum incrustations in the calorizer, SO_2 gases may also be derived from sources other than the cooker, for example, from the roasting furnace, and mixed with the liquor prior to its entry into the calorizer. It is also possible to mix with the liquor, by means of the injector, other gases, such as oxygen, which prevent the deposition of gypsum in the calorizer, either in association or in place of SO_2 gas.

I claim:

1. Apparatus for circulating liquid in pulp cookers, comprising a cooker, a draw-off conduit in communication with and located inside said cooker, pumping means in said conduit but external of said cooker for increasing the pressure on the liquor passing therethrough, gas injecting means in said conduit and inside said cooker and actuated by the liquor under increased pressure, means in said conduit beyond said gas injecting means and external of said cooker for heating the liquor and entrained gas and a return conduit for discharging the thus treated liquor into the cooker.

2. Apparatus for circulating liquor in pulp cookers, comprising a cooker, a draw-off conduit in communication with and located inside said cooker, means provided in said conduit but external of said cooker for increasing the pressure on the liquor passing therethrough, gas injecting means in said conduit and inside said cooker and actuated by the liquor under increased pressure, communication within said cooker between said injecting means and the gas space at the top of the cooker, means in said conduit beyond said gas injecting means and external of said cooker for heating the liquor and entrained gas and a return conduit for discharging the thus treated liquor into the cooker.

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