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METHOD AND MEANS FOR CLEANING SULPHITE CELLULOSE PREHEATERS

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Fig. 1.

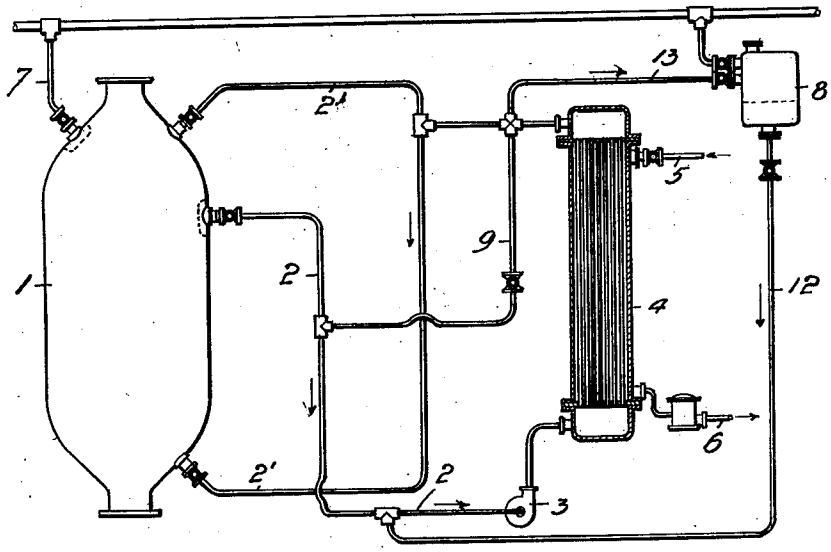
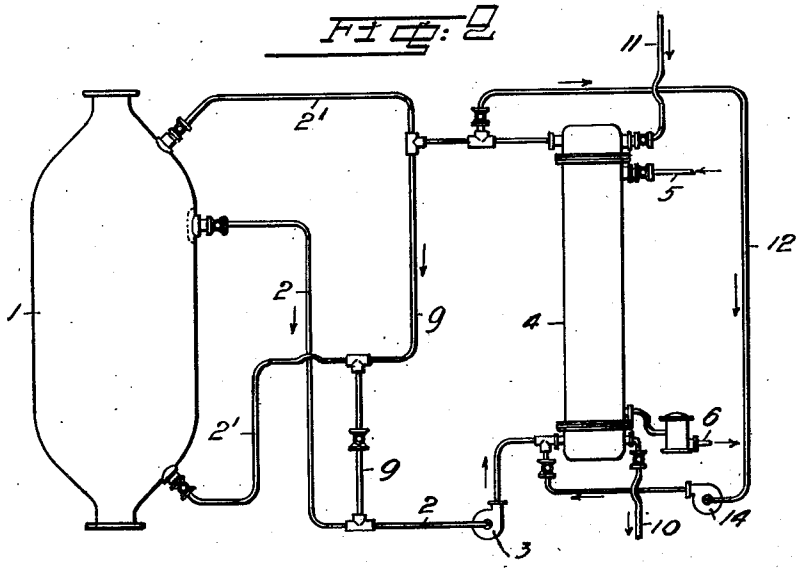


Fig. 2.



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METHOD AND MEANS FOR CLEANING SULPHITE CELLULOSE PREHEATERS

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7 Claims. (Cl. 257—1)

The present invention relates to improvements in methods and means to be used in connection with sulphite cellulose boilers of the kind, wherein an outer circulating system provided with pump is used for circulating the reaction liquid through an indirectly heated preheater. In such preheaters incrustations are deposited from time to time, particularly on the tube walls in the preheater. The danger of formation of such incrustations is different in different plants and may also vary during different seasons. Thus the formation of incrustations is particularly extensive during the hot seasons.

The incrustations consist, as tests have proved, almost entirely of gypsum and cause a considerable decrease of the heat transmittance in the preheater. It is therefore of great importance that they be removed from time to time. According to the invention this is carried out by circulating in a closed circulating system a liquid dissolving the incrustations, for example water. The circulating system consists at least of a pump and the preheater and the necessary conduits, and said circulation is to be carried out when the boiling operation has been concluded, or the preheater has been shut off from the boiler. Finally the circulation is to be carried out with such a velocity of the liquid through the preheater that the flow of the liquid through the preheater becomes turbulent.

As incrustation dissolver distilled water is particularly suitable. However, as such a liquid only seldom is available, common water must usually be used. This contains, however, lime which decreases the ability of the water of dissolving the incrustations. To the water may therefore in a way known per se be added sulphurous acid which together with the lime in the water forms calcium bisulphite that does not act injuriously upon the solubility of the incrustations (the gypsum). In a sulphite cellulose plant sulphurous acid is always available, for example in the gases obtained at the blowing of the boilers, which gases may be utilized for said purpose.

Certain salt solutions have also the ability of dissolving more gypsum than pure water, such as solutions of ammonium chloride or sodium chloride.

The method according to the invention is to be carried out as described below with reference to the accompanying drawing, in which,

Fig. 1 is a partly sectional, diagrammatic view illustrating an apparatus suitable for carrying out the improved method; and

Fig. 2 is a diagrammatic view of a modified form of apparatus.

The simplest way of dissolving the incrustations in the preheater consists according to the invention in filling the boiler connected to the preheater with water and thereupon starting circulation through a circulating system of the kind illustrated in Fig. 1. In this figure, 1 designates the boiler, 2 and 2′ the circulation conduits, 3 the circulation pump. 4 is the preheater provided with steam supply conduit 5 and discharge conduit 6 for the water condensate. 7 is the gas discharge conduit from the boiler. When the preheater is to be cleansed from incrustations, the water is led from the boiler 1 through the conduit 2 to the pump 3 and from there through the preheater 4 and the conduits 2′ back to the boiler. In this case the circulating system used for carrying out the method according to the invention is thus identical with the circulating system used in the ordinary boiling with the reaction liquid.

It is then, however, necessary that the boiler be put out of operation during the period necessary for cleansing the preheater. To avoid this one may, as shown in Fig. 1, use a separate container 8 arranged outside of the boiler, and circulate the water or other liquid dissolving the incrustations through the conduit 12, the pump 3, the preheater 4, the conduit 13 and said container 8.

If found suitable, the circulation may be carried out in such a way that a considerable part of the circulating liquid is led from the preheater to the pump by way of a by-pass conduit 9 past the container 8 so that only a minor part of liquid is passed through said container, as also illustrated in Fig. 1.

However, it is not necessary to circulate the liquid through a container. In such a case new dissolving liquid should be introduced continuously or discontinuously into the circulating system and already used liquid be removed in a corresponding way. Such an arrangement is illustrated in Fig. 2, wherein the boiler 1 as usual is connected to the pump 3 and the preheater 4 by way of the usual circulation conduits 2 and 2′ provided for the boiler. For cleansing the preheater 4 from incrustations one may use the circulating system 3, 4, 9, 2. New dissolving liquid is admitted through the conduit 11 and already used liquid is discharged through the conduit 10. The quantity of liquid is suitably so regulated that the concentration of dissolved gypsum (incrustations) in the discharged liquid will not be too high.

Such a continuous or discontinuous introduction of new liquid and discharge of used liquid may of course also be used in connection with circulating systems containing a separate container or the boiler, but is of course of less importance in such cases.

In Fig. 2 a modification of the arrangement just described is also illustrated. Instead of using the pump connected to the circulating system of the boilers, a separate pump 14 is used for circulating the liquid dissolving the incrustations. This pump as well as the container 8 in Fig. 1 may be common to a plurality of boilers.

Tests made have proved that by circulating a liquid dissolving the incrustations through a closed circulating system with the above mentioned velocity between the boiling processes, that is during the periods of blowing, emptying and charging the boilers, the heating surfaces of the preheater can be kept clean from incrustations, even under difficult working conditions. This makes available the use of higher temperatures and consequently higher pressures, which have heretofore been objectionable because of the enormous accumulation of incrustation that was engendered by such higher temperatures. On account thereof the heating operation may also be accelerated and the boiling period shortened, which means that an improved economy in the manufacture of the cellulose will be attained. Thus the invention involves an important technical progress.

Having now particularly described the nature of my invention and the manner of its operation, what I claim is:

1. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises circulating a liquid capable of dissolving said incrustations through a closed circulating system containing said preheater, introducing fresh liquid into the system during the circulation of said liquid and withdrawing a corresponding quantity of the used cleaning liquid.

2. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises circulating a liquid capable of dissolving said incrustations through a closed circulating system containing said preheater, simultaneously continually introducing fresh liquid into the system and continually withdrawing a corresponding quantity of the used cleaning liquid.

3. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises circulating a liquid capable of dissolving said incrustations through a closed circulating system containing said preheater with such a velocity that the flow of said dissolving liquid through the preheater will be of a turbulent character, simultaneously continually introducing fresh liquid into the system and continually withdrawing a corresponding quantity of the used cleaning liquid.

4. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises shutting off the preheater from the boiler, circulating water through a closed circulating system containing said preheater with such a velocity that the flow through the tubes of the preheater is turbulent, simultaneously continually introducing fresh water into the system and withdrawing a corresponding quantity of used cleaning liquid.

5. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises shutting off the preheater from the boiler, circulating water containing an agent which facilitates the dissolution of said incrustations through a system containing said preheater with such a velocity that the flow through the tubes of the preheater is turbulent, simultaneously continually introducing fresh liquid into the system and withdrawing a corresponding quantity of used cleaning liquid.

6. The method of removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, which comprises shutting off the preheater from the boiler, circulating water containing sulphurous acid through a system containing said preheater with such a velocity that the flow through the tubes of the preheater is turbulent, simultaneously continually introducing fresh liquid into the system and withdrawing a corresponding quantity of used cleaning liquid.

7. Means for removing incrustations from indirectly heated preheaters for the reaction liquid in circulating systems for sulphite cellulose boilers, comprising conduits containing a pump and connected with the preheater to form a closed circulating system which system is provided with connecting conduits for introduction of fresh liquid into said system and for removal of used liquid out of the system.

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