

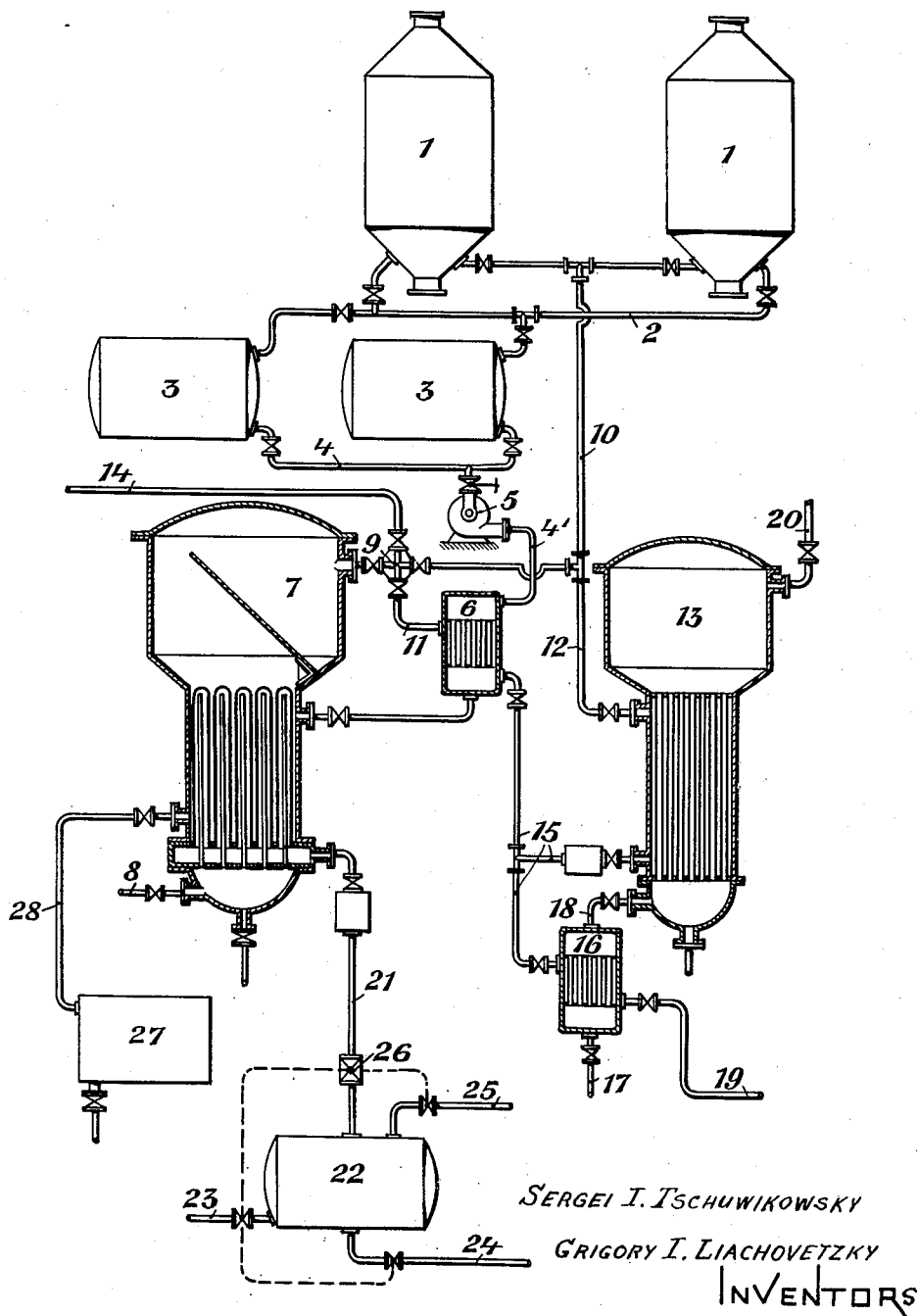
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S. I. TSCHUWIKOWSKY ET AL

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METHOD OF COOKING SULPHITE CELLULOSE

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BY *John P. Wilson*
ATTORNEY.

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SERGEI I. TSCHUWIKOWSKY AND GRIGORY I. LIACHOVETZKY, OF MOSCOW, UNION OF
SOCIALIST SOVIET REPUBLICS

METHOD OF COOKING SULPHITE CELLULOSE

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A very low percentage only of the sulphite cellulose factories uses the heat of the liquor for preheating the water or the cooking acid. A low percentage of the factories obtains the thickening of the liquor during the process of obtaining alcohol, tanning extract, resin and so on. In the first mentioned process a portion of the heat of the liquor is utilized, but the valuable products present are not utilized. In the second mentioned process a by-product is obtained during the thickening of the liquor, but the heat of the waste liquor leaving the cookers is not perfectly utilized during the process of evaporating. The thickening of the sulphite liquor is usually carried out under vacuum at low temperatures which, as is well known, enhances the viscosity, impairs the circulation, causes the separation of the products adapted to form crusts and reduces the heat conductivity. These circumstances cause technical difficulties and augment the costs in such a manner that very often the thickening of the liquor is renounced. As the liquor coming from the cookers contains about 25% of the heat consumed in cooking, the reduction of the heat used for cooking the cellulose is materially dependent on the method employed for utilizing the liquor running off. It therefore follows that from the standpoint of heat economy the methods of evaporating and of cooking the cellulose are not to be separated, as this is usually the case up to now, but must be combined. If the cellulose is directly cooked by steam leaving a steam engine or delivered by a boiler, a device for preparing the feed water for the boiler is now required the capacity of which is a little greater than the steam consumption necessary for cooking the cellulose. On account of a great quantity of additional water required, the main—and utilizing costs are increased, the properties of the feed water (particularly if chemically purified) are impaired, the operation of the steam boilers is influenced and additional losses of heat are caused in the feed water of the boilers.

All these draw-backs and disadvantages are obviated by the use of the method accord-

ing to the present invention for cooking cellulose.

The invention is concerned with a method for cooking cellulose according to which the cooking of the cellulose is carried out by the vapor produced during the evaporation of the sulphite liquor. The cooking and the thickening of the liquor produced during the cooking form a continuous process.

As both these processes are to be carried out simultaneously and must not be separated from each other, a common cycle of heat circulation is obtained under these conditions.

The evaporating device, thereby, utilizes the heat contained in the liquor delivered by the cookers, whereas the heat of the vapor produced by the thickening of the liquor is utilized by the cookers for cooking the cellulose.

The evaporating devices must be directly connected to the cooking vessels. As according to the new process the thickening of the liquor is carried out under high temperatures, because vapors of high temperatures are required for the cooking of cellulose, the viscosity of the liquor is reduced, the circulation is improved and far better utilizing conditions are obtained compared with the present conditions. The amount of the liquor available for exploitation and the amount of vapor produced depend on the process of cooking and on the kind of cellulose treated. The heat of the secondary steam must, of course, be utilized perfectly to obtain an economic process. The calculation shows that, under the usual fluctuations of the liquor output, the main portion of the secondary steam is used for the cooking of the cellulose and only a small portion of the steam may be distributed among the other cellulose producing consumers. In this manner, the number of the additional consumers, the amount of the available secondary steam and the general diagram of operation are determined in each case in connection with the liquor output, the amplitude and the kind of the plant. The same is true with regard to the condensate of the secondary steam and the heat of same. By the new method the volatile products contained in the secondary steam may be ob-

tained by fractional distillation without consuming any additional heat. The losses of condensate are in this cooking process limited in the same manner as in an indirect cooking process, because the consumed steam coming from the boilers is returned to the boiler house in the form of a pure condensate of high temperature.

Hereby the thermal efficiency of the power plant is increased and the use of a great plant for preparing the water is no longer necessary. The small addition of feed water may be produced from the possible and the above mentioned abundance of the secondary steam. In the accompanying drawing a plant for carrying out the process according to the invention is shown diagrammatically by way of example.

From the cookers 1 (or from devices for chemical treatment) the sulphite liquor flows directly by way of the piping 2 into one of the closed and isolated vessels 3. This piping 2 as well as all other pipings mentioned below are, in a known manner, provided with valves or other suitable devices necessary for carrying out the new process. By means of a suitable pump 5 the liquor is pumped through the pipings 4 and 4' to the preheater 6 and the evaporator 7. The latter and the preheater may be of any suitable construction, provided that there is no possibility of a mixing of the liquor with the heating steam and its condensate. According to the conditions the evaporator 7 may be of a multiple effect and consist of several units.

The evaporator 7 is heated by the exhaust steam of the steam engine, by steam taken from this engine or delivered directly by the steam boiler. The heating steam passes through the tube 8 into the evaporator 7. In the evaporator 7 the secondary steam is produced the pressure and temperature of which are suitable for the cooking of the cellulose. The secondary steam passes through the piping 9 and by way of the steam pipe 10 reaches the cookers 1 so as to heat them. Together with the above mentioned abundance of the secondary steam, the steam delivered by the steam pipe may also be led to the other consumers, i. e. (1) by way of the pipe 11 to the preheater 6 for the liquor, (2) by way of the steam pipe 12 to the evaporator 13 of the fresh water for the purpose of producing low pressure steam and (3) by way of the pipe 14 to other devices, for example to drying drums for finally drying the liquor for the purpose of a higher preheating of the cooking acid and so on.

The condensate of the secondary steam passes from the evaporator 13 and from the preheater 6 by way of pipings 15 to the preheater 16 for the fresh water. The fresh water enters the preheater 16 by the tube 17 and is led from there by the pipe 18 to the preheater 13.

After leaving the preheater 16, the cooled condensate of the secondary steam passes, by way of the piping 19, into the working plant. Before this steam is used, the volatile products may be separated by subjecting this steam to a fractional distillation.

From the evaporator 13 for the fresh water the low pressure steam passes through the steam pipe 20 into a drying chamber, a heating system and other devices of the plant and may be used as an additional distillate for the boiler feeding.

The condensate of the heating steam which is led by the steam pipe 8 to the evaporator 7 is passed by the tube 21 to the storage tank 22. This tank 22 may be provided with an automatically operating device 26 by which the purity of the condensate is controlled.

The pure condensate passes from the storage tank 22, by way of the piping 23, into the boiler house and serves as feed water for the boiler. In case of contamination the condensate leaves the storage tank 22 by way of the pipe 24 and is used in the plant as hot water. Before the condensate leaves the tank 22 through the pipe 24, the heat of the condensate may be utilized as low pressure steam which is led away from the tank 22 by the pipe 25. This steam may be used in all cases in which an absolute purity is not required.

The thickened liquor is led by the tube 28 into the tank 27.

What we claim is:

1. In a method of cooking sulphite cellulose leading the liquor leaving the cookers into an evaporator, heating said evaporator by fresh steam to evaporate said liquor and returning the vapors produced to the cookers.

2. In a method of cooking sulphite cellulose, leading the liquor leaving the cookers into an evaporator, heating said evaporator by fresh steam to evaporate said liquor and utilizing the vapors produced for any suitable purpose.

3. In a method of cooking sulphite cellulose, leading the liquor leaving the cookers into an evaporator, heating said evaporator by fresh steam to evaporate said liquor, separating all volatile products contained in the liquor coming from said cookers by a fractional distillation and returning the vapors produced to the cookers.

4. In a method of cooking sulphite cellulose, leading the liquor leaving the cookers into an evaporator, heating said evaporator by fresh steam to evaporate said liquor, separating all volatile products contained in the liquor coming from said cookers by a fractional distillation and utilizing the vapors produced for any suitable purpose.

In testimony whereof we have affixed our signatures.

SERGEI I. TSCHUWIKOWSKY.
GRIGORY I. LIACHOVETZKY.