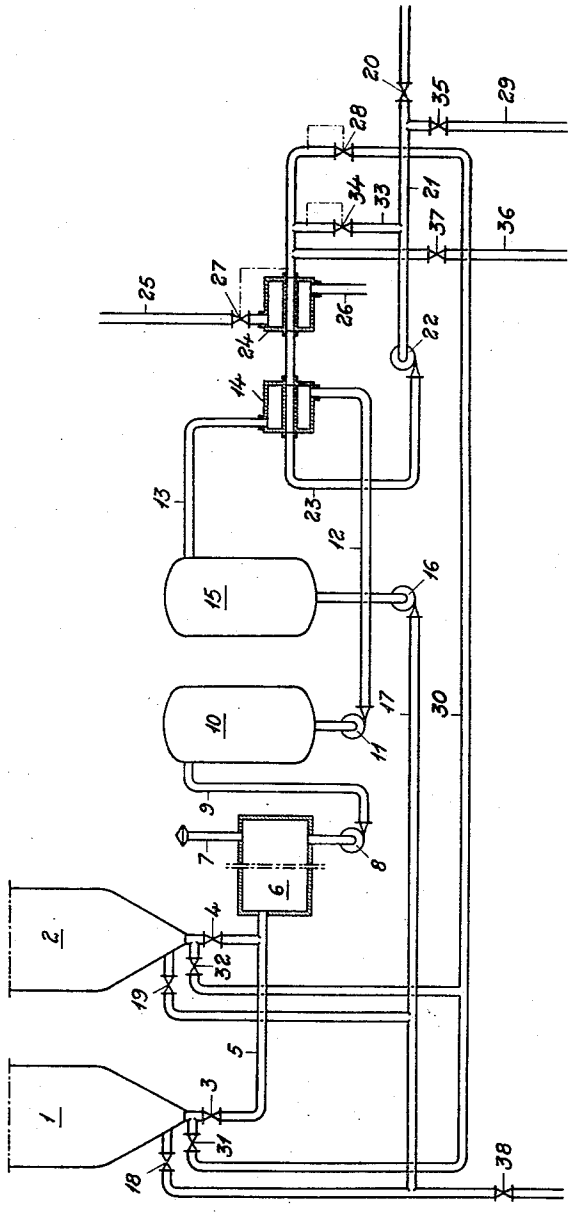
Feb. 25, 1958 C. F. ROSENBLAD 2,824,800

METHOD OF COOKING SULPHITE PULP

Filed July 6, 1955



INVENTOR

Curt Fredrik Rosenblad

BY

Albert M. Parker

ATTORNEY

United States Patent Office

2,824,800

Patented Feb. 25, 1958

2,824,800

METHOD OF COOKING SULPHITE PULP

Curt Fredrik Rosenblad, Princeton, N. J., assignor to Aktiebolaget Rosenblads Patenter, Stockholm, Sweden, a corporation of Sweden

Application July 6, 1955, Serial No. 520,223

Claims priority, application Sweden July 6, 1954

3 Claims. (Cl. 92—11)

In cooking or digesting sulphite pulp the digesters are usually charged with digestion acid from a storage tank in which digestion acid enriched in SO_2 is kept at a temperature, for instance 70–80° C., at which it is desired to supply the digestion acid to the digester and at a pressure of about 3 atm. overpressure required for the SO_2-gas to be kept dissolved in the digestion acid at this temperature.

The storage tank must consequently be constructed for a rather considerable overpressure and also be well insulated for avoiding large losses of heat. Due to this fact and because the storage tank should have a great volume, it follows that said tank will be expensive. The digestion acid is usually heated in indirect heat exchangers before being supplied to the storage tank, or during circulation through same. Usually this process takes place during a considerably longer period of time than the time during which the digestion acid is transferred from the storage tank to the digester, so that the heat exchangers required for this purpose are maintained more or less in continuous action. It is true that by doing so one gains the advantage of being able to dimension the heat exchangers for a flow per time unit which is considerably lower than the quantity of digestion acid per the same unit of time while being supplied to the digester but, on the other hand, the serious drawback from a service point of view then arises that the heat exchangers cannot be washed out without interrupting the output.

The present invention relates to a new method of charging the digester with heated digestion acid and has the object, among others, of obviating the need of storing hot digestion acid under pressure, as well as rendering it possible to clean out periodically the indirect heat exchangers which serve for heating the digestion acid without disturbing operations.

A further object of the invention is to enable carrying out the heating of the digestion acid in a most expedient manner, both as regards economy in heat and service technique. It is a special prerequisite of the invention that the digestion be carried out in such a way that, when it is concluded, the contents of the digester including the liquor shall be blown out directly into a pulp-bin or blow-pit connected with the atmosphere, after which the liquor is extracted or separated from the pulp.

The invention is primarily characterized by the fact that the digestion acid, while it is being supplied into a digester for starting the cooking or digestion, is first heated in a first heating stage by indirect exchange of heat with hot waste liquor or lye which has been extracted from the pulp-bin and subsequently heated further in a second heating stage by indirect exchange of heat with steam, cooled liquor which has been discharged from the first heating stage being stored and then introduced as a cooling medium or a cooling and flushing medium into the contents of a digester which have been

completely digested, or in the outlet of the pulp-bin when the contents of the digester are being blown.

The invention will be described in greater detail below with reference to the accompanying drawing, which diagrammatically shows an example of a practical embodiment of the invention.

Two digesters 1 and 2, in which cooking or digestion is carried on with adjustment of their mutual time ratios, can be blown separately through discharge valves 3 and 4 respectively, and a blow-pipe to a pulp-bin 6, which is connected with the atmosphere by means of an outlet 7. The waste lye or liquor from the pulp-bin can be led to a hot lye storage tank 10 through a connecting pipe 9 fitted with a pump. From the hot lye storage tank 10 hot lye can be caused by a pump 11 to pass through a pipe-line system 12, 13 through a heat exchanger 14 in which the lye is cooled so that it in a cool state enters a cold lye storage tank 15, from which cold lye can be passed by means of a pump 16 to either of the digesters 1 and 2 through a pipe line 17 and the valves 18 and 19 respectively in the discharge throat of the respective digesters.

Digestion acid from the acid preparation can, through a valve 20, a pipe 21, a pump 22 and a pipe-line 23, be passed through the heat exchanger 14, in which the digestion acid is heated in indirect heat exchange relation to the waste lye passing through the same heat exchanger. The digestion acid thus heated is further conducted through a second heat exchanger 24, in which the digestion acid is further heated in an indirect heat exchange with steam to an appropriate temperature for feeding the digesters. The steam is led into this heat exchanger by a pipe-line 25, and the condensate of steam developed during the heat exchange is withdrawn from the heat exchanger by a tube 26, for example to a discharge pipe for the condensate, not shown in the drawing. Pipe-line 25 is fitted with a control valve 27, which, actuated by a temperature impulse in the digestion acid outlet from heat exchanger 24, acts to choke the flow when the temperature there tends to exceed the appropriate value for feeding the digestion acid to the digester, and to open the flow when the temperature tends to fall below that value. By doing so the flow of steam is controlled so that the digestion acid with the intended constant, final temperature can be passed on through a control valve 28 and a conduit 30 into either of the digesters 1 and 2 through valves 31 and 32 respectively. The control valve is of the overflow type, adapted to maintain a constant pressure on the flow side of the valve, that is to say in the heating system, said pressure being sufficiently high to prevent gases from being liberated from the digestion acid while this is being heated. The tendency of the digestion acid to form incrustations in the heat exchangers is hereby strongly reduced. A shunt pipe 33 with a control valve 34 of the same kind as control valve 28, serves as a return line for the surplus of digestion acid carried through pump 22 when the instantaneous need of digestion acid for the digester is comparatively small in charging up stage so that a circulation of digestion acid can be maintained throughout the heating system. Control valve 34 is for this reason adjusted so as to open at a somewhat higher overpressure than control valve 28. In this way it is possible to maintain, irrespective of the instantaneous charging intensity, a constant high rate for the passage of the digestion acid through the heat exchangers which is favourable for the transmission of heat, and in order for reducing a possible tendency to incrustation.

The arrangement of a preparatory heating up of the

digestion acid with hot waste lye ensures a marked reduction in the peak loads in the boiler-house which are unavoidable in intermittent heating up with steam, as in the present instance. The method of combining the heating up by steam with heating by means of waste lye also offers other important advantages. Cooling of the digester content before this is blown to the bin, so as to condense liberated vapors and retaining gases solved in the lye, has, as known in itself, for example the advantage that gases which are disagreeable for the neighbourhood, can be practically prevented from escaping, and in addition the bin can be made smaller than if it has to receive large quantities of vapors and gases. According to the invention, these advantages are moreover obtained simultaneously as heat, which is released from the contents of the digester on cooling and conveying to the cooled waste lye, is recovered with the charged digestion acid which absorbs such heat from the waste lye in its first stage of heating.

As the heat exchangers have to be utilized only during the period when some digester is charged with digestion acid, it is possible to arrange for intervals when the heat exchangers can be cleaned without interrupting operations. When valve **20** has been closed, a cleansing liquid can then be taken in by pipe **21** through a pipe **29** with a valve **35**, pumped through the heat exchangers and discharged through a tube **36** having a valve **37**. If desired, a cleansing liquid can also be kept in circulation through shunt line **33**. A surplus of cooled waste lye obtained in the ordinary running of the plant can be withdrawn from the system through valve **38**.

The practical example given here can of course be modified in many ways within the scope of the invention by anyone skilled in the art. Valves have, for example, only been shown in so far as absolutely necessary in order to illustrate the operation.

What I claim is:

1. In a method of digesting or cooking sulphite pulp, the process of preheating the digestion acid when charging a digester and recovering heat from waste liquor, comprising in combination the steps of blowing a digester to an atmospheric pressure blow pit, while flushing and cooling the digester content with low temperature waste liquor, withdrawing the hot waste liquor from the blow pit and storing said waste liquor substantially at its blow pit temperature, passing, in indirect heat exchange relation to each other, digestion acid which is being charged to a digester and stored hot waste liquor, so as in a first stage to heat the digestion acid and to cool the liquor, storing the cooled waste liquor separately from the hot waste liquor, passing the heated digestion acid and steam in indirect heat exchange relation to each other, so as to increase in a second stage the temperature of the digestion acid to the desired preheating temperature, passing the digestion acid to the digester at said preheating temperature and utilizing stored cooled spent liquor as flushing and cooling agent in a digester blowing process.

2. A method according to claim 1, in which the digestion acid is heated at a pressure which is high enough to prevent gases from being liberated from the digestion acid during any part of the acid heating stages.

3. A method according to claim 1, in which digestion acid is passed through both acid heating stages in a larger quantity per time unit than the quantity of acid instantaneously required for the charging of the digester whereby the superfluous quantity of digestion acid leaving the last heating stage is recirculated to the first heating stage.

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