

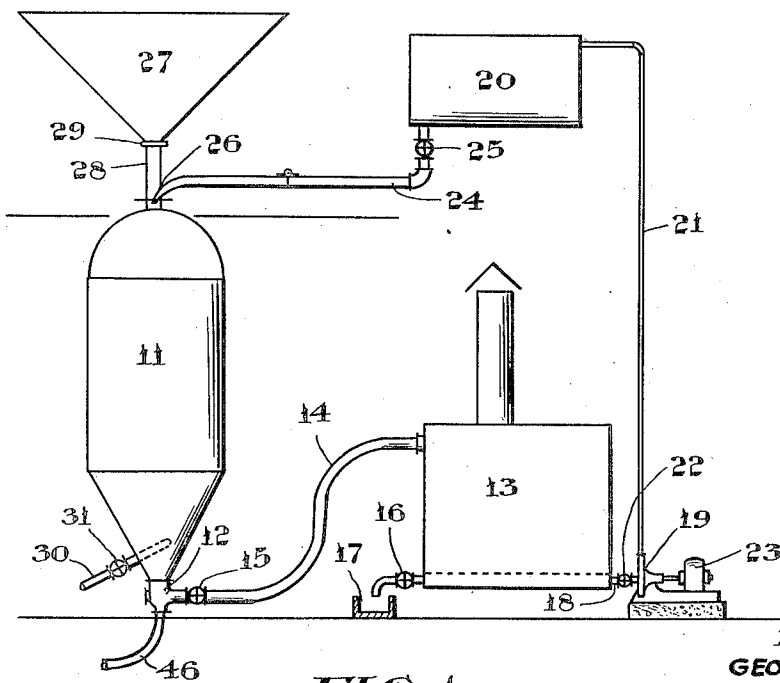
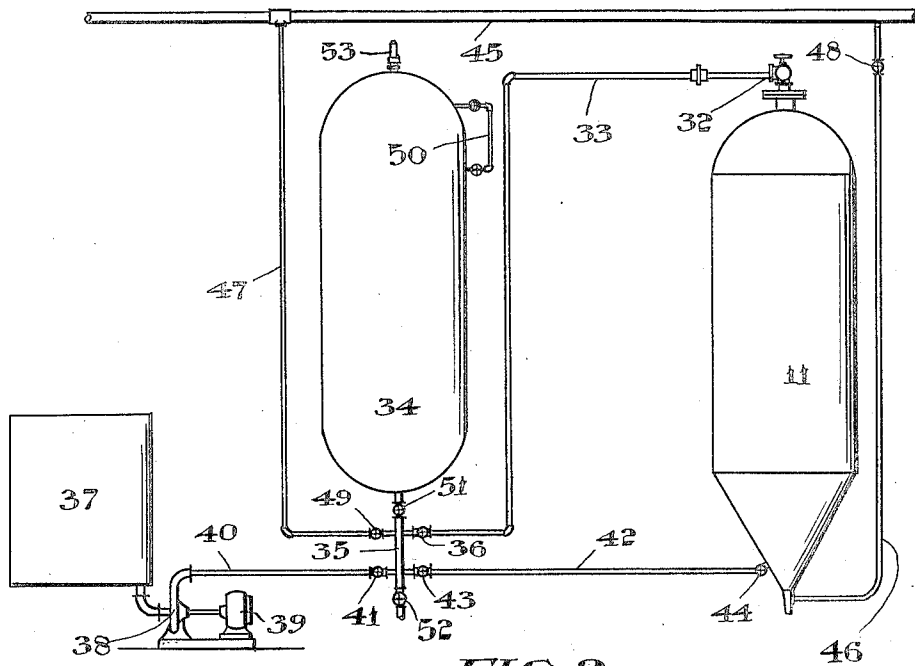
Jan. 1, 1929.

1,697,032

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METHOD OF COOKING SULPHITE PULP

Original Filed Dec. 7, 1925



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METHOD OF COOKING SULPHITE PULP.

Application filed December 7, 1925, Serial No. 73,860. Renewed May 14, 1928.

This invention relates to new and useful improvements in the method of cooking sulphite pulp and the object of the invention is to provide a simple and efficient method of preparing the charge of pulp and the manner of cooking same, so that the output from each charge will show a decided increase and a better grade of pulp, when compared with the methods at present in use.

Another object is to provide a method of cooking pulp in which the charge will be cooked in a more uniform manner and in a shorter space of time than in the methods of cooking usually employed.

A further object is to provide a method of cooking sulphite pulp in which hot waste liquor from the blow pits will be used to increase the capacity of the digester.

A still further object is to provide a method of cooking pulp, in which the hot fluid from the digester relief will be utilized to preheat the cooking acid.

In my invention, the wood chips are preheated and packed in a very close manner within the digester, by utilizing the hot liquor from the blow pit for doing same. When the digester is full of preheated chips, I then introduce preheated cooking acid and steam for the purposes of cooking the chips.

In the drawings which are diagrammatic, I have shown devices of simple construction which may be used in cooking sulphite pulp according to my invention.

Figure 1 is a diagrammatic view of one form of apparatus which may be used for charging the digester.

Figure 2 is a diagrammatic illustration of a device for cooking the charge.

Referring more particularly to the drawings, 11 designates a digester and 12 the discharge end which is connected to a blow pit 13, by means of the pipe 14 provided with a control valve 15. The blow pit is provided with a drain cock 16 at its lower end which controls the flow of waste liquor to the trough 17. Also connected to the bottom of the blow pit is the inlet pipe 18 of the pump 19, the outlet from which is connected to the top of a storage tank 20 by means of the pipe 21. A suitable control valve 22 may be fitted in the connection between the blow pit and the inlet side of the pump, which may be driven from any suitable source, such as the motor 23. Depending from the underside of the storage tank and communicating therewith is the discharge pipe 24, which may be

provided with a suitable valve 25 for controlling the passage or flow of liquor there-through. This pipe 24 may be made in sections, so that it may be very easily dismantled when not required or during the cooking of the charge in the digester. The end 26 of the pipe 24 is so positioned when in use that it communicates with the top of the digester. Positioned above the digester is the chip storage bin 27 which communicates with the top of the digester by means of the chute 28 which may be provided with a gate valve 29 to control the feed of chips to the digester. The bottom of the digester is provided with a drain pipe 30, with a control valve 31 mounted therein. The top of the digester is provided with a relief passageway or valve 32, in the cover of the digester which with the cover may be removed to fill the digester. The valve 32 has an outlet pipe 33 which communicates with the bottom of the pressure tank 34, through the medium of the pipe 35. A valve 36 may be fitted to the pipe 34 and in proximity to the junction between the pipes 33 and 35. Cold cooking acid is stored in the tank 37, the outlet from which is connected to a pump 38 driven by any suitable means such as the motor 39. The outlet from this pump 38 is connected to the pipe 35 by means of the pipe 40 which is provided with a valve 41. A pipe connection 42 between the pipe 35 and the bottom of the digester may be provided with suitable control valves 43 and 44, one at each end thereof. Steam from a suitable source (not shown) is fed to the bottom of the digester and to the pipe 35 through the medium of the main steam pipe 45 and the branches 46 and 47, the former to the digester and the latter to the pressure tank. A valve 48 may be mounted in the pipe 46 and valve 49 may be mounted in the pipe 47. The pressure tank is provided with the gauge glass 50 and a shut-off valve 51 may be fitted in the pipe line 35 in close proximity to the bottom of the pressure tank. A suitable drain valve 52 may also be fitted to the lower end of the pipe 35. A relief valve 53 may be fitted to the top of the pressure tank.

The method of operation is as follows assuming that the digester is filled with cooked sulphite. Valve 12 is opened and the charge within the digester blown by any suitable means into the blow pit 13. When the digester is empty the cover is removed leaving the top of the digester open to receive a fresh charge of chips from the bin 27. Valve 18 is opened

and pump 19 brought into operation to pump the hot liquor from the blow pit into the storage tank 20 from where it is led into the digester through the pipe 24. Valves 25, 29 and 31 are then opened and valve 15 closed. The wood chips and the hot liquor flow into the digester through the top opening, the liquor draining off through connection 30. In this way, the hot liquor preheats the chips as they pass into the digester and also washes them into position within the digester so that they are very closely packed together. This method of packing the chips greatly increases the charge when compared with the methods at present in use in which the chips are fed and settled into position in the digester by gravity alone and this increase in digester capacity may be as high as 15%, a considerable advantage and saving over the present feeding methods. Also by using the hot liquor from the blow pit further saving is made in the cooking operation since the chips are raised in temperature to approximately that of the liquor with which they come in contact. This heat in the past has been discharged as waste. To complete the cooking of the charge, valves 25 and 29 are closed and the cover is connected to the top of the digester after all the feeding mechanism has been removed therefrom. The liquor fed to the digester having drained off through the pipe 30, valve 31 is closed. It is now necessary to introduce sulphite cooking acid and steam to complete the cooking. Now if cold acid is introduced or fed into the digester, the heat which the chips contain will be transferred to the acid as it diffuses through the mass and as a result of this the heat will be localized. Whether this localization of the heat occurs at the top or the bottom will depend upon whether the acid is fed from the top or the bottom. In either case it is equally objectionable, since the wide differential in temperature thus occurring is difficult to correct and makes for poor cooking conditions and may result in high screening losses.

In the operation of this method the cooking acid is heated before it is introduced into the digester from the pressure tank 34. The cold acid is pumped from tank 37 into tank 34 through the operation of pump 38 and the manipulation of valves 41 and 51. Gas and steam which is relieved during the cooking and finishing of the digester earlier in the series and in which this charge of acid may subsequently be used, is introduced to the pressure tank directly and without intermediate cooling through the operation of valves 32 and 36.

In this way perfect recovery of the excess sulphur dioxide gas is made and at the same time the otherwise large amount of heat which is customarily abstracted by coolers is regenerated and thus used for heating the cooking acid. Steam may also be used to

further heat the acid through manipulation of valve 49. By these means, the temperature of the cooking acid may be raised to approximately 100° C. before introducing it into the digester. The digester having been filled with preheated chips in the manner previously described and the charge of cooking acid having been prepared and preheated as described, the cooking acid is now admitted to the digester through manipulation of the valves 44 and 43. The fact that both the cooking acid and chips have been preheated to approximately the same temperature, insures a more or less uniform initial temperature in the digester and thus obviates any difficulty in bringing about the further heating or cooking operations within the digester. In this way it is possible to commence the cooking operation with an initial temperature closely approximating 100° C., in place of 30° to 40° C. as under present methods. It will readily be seen that by starting the cooking of the pulp at this high temperature, a great saving in time can be made when compared with the older methods. Steam is introduced into the digester through pipe 46 by manipulating valve 48, for the purpose of raising the temperature within the digester to the temperature at which it is desired to finish the charge.

Having thus described my invention, what I claim is;—

1. In a sulphite cooking process, the method which consists of utilizing hot liquor discharged with the cooked pulp from a digester into a blow pit to preheat, and wash into position a second charge of chips in the digester, and mixing with the second charge a quantity of cooking acid which has been raised in temperature, by the fluid passing through the relief of the digester while the first mentioned charge of pulp was under cooking conditions.

2. In a sulphite cooking process, the method which consists of utilizing hot liquor discharged with pulp which has been cooked in a digester to pack, preheat and wash into position a second charge of pulp fed into the digester, and mixing with said second charge a quantity of cooking acid which has been raised in temperature by means of steam and the gases passing from the relief of the digester during the cooking of the first mentioned charge of pulp.

3. In a sulphite cooking process, the method which consists of utilizing the relief of gases from one charge of pulp to preheat cold cooking acid, discharging the pulp when cooked into a container and utilizing the hot liquor of said discharge to preheat and wash into position a second charge of chips, draining off the liquor from the second charge of chips, raising the temperature of the cooking acid to the temperature of the second charge of chips by steam, feeding the hot acid to

the second charge of chips and then cooking same by introducing steam.

4. A process of cooking pulp which consists, in preheating a charge of chips in a digester or container by means of hot liquor discharged with the cooked pulp in a previous digesting operation, preheating a charge of cooking acid in another container by means of hot gases also obtained from a previous digesting operation, bringing the two preheated materials together by diffusing the hot acid through the hot chips, and then introducing steam to complete the cooking operation.

5. A process of cooking sulphite pulp which consists, in preheating a charge of chips in a digester or container to a temperature of approximately 100° C. by means of a hot liquor discharged with the cooked pulp in a previous digesting operation, preheating a charge of cooking acid in another container to a temperature of approximately 100° C. by means of hot gases also obtained as the result of a previous digesting operation, bringing the two preheated materials together in a digester in such a manner as to maintain approximately the same temperature between the chips and cooking acid, and then introducing steam into the mass to complete the cooking operation.

6. A process of cooking sulphite pulp which consists, in preheating a charge of chips in a digester by the introduction of a hot liquid discharged with the pulp in the course of a previous digesting operation, preheating a charge of cooking acid in another container by means of hot gases obtained as a product of the aforesaid previous operation, then introducing the cooking acid into the digester at approximately the same temperature as the chips whereby the temperature of the preheated mass will be substantially uniform, and then raising the temperature of the mass by means of steam to complete the cooking operation.

7. A process of cooking pulp which consists in preheating a charge of chips in a digester by introduction of hot liquor discharged with the cooked pulp at the end of a previous digesting operation, then draining the liquor from the digester, then introducing into the digester hot gases given off in the course of the aforesaid previous digesting operation and then introducing steam into the digester to raise the temperature of the mass sufficiently to complete the cooking operation.

In witness whereof, I have hereunto set my hand.

GEORGE H. TOMLINSON.