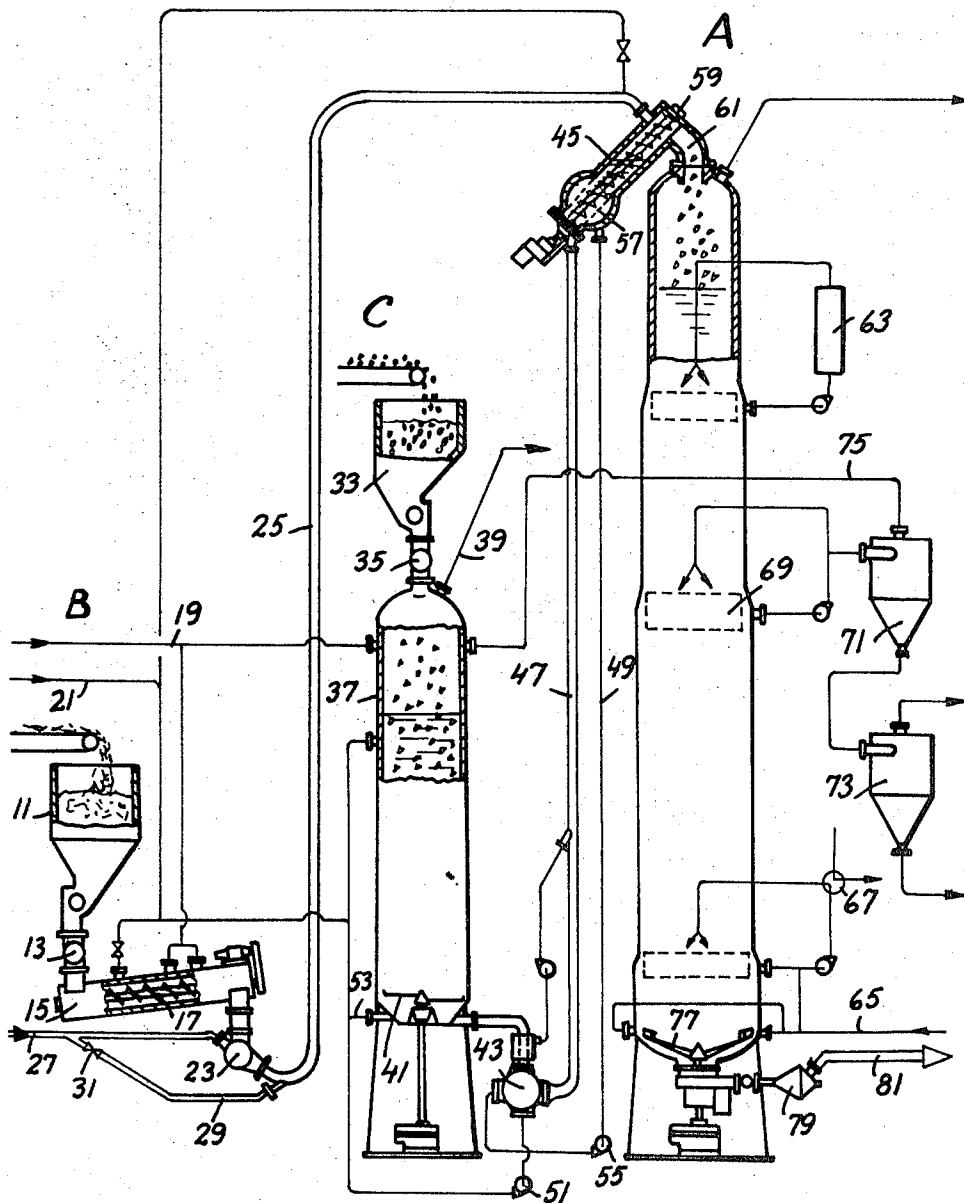


May 11, 1971

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METHOD FOR COMMON DIGESTION OF TWO DIFFERENTLY
PRE-TREATED FRACTIONS OF WOOD CHIPS
Filed Sept. 18, 1968

3,578,554



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METHOD FOR COMMON DIGESTION OF TWO DIFFERENTLY PRE-TREATED FRACTIONS OF WOOD CHIPS

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Filed Sept. 18, 1968, Ser. No. 760,486

Claims priority, application Sweden, Sept. 18, 1967, 12,803

Int. Cl. D21c 3/26

U.S. Cl. 162—19

2 Claims

ABSTRACT OF THE DISCLOSURE

A continuous digester is charged with wood chips divided by screening into two fractions, viz a larger fraction of coarser particles and a smaller fraction of finer particles. The fractions are digested in common but are pre-treated differently. The pre-treatment of the coarser fraction consists in steaming and thorough impregnation with digesting liquor, and the pre-treatment of the finer fraction consists in merely steaming or steaming and impregnation during a shorter time. The two fractions are conveyed to the digester top in different ways, the coarser chips being suspended in circulating liquid, and the finer chips may be blown by steam, preferably steam later used for heating the digester to digesting temperature.

The invention relates to digestion of wood chips in a continuous cellulose digester.

Modern methods of open air storing and transportation have involved the deterioration of the quality of wood chips used in cellulose mills. Where it is desired to maintain a good and even quality of the pulp obtained by the digestion, a portion of the chips must be screened out and discarded, which involves fiber losses. Particularly the comparatively great quantity of finer particles is not desired and cannot be allowed to accompany the chips particles of the correct and desired size because the digestion will be impaired and an inhomogeneous pulp obtained. The proposition to digest the finer chips particles in a separate digester is difficult to realize because such fiber material will easily be so densely packed that the digesting liquors cannot be circulated therethrough in the desired manner and besides, the cost of an additional digester of a comparatively small size is usually prohibitive.

According to the present invention said difficulties are obviated thereby that the charge of chips is divided by screening into a larger fraction of coarser particles and a smaller fraction of finer particles and that said fractions after separate pre-treatment and separate transportation up to the digester top are mixed and digested in common. By providing for each chips fraction a pre-treatment adapted to the respective particle size the subsequent digestion can take place in common in a single digester with comparatively good result. Preferably the coarser chips fraction is steamed and impregnated with digesting liquor by immersion therein, whereas the finer chips fraction is steamed and possibly mixed with digesting liquor in a separate operation. By transporting the two kinds of chips to the top of the usually very tall digester in different ways, the advantage is gained that the coarser chips fraction can be pumped into the digester by the use of circulating liquid which, due to the risk of clogging the screens would not be possible if the finer particles were admixed thereto, whereas the finer chips fraction is easy to convey to the digester top by blowing with steam. For that last-mentioned transportation purpose it is advantageous to use high-pressure steam required for heating the digester charge.

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The invention will be more closely described herein below with reference to the accompanying drawing which shows a cellulose digestion plant suitable for performing the method according to the invention.

In the drawing, A designates generally an upright cylindrical cellulose digester adapted for continuous downwardly directed feed of the fibrous material, and B and C designate two devices connected in parallel to the digester and adapted for pre-treatment and supply of chips thereto.

The pre-treatment device B is provided for a finer fraction of the hewn chips available in the cellulose mill in question, which fraction is obtained by screening and to which may be admixed sawdust in a percentage of about 15 percent as a maximum. Said fiber material is introduced into a hopper 11, from which it is transferred via a rotary low-pressure feeder valve 13 into a steaming vessel 15, in which the chips are steamed by low-pressure steam, supplied through the conduit 19, while being stirred by the conveying screw 17. The cylindrical steaming vessel is substantially horizontal but may be somewhat inclined so that its output end towards which the chips are moved by the conveying screw 17, is located at a somewhat higher level than the input end. A small quantity of digesting liquor supplied through the conduit 21 may be introduced into the steaming vessel in order to have the chips impregnated, at least superficially, with said liquor. In that case the liquor forms a pool at the charging end of the steaming vessel, and the chips are immersed into said pool before they are raised by the feeding screw 17. From the steaming vessel the chips are carried through a high-pressure feeder valve 23 and a standpipe 25 up to the digester top. Usually the steaming vessel is located at ground level, whereas the digester top is situated at a level of several tens of meters above ground, power being required for the chips transportation. According to the invention the chips are conveyed by a flow of steam, high-pressure steam from conduit 27 being supplied not only to the high-pressure feeder valve 23 in order to flush out its chips-filled pockets, but also via a branch conduit 29 to the lower end of the standpipe 25 in a required quantity controlled by the valve 31.

The pre-treatment device C is provided for the coarser fraction of the wood chips obtained during the screening thereof. Said fraction is introduced into a hopper 33 and discharged by a rotary feeder valve 35 into the top of an upright cylindrical vessel 37 adapted for a combined steaming and impregnating treatment of the chips. The upper part of said vessel is maintained filled with low-pressure steam supplied through the conduit 19 and the lower part thereof is maintained filled to a predetermined level with such digesting liquor, for instance sulphate liquor, as should be used for digestion of the fiber material in the continuous digester A and taken from the conduit 21. First the chips are heated with steam in the upper end of the vessel, air released being let off periodically through the conduit 39. The chips then move as a solid column continuously down below the surface level in the vessel, the chips particles being impregnated with digesting liquor by absorption. The mixture of chips and digesting liquor is discharged at the bottom end of the vessel by means of a motor-driven rotary scraper 41 and is transferred to the top of the digester A by means of a conveying device operating with circulating liquid and comprising a high-pressure feeder valve 43 of known construction, a screening device 45 located near the digester top and two conduits 47, 49 extending therebetween. Small batches of the chips-liquor-mixture are successively introduced into the pockets of the rotary feeder valve when said pockets are in the vertical position, a corresponding amount of liquor being returned by means of the pump 51

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through the conduit 53 to the vessel 37. When the pockets have been turned to their horizontal position, they form part of a circulation loop under high pressure and the chips-liquor-batch therein is fed through the conduit 47 to the screening device 45 by the action of the pump 55 which is supplied with liquor drawn off the chips through a screen 57 in the device 45 and returned through the conduit 49. Thus the pump maintains a circulating liquid flow by which the chips are carried from the bottom of the vessel 37 to the top of the digester A. By means of a feeding screw 59 the chips are lifted above the liquor level in the device 45 and are dropped through the outlet 61 into the uppermost steam-filled space of the digester. Also connected to said space is the conduit 25 which supplies the high-pressure steam required for a first digesting treatment in steam phase and also the finer wood material carried therewith. Thus said material will be mixed with the coarser material in connection with the charging of the digester.

The digester may be of any previously known design. According to the drawing there follows upon the steam phase digesting step a digesting step in liquid phase comprising circulation and heating of the digesting liquor in a heat exchanger 63. In the lower part of the digester the pulp is washed by liquid supplied at the digester bottom through the conduit 65 and heated at a somewhat higher level by circulation through a heat exchanger 67. Said liquid is then driven upwardly in counter-current to the downwardly moving chips column and is finally discharged together with black liquor through a sieve girdle 69 inserted in the digester shell, and transferred to the two blow tanks 71, 73 connected in series. The steam released due to the pressure drop in the first tank 71 flows through the conduit 75 to the vessel 37 and is used therein for the steaming of the chips. The digested and preliminary washed pulp is discharged from the digester by means of a rotary scraper 77 and departs through the throttling device 79 and the conduit 81.

The invention provides the possibility of pretreating the two chips fractions in mutually different ways and so that the best possible final result is obtained after the common digestion of the two fractions. The finer material into which the digesting liquor penetrates more easily can be

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pre-impregnated with digesting liquor during a much shorter time than the coarser material, or is not pre-impregnated at all, because the former is more easily digested or will get a sufficient contact with the digesting liquor after its introduction into the digester. Also the duration and the temperature of the steaming operation of the two chips kinds can be chosen differently and adapted to the degree of comminution of the material.

What is claimed is:

1. A method for digesting a charge of wood chips in a continuous cellulosic digester comprising the steps of:

- (a) dividing said charge of chips into a first fraction of coarse particles and a second fraction of fine particles,
- (b) pretreating said first fraction by steaming and impregnating the same with digesting liquor,
- (c) pretreating said second fraction by steaming separately from said first fraction,
- (d) feeding the pretreated first fraction to the top of said digester as a suspension, in circulating liquid,
- (e) feeding the pretreated second fraction to the top of said digester by blowing the same with steam, and
- (f) digesting the resulting mixture of said fractions in said digester.

2. A method as claimed in claim 1 wherein the second fraction is blown to the top of the digester by high pressure steam used to heat the digester to the digesting temperature.

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U.S. Cl. X.R.

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