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(54) METHOD AND ARRANGEMENT FOR DISCHARGE DILUTION

VERFAHREN UND ANORDNUNG ZUR AUSLASSVERDÜNNUNG

PROCÉDÉ ET AGENCEMENT POUR DILUTION DE DÉCHARGE

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Description

TECHNICAL FIELD

[0001] The present invention relates to pulp manufacturing processes in general, and particularly to adaptations of discharge dilution to enable improvements in screening in such processes.

BACKGROUND

[0002] Pulp processing (e.g. Kraft process or sulfite process) typically comprises introducing wood chips or other lignocellulosic material into a digester or cooker together with an impregnation liquid e.g. black liquor from a displacement tank and the chips or other lignocellulosic material is preheated and pre-impregnated. Black liquor is the waste product from the so called Kraft process when pulpwood is digested into paper pulp removing lignin, hemicelluloses and other extractives from the wood to free the cellulose fibers. Thereby, black liquor is an aqueous solution of lignin residues, hemicellulose, and the inorganic chemicals used in the process. Correspondingly, white liquor is a strongly alkaline solution typically of sodium hydroxide and sodium sulfide which is used to break the bonds between lignin and cellulose. Thereby, white liquor is the "pure" impregnation liquid whereas the black liquor is recycled impregnation liquid. Subsequently, hot black and white liquor is introduced into the digester and displaces the initially introduced impregnation liquid back into the displacement tank. Due to the introduction of hot liquor the fiber is heated and cooked during a period of maintaining the temperature at a desired level. The cooking dissolves or softens the lignin in the material and the cooking time and temperature is dependent on the material to be cooked as well as desired fiber properties after cooking. After cooking, black liquor e.g. displacement liquor (from the displacement tank) with a lower temperature is introduced into the digester to lower the temperature and thereby terminate the cooking reactions. Finally the digester is discharged to an atmospheric storage tower e.g. discharge tank from which the cooked pulp is transported via piping to e.g. a screening process in order to deliver a finished pulp with predetermined properties e.g. predetermined fiber fractions i.e. concentration of fibers in the pulp.

[0003] In this context, wood pulp can be defined as wood chips mechanically ground and/or chemically digested at elevated temperatures to produce fibers for use in manufacturing paper or fiber-based wood composites [1]. In the same manner pulp can be manufactured from other lignocellulosic materials, e.g. bagasse. Lignocellulose or lignocellulosic material refers to plant dry matter (biomass), so called lignocellulosic biomass. So called virgin biomass includes all naturally occurring terrestrial plants such as trees, bushes and grass. So called waste biomass is produced as a low value byproduct of various industrial sectors such as agricultural (corn

stover, sugarcane bagasse, straw etc.), forestry (saw mill and paper mill discards). Energy crops are crops with high yield of lignocellulosic biomass produced to serve as a raw material for production of second generation biofuel examples include switch grass (*Panicum virgatum*) and Elephant grass.

[0004] Pulp consistency is defined as the mass concentration of fibers in water. Consistency is calculated as (dry weight of sample/wet weight of sample) x100%.

10 Pulp consistency is roughly divided into three ranges:

Low consistency: <5%

Medium consistency: 5 - 15%

High consistency: >15%

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[0005] The different ranges of consistency are found in different parts of the pulping and papermaking process, for example high consistency can be found in e.g. mechanical pulping, reject refining, bleaching, storage, medium consistency in e.g. cooking, bleaching, storage, repulping, low consistency in stock preparation, cleaning, screening, beating, and blending.

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[0006] In present pulp manufacture processes, liquor from the displacement liquor tank is utilized in order to dilute the pulp in the discharge sequence. The dilution is necessary in order to enable emptying or discharging the pulp from the digester and into the discharge tank. In the subsequent screening process some of the process steps are fed with a pulp at low consistency and using liquor for its function. A reject washer is often such a process step/stage. The accept from these process steps, which is a low consistency pulp which resembles pure liquor more than a thicker pulp, is subsequently fed to a reject tank and then fed to the discharge tank. The flow from the reject tank then lowers the consistency in the system significantly. To reduce the consequences of the reject tank flow, typically a so called delta thickener is added, which removes most of the liquor from the pulp fed to the discharge tank

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[0007] Consequently, the pulp fed to the discharge tank from batch cooking does not have high consistency enough to handle all the liquor from the reject tank as dilution in the discharge tank without lowering the screen feed consistency more than desired. In many applications today, the consistency is increased with a thickening device e.g. delta thickener or the like in order to enable the screening being fed at a normal consistency. Depending on the manufacturer of the processing equipment, the thickening agent or device varies. The thickening agent and/or machinery introduces both unwanted process steps and material into the process, thus increasing both time and costs for the pulping process.

[0008] Therefore, there is a need for an improved dilution method and arrangement in the discharge sequence without the above mentioned disadvantages.

SUMMARY

[0009] The present invention relates to improved discharge method and arrangement in pulp processing.

[0010] In a first aspect the proposed technology discloses a method of providing a diluted discharge pulp, comprising the steps of providing pulp with a first consistency in a digester, which pulp comprises cooked lignocellulosic fibrous material, diluting the provided pulp by feeding a reject liquor from a screening process into the digester during a discharge sequence to provide a diluted pulp in the digester, where the reject liquor from the screening process is a pulp with a lower consistency than the pulp with a first consistency, and feeding the diluted pulp through a discharge pipe to a discharge tank to provide a diluted discharge pulp.

[0011] By means of the proposed technology the pulp can be diluted without addition of any unwanted additives and reject liquor can be reused in the discharge process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention, together with further objects and advantages thereof, may best be understood by referring to the following description taken together with the accompanying drawings, in which:

Fig. 1 is a flow chart of an embodiment of a method according to the proposed technology;

Fig. 2 is a schematic block chart of a system according to the proposed technology.

Fig. 3 is a schematic block chart illustrating prior art;

Fig. 4 is a schematic block chart illustrating the benefits of the embodiments of the proposed technology;

DETAILED DESCRIPTION

[0013] The present disclosure will be described in the context of a batch cooking process. However, it is easily adapted for a case of continuous cooking. Further, although the background and the description of the proposed technology primarily describes the so called Kraft process, it is equally applicable to sulfite processes or similar with appropriate adaptation of processing terminology.

[0014] The inventors have identified the benefits of reusing reject liquor or low consistency pulp, i.e. pulp with a low concentration of solid fibers, from the screening process for diluting the pulp during the discharge sequence. In other words, instead of using liquor from the displacement liquor tank during the discharge sequence, the same functionality can be met by using liquor from a screening reject tank. As most of the flow from the reject tank will be used in the cooking discharge sequence, only a small part will be sent to the bottom of the discharge tank to control the consistency. The dilution is then reduced so that it is not necessary to add any thickening device to run screening in normal consistency. Thereby,

reusing low consistency reject liquor from the screening process for dilution during the discharge sequence will reduce the need for additives or machinery that increase the consistency of the feed into the screening process.

[0015] With reference to Figure 1, embodiments of a method of providing a diluted discharge pulp in a pulp processing plant will be described. In this context the pulp can comprise processed wood fiber [1] or other processed lignocellulosic fiber. According to a first embodiment, the method includes the steps of providing S10 pulp with a first consistency in a digester, said pulp comprising digested or cooked wood chips or other lignocellulosic fibrous material at a certain concentration. Subsequently, diluting S20 the provided pulp by feeding a low consistency screening reject liquor, i.e. a reject liquor from a screening process, into the digester to provide a diluted pulp in the digester, and finally feeding S30 the diluted pulp through a discharge pipe to a discharge tank to provide a diluted discharge pulp. As described above, the low consistency screening reject liquor is in fact a pulp with low consistency, i.e. lower consistency than the pulp with a first consistency. Thus, the low consistency screening reject liquor has a lower concentration of fibers than the pulp with a first consistency.

[0016] According to a further embodiment, the diluting step S20 comprises feeding a first fraction of the reject liquor from the screening process into the discharge pipe to further dilute the pulp.

[0017] According to yet another embodiment, the method includes the further steps of diluting S40 the discharge pulp in the discharge tank with a second fraction of the reject liquor from the screening process, before (which is common for all embodiments) feeding S50 the (diluted or undiluted) discharge pulp to the screening process for screening S60.

[0018] According to a further embodiment, the method includes an intermediate step of feeding the reject liquor from the screening process to a buffer, and subsequently feeding the first and/or second fraction from the buffer to the digester and optionally also to the discharge pipe and/or to the discharge tank.

[0019] In the above described embodiments, no mention is made to the consistency or concentration of the diluted pulp. However, according to a further embodiment, it is possible to control, in step S25, the dilution in order to achieve a diluted pulp with a predetermined consistency or concentration of fibers. This may be performed by determining the concentration of the pulp in the digester and diluting the pulp in order to achieve a wanted concentration. More commonly though is diluting the pulp just enough to enable discharging the pulp from the digester.

[0020] With reference to Figure 2 embodiments of a discharge dilution arrangement 100 according to the present disclosure will be described.

[0021] According to a first embodiment, the discharge dilution arrangement 100, comprises a digester 1 configured for receiving at least a lignocellulosic fibrous mate-

rial and a cooking liquor to cook into a pulp. Further, the discharge dilution arrangement 100 includes a discharge tank 2 configured for receiving said pulp from said digester 1 and for outputting said pulp to a screening process. The digester 1 and the discharge tank 2 are connectable via a discharge pipe 3, configured for feeding cooked pulp from the digester 1 to the discharge tank 2. Finally, the discharge dilution arrangement 100 includes a digester dilution pipe 4 configured for feeding a reject liquor from the screening process into at least the digester tank 1 to dilute the pulp, where the reject liquor from the screening process is a pulp with a lower consistency than the pulp in the digester. Preferably, the screening reject liquor is fed into the digester 1 at the bottom of the tank. However, it is also technically feasible to add the screening reject liquor to other parts of the tank as well.

[0022] According to a further embodiment, the discharge dilution arrangement 100 includes a first discharge dilution pipe 4' configured for additionally feeding the reject liquor from the screening process into the discharge pipe 3 to further dilute the pulp in the discharge pipe 3.

[0023] According to another embodiment, the discharge dilution arrangement 100 further includes a second discharge dilution pipe 5 configured for additionally feeding the reject liquor from the screening process into the discharge tank 2 as well to further dilute the pulp.

[0024] In order to improve the control of the dilution and ensure a sustainable and even access to the reject liquor, it might prove beneficial to collect the reject liquor into a buffer tank from which the reject liquor is then distributed to the parts of the arrangements where dilution is required. According to a further embodiment, the discharge dilution arrangement 100 further comprises a buffer tank 6 arranged to receive the reject liquor from the screening process and to provide a first fraction of the reject liquor from the screening process to the digester dilution pipe 4 and optionally also a second fraction of the reject liquor from the screening process via the second discharge dilution pipe 5 to the discharge tank 2, to provide a diluted discharge pulp.

[0025] For those cases where a dilution in the discharge pipe 3 is also required, according to a further embodiment, the buffer tank 6 is further configured to provide a third fraction of the reject liquor from the screening process via the first discharge dilution pipe 4' to the discharge pipe 3.

[0026] The above described arrangements can be implemented for both batch digesters and continuous digesters.

[0027] In order to further explain the benefits of the above described embodiments, an example of the impact of various concentrations of fibers in the pulp in the different process steps will be described with reference to Figure 3 and Figure 4. The consistency and consistency intervals of the pulp are to be viewed as non-limiting examples and are indicated merely to illustrate the benefits of the proposed technology.

[0028] In Figure 3, which illustrates prior art without the use of a thickening device, a digester 1 is disclosed with a capacity for processing 20 t/h of wood chips or other lignocellulosic material. Impregnation and/or cooking liquid, e.g. black and/or white liquor or similar depending on the chemical process used, is added to achieve a concentration of fibers in the pulp, or first consistency of the pulp, of approximately 10%, corresponding to a total volume of 200 m³/h of cooked pulp. In order to enable emptying or discharging the digester 1, more liquor or similar is added to dilute the cooked pulp and to reduce the consistency of the cooked pulp to e.g. 5%. In order to handle the processing capacity of 200 m³/h from the digester 1, it is necessary to add 200 m³/h of dilution liquid e.g. liquor or similar, thereby resulting in a feed of 400 m³/h of diluted cooked pulp from the digester 1 to the discharge tank 2. This results in a doubling of the processed volume.

[0029] As discussed previously, it is then potentially necessary to further dilute the cooked pulp in order to enable emptying the discharge tank 2 into the subsequent screening process. Accordingly, the discharge 2 is fed with screening reject liquor to further lower the concentration of fibers to about 3%. In this example the low consistency screening reject liquor is fed with a capacity of 2 t/h and a concentration of fibers, or consistency, of 0.6%, which corresponds to 330 m³/h. Thereby, the discharge tank 2 outputs 22 t/h with a consistency of 3% and a volume of 730 m³/h. Through the screening process a screened pulp with a consistency of maximum 3% is provided to press feed and about 10% of the production is provided to a screening reject wash.

[0030] With reference to Figure 4, the dilution in both the digester 1 and optionally the discharge tank 2 is provided by adding the low consistency screening reject liquor, in contrast to the prior art. In a corresponding manner as in Figure 3, a digester 1 is disclosed with a capacity for processing 20 t/h of wood chips or other lignocellulosic material. Impregnation and/or cooking liquid, e.g. black and/or white liquor or similar depending on the chemical process used, is added to achieve a concentration or first consistency of approximately 10%, corresponding to a total volume of 200 m³/h of cooked pulp. In order to enable emptying or discharging the digester 1, a low consistency screening reject liquor with a consistency of approximately 0.6% is added to dilute the cooked pulp in the digester. In order to handle the processing capacity of 200 m³/h from the digester 1, it is necessary to add 1.2 t/h of the low consistency screening reject liquor with a consistency of 0.6%, thereby resulting in a feed of 400 m³/h of diluted cooked pulp with a concentration of 5.3% from the digester 1 to the discharge tank 2. This results in a doubling of the processed volume, in a similar manner as in Figure 3.

[0031] As discussed previously, with reference to Figure 3, it is then potentially necessary to further dilute the cooked pulp. Accordingly, the discharge 2 is also fed with the low consistency screening reject liquor. However, in

contrast to the prior art solution in Figure 3 the addition of screening reject liquor is performed with 0.8t/h with a consistency of 0.6% corresponding to 130 m³/h. Thereby, the discharge tank 2 outputs 22 t/h with a concentration of 4.1% and a volume of 530 m³/h.

[0032] In case of using some other liquid than the low consistency screening reject liquor it is easy to see the benefits of the current embodiments. Using a diluting liquid with 0% fibers corresponds to an output volume of 730 m³/h from the discharge tank 2 as illustrated in Figure 3 (without a thickening agent) to provide the necessary screening consistency of 3-4.5%. By utilizing a diluting liquid with 0.6% fibers the processed volume can be reduced to 530 m³/h, which is a significant improvement and saves both time and money.

[0033] As mentioned before, the above described fiber concentrations are merely examples. The above mentioned first consistency is typically around 10%, but can also vary within consistency intervals of for example around 9.5-10.5%, 9-11%, 8-12%. The low consistency screening reject liquor is potentially 0.6%, but can also vary within concentration intervals of for example 0.3-1%. The resulting diluted pulp is diluted to such an extent that it is possible to empty the digester with a minimum of dilution. As an example the diluted pulp could be between 4-7%, or 4-6%, 4-5%, 4.5-5.5%. Basically, depending on the material to be processed, the chemicals used, the cooking or digesting parameters applied in the process, the type of screening and other variables the specific concentrations can vary also outside the above given example intervals.

[0034] With the presently proposed technology it is possible to achieve a desired consistency of the pulp and at the same time avoiding the need for a thickening agent or machinery to be introduced into the system.

REFERENCES

[0035]

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Claims

1. A method of providing a diluted discharge pulp, comprising providing (S10) pulp with a first consistency in a digester, said pulp comprising cooked lignocellulosic fibrous material,

characterized by

diluting (S20) said provided pulp by feeding a reject liquor from a screening process into said digester during a discharge sequence to provide a diluted pulp in said digester, said reject liquor from said screening process being a pulp with a lower consistency than said pulp with a first consistency, **and** feeding (S30) said diluted pulp through a discharge pipe to a discharge tank to provide a diluted discharge pulp.

2. The method according to claim 1, wherein said diluting step (S20) additionally comprises feeding a first fraction of said reject liquor from said screening process into said discharge pipe to further dilute the diluted pulp.

3. The method according to claim 2, comprising the further steps of diluting (S40) said discharge pulp in said discharge tank with a second fraction of said reject liquor from said screening process, and feeding said diluted discharge pulp to said screening process.

4. The method according to any of claims 1-3, comprising the step of feeding said reject liquor from said screening process to a buffer, and subsequently feeding said reject liquor from said buffer to at least said digester, and optionally to said discharge pipe, and optionally to said discharge tank.

5. A discharge dilution arrangement (100), comprising a digester (1) configured for receiving at least a lignocellulosic fibrous material and a cooking liquor to cook into a pulp; a discharge tank (2) configured for receiving said pulp from said digester (1) and for outputting said pulp to a screening process; and a discharge pipe (3), configured for feeding cooked pulp from said digester (1) to said discharge tank (2),

characterized by

a digester dilution pipe (4) configured for feeding a reject liquor from said screening process into at least a bottom section of said digester tank (1) to dilute the pulp in the digester (1), said reject liquor from said screening process being a pulp with a lower consistency than the pulp in the digester, **and** a first discharge dilution pipe (4') configured for additionally feeding said reject liquor from said screening process into said discharge pipe (3) to further dilute the pulp in the discharge pipe (3).

6. The discharge dilution arrangement according to claim 5, comprising, a second discharge dilution pipe (5) configured for additionally feeding said reject liquor from said screening process into said discharge tank (2) to further dilute the pulp.

7. The discharge dilution arrangement according to claim 5 or 6, wherein said arrangement further comprises a buffer tank (6) arranged to receive said reject liquor from said screening process and to provide said reject liquor from said screening process to said digester dilution pipe (4) and optionally a first fraction of said reject liquor from said screening process to said first discharge dilution pipe (4'), to provide a diluted discharged pulp with a predetermined consistency. 5
8. The discharge dilution arrangement according to any of claims 5-7, wherein said buffer tank (6) is further configured to provide a second fraction of said reject liquor from said screening process via said second discharge dilution pipe (5) to said discharge tank (2). 15
9. The discharge dilution arrangement according to any of claims 5-8, wherein said digester (1) is a batch digester or a continuous digester. 20

Patentansprüche

1. Verfahren zum Bereitstellen eines verdünnten Auslasszellstoffs, das Folgendes umfasst: 25
- Bereitstellen (S10) von Zellstoff mit einer ersten Konsistenz in einem Kocher, wobei der Zellstoff ein gekochtes lignozellulosisches Fasermaterial umfasst, 30
- gekennzeichnet durch**
- Verdünnen (S20) des bereitgestellten Zellstoffs durch ein Zuführen einer Spucklauge aus einem Siebprozess in den Kocher während einer Auslasssequenz, um einen verdünnten Zellstoff in dem Kocher bereitzustellen, wobei es sich bei der Spucklauge aus dem Siebprozess um einen Zellstoff mit einer geringeren Konsistenz handelt als der Zellstoff mit der ersten Konsistenz, und 35
- Zuführen (S30) des verdünnten Zellstoffs durch ein Auslassrohr in einen Auslasstank, um einen verdünnten Auslasszellstoff bereitzustellen. 40
2. Verfahren nach Anspruch 1, wobei der Schritt des Verdünnens (S20) zusätzlich ein Zuführen einer ersten Fraktion der Spucklauge aus dem Siebprozess in das Auslassrohr umfasst, um den verdünnten Zellstoff weiter zu verdünnen. 45
3. Verfahren nach Anspruch 2, das die weiteren Schritte des Verdünnens (S40) des Auslasszellstoffs in dem Auslasstank mit einer zweiten Fraktion der Spucklauge aus dem Siebprozess und des Zuführens des verdünnten Auslasszellstoffs in den Siebprozess umfasst. 50

4. Verfahren nach einem der Ansprüche 1-3, umfassend den Schritt des Zuführens der Spucklauge aus dem Siebprozess in einen Puffer, und anschließendes Zuführen der Spucklauge aus dem Puffer in mindestens den Kocher, und gegebenenfalls in das Auslassrohr und gegebenenfalls in den Auslasstank. 5
5. Auslassverdünnungsanordnung (100), die Folgendes umfasst: 10

einen Kocher (1), der zum Aufnehmen von mindestens einem lignozellulosischen Fasermaterial und einer Kochlauge zum Einkochen in einen Zellstoff konfiguriert ist;
einen Auslasstank (2), der zum Aufnehmen des Zellstoffs aus dem Kocher (1) und zum Ausgeben des Zellstoffs in einen Siebprozess konfiguriert ist; und
ein Auslassrohr (3), das zum Zuführen von gekochtem Zellstoff aus dem Kocher (1) in den Auslasstank (2) konfiguriert ist, 15

gekennzeichnet durch

ein Kocherverdünnungsrohr (4), das zum Zuführen einer Spucklauge aus dem Siebprozess in mindestens einen unteren Bereich des Kochertanks (1) konfiguriert ist, um den Zellstoff in dem Kocher (1) zu verdünnen, wobei es sich bei der Spucklauge aus dem Siebprozess um einen Zellstoff mit einer geringeren Konsistenz als der Zellstoff in dem Kocher handelt, und
ein erstes Auslassverdünnungsrohr (4'), das zum zusätzlichen Zuführen der Spucklauge aus dem Siebprozess in das Auslassrohr (3) konfiguriert ist, um den Zellstoff in dem Auslassrohr (3) weiter zu verdünnen. 20

6. Auslassverdünnungsanordnung nach Anspruch 5, umfassend ein zweites Auslassverdünnungsrohr (5), das zum zusätzlichen Zuführen der Spucklauge aus dem Siebprozess in den Auslasstank (2) konfiguriert ist, um den Zellstoff weiter zu verdünnen. 25
7. Auslassverdünnungsanordnung nach Anspruch 5 oder 6, wobei die Anordnung ferner einen Puffertank (6) umfasst, der dazu ausgelegt ist, die Spucklauge aus dem Siebprozess aufzunehmen und die Spucklauge aus dem Siebprozess dem Kocherverdünnungsrohr (4) bereitzustellen, und gegebenenfalls eine erste Fraktion der Spucklauge aus dem Siebprozess dem ersten Auslassverdünnungsrohr (4'), um einen verdünnten Auslasszellstoff mit einer vorbestimmten Konsistenz bereitzustellen. 30
8. Auslassverdünnungsanordnung nach einem der Ansprüche 5-7, wobei der Puffertank (6) ferner dazu konfiguriert ist, eine zweite Fraktion der Spucklauge aus dem Siebprozess über das zweite Auslassverdünnungsrohr (5) an den Auslasstank (2) bereitzustellen. 35

stellen.

9. Auslassverdünnungsanordnung nach einem der Ansprüche 5-8, wobei der Kocher (1) ein satzweise arbeitender Kocher oder ein kontinuierlicher Kocher ist.

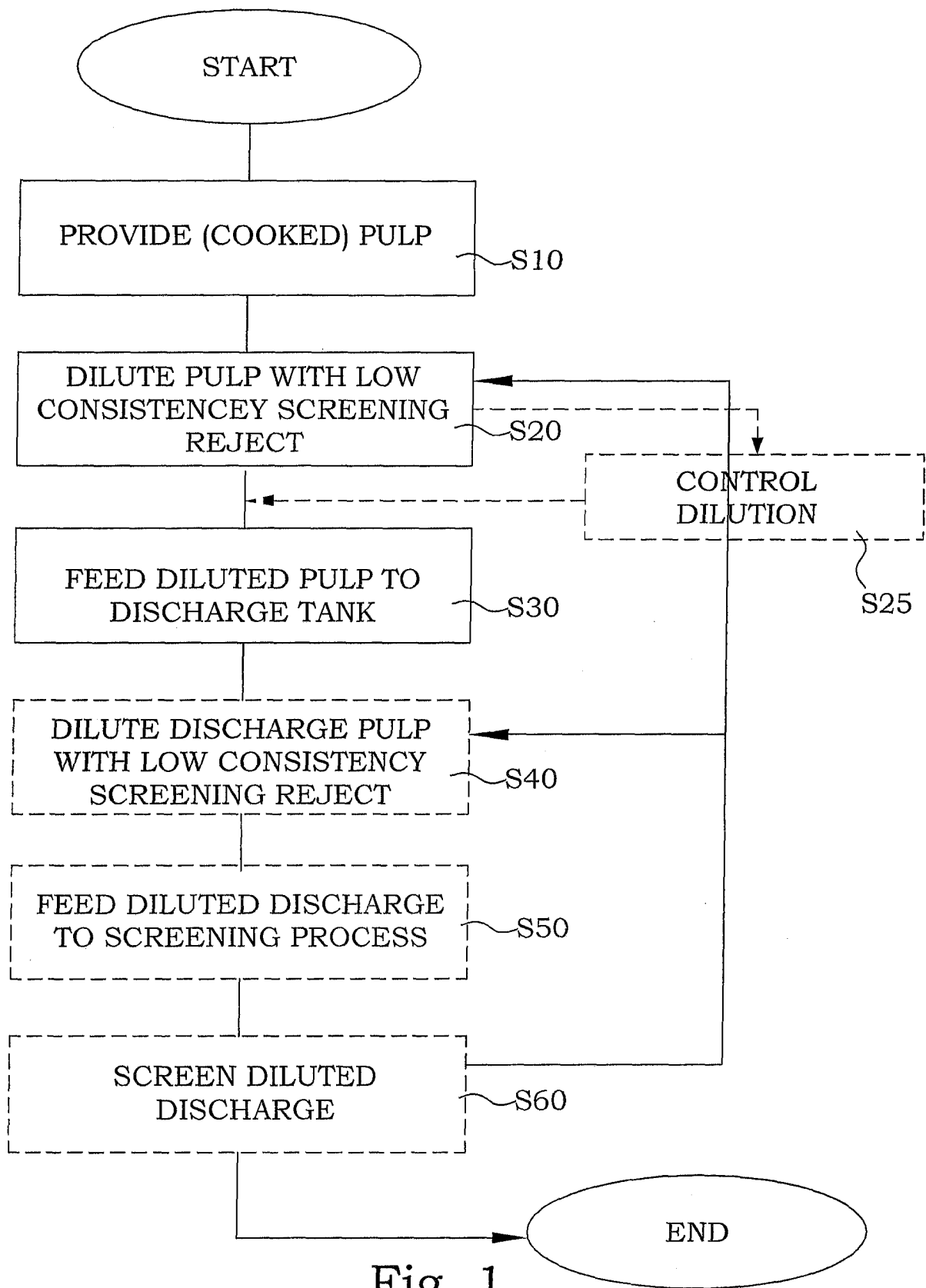
Revendications

1. Procédé de fourniture d'une pâte de décharge diluée, comprenant la fourniture (S10) d'une pâte qui présente une première consistance dans un lessiveur, ladite pâte comprenant un matériau fibreux lignocellulosique cuit, **caractérisé par** la dilution (S20) de ladite pâte fournie en introduisant une liqueur de rejet issue d'un processus de criblage dans ledit lessiveur pendant une séquence de décharge pour fournir une pâte diluée dans ledit lessiveur, ladite liqueur de rejet issue dudit processus de criblage étant une pâte qui présente une consistance plus faible que ladite pâte qui présente une première consistance, et l'introduction (S30) de ladite pâte diluée à travers un tuyau de décharge dans une cuve de décharge pour fournir une pâte de décharge diluée.
2. Procédé selon la revendication 1, dans lequel ladite étape de dilution (S20) comprend en outre l'introduction d'une première fraction de ladite liqueur de rejet issue dudit processus de criblage dans ledit tuyau de décharge pour diluer encore plus la pâte diluée.
3. Procédé selon la revendication 2, comprenant les étapes supplémentaires de dilution (S40) de ladite pâte de décharge dans ladite cuve de décharge avec une seconde fraction de ladite liqueur de rejet issue dudit processus de criblage, et d'introduction de ladite pâte de décharge diluée dans ledit processus de criblage.
4. Procédé selon l'une quelconque des revendications 1 à 3, comprenant l'étape d'introduction de ladite liqueur de rejet issue dudit processus de criblage dans une solution tampon, et ensuite l'introduction de ladite liqueur de rejet issue de ladite solution tampon dans au moins ledit lessiveur, et facultativement dans ledit tuyau de décharge, et facultativement dans ladite cuve de décharge.
5. Agencement de dilution de décharge (100), comprenant un lessiveur (1) conçu pour recevoir au moins un matériau fibreux lignocellulosique et une liqueur de cuisson pour cuire et obtenir une pâte ; une cuve de décharge (2) conçue pour recevoir la-

dite pâte en provenance dudit lessiveur (1) et pour sortir ladite pâte vers un processus de criblage ; et un tuyau de décharge (3), conçu pour introduire la pâte cuite issue dudit lessiveur (1) dans ladite cuve de décharge (2), **caractérisé par**

un tuyau (4) de dilution de lessiveur conçu pour introduire une liqueur de rejet issue dudit processus de criblage dans au moins une section inférieure de ladite cuve de lessiveur (1) pour diluer la pâte dans le lessiveur (1), ladite liqueur de rejet issue dudit processus de criblage étant une pâte qui présente une consistance plus faible que la pâte dans le lessiveur, et un premier tuyau de dilution de décharge (4') conçu pour introduire en outre ladite liqueur de rejet issue dudit processus de criblage dans ledit tuyau de décharge (3) pour diluer encore plus la pâte dans le tuyau de décharge (3).

6. Agencement de dilution de décharge selon la revendication 5, comprenant un second tuyau de dilution de décharge (5) conçu pour introduire en outre ladite liqueur de rejet issue dudit processus de criblage dans ladite cuve de décharge (2) pour diluer encore plus la pâte.
7. Agencement de dilution de décharge selon la revendication 5 ou 6, dans lequel ledit agencement comprend en outre une cuve (6) de solution tampon agencée pour recevoir ladite liqueur de rejet issue dudit processus de criblage et pour fournir ladite liqueur de rejet issue dudit processus de criblage audit tuyau (4) de dilution de lessiveur et facultativement une première fraction de ladite liqueur de rejet issue dudit processus de criblage audit premier tuyau (4') de dilution de décharge, pour fournir une pâte déchargée diluée qui présente une consistance prédéterminée.
8. Agencement de dilution de décharge selon l'une quelconque des revendications 5 à 7, dans lequel ladite cuve (6) de solution tampon est en outre conçue pour fournir une seconde fraction de ladite liqueur de rejet issue dudit processus de criblage via ledit second tuyau de dilution de décharge (5) à ladite cuve de décharge (2).
9. Agencement de dilution de décharge selon l'une quelconque des revendications 5 à 8, dans lequel ledit lessiveur (1) est un lessiveur en discontinu ou un lessiveur en continu.



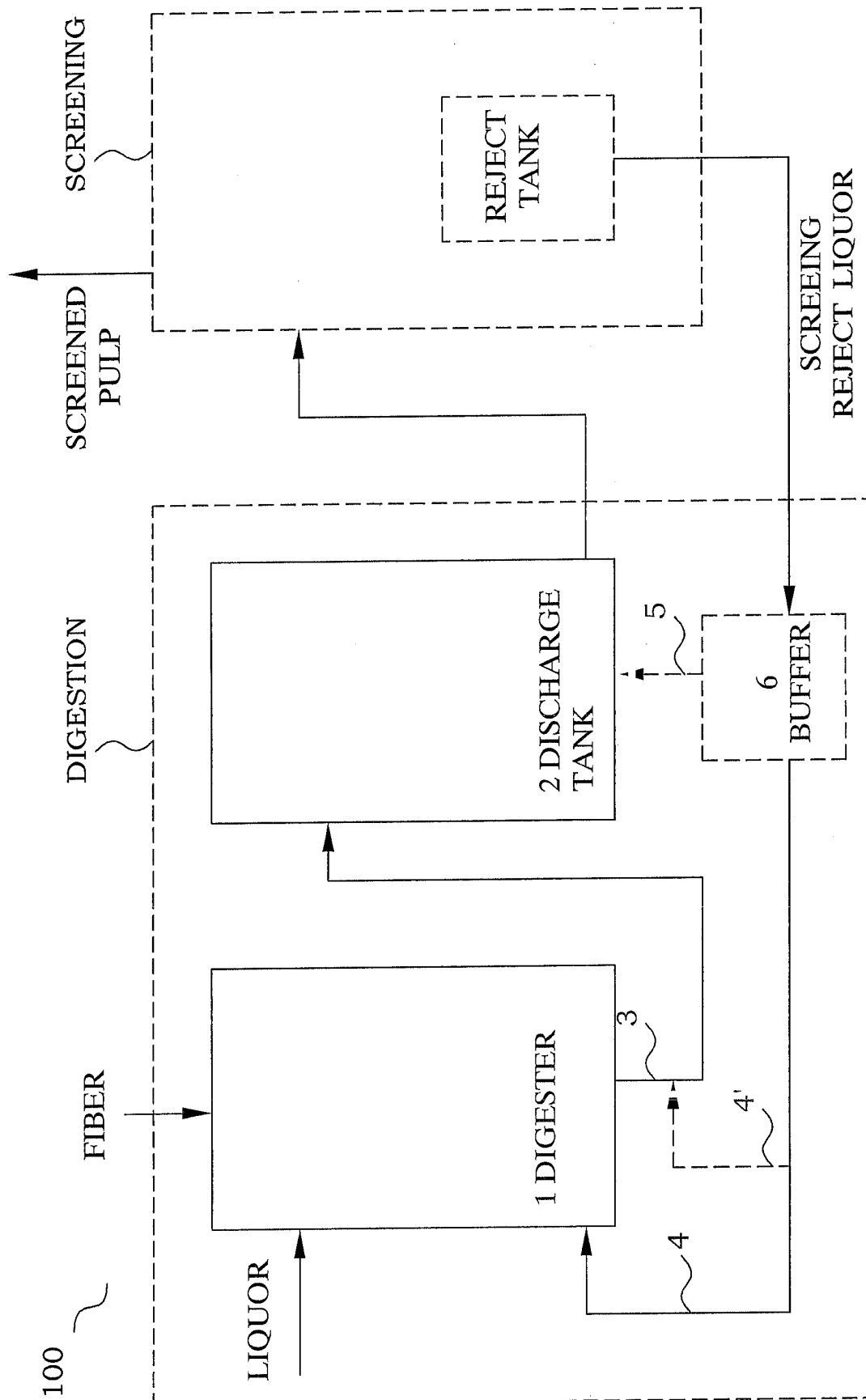
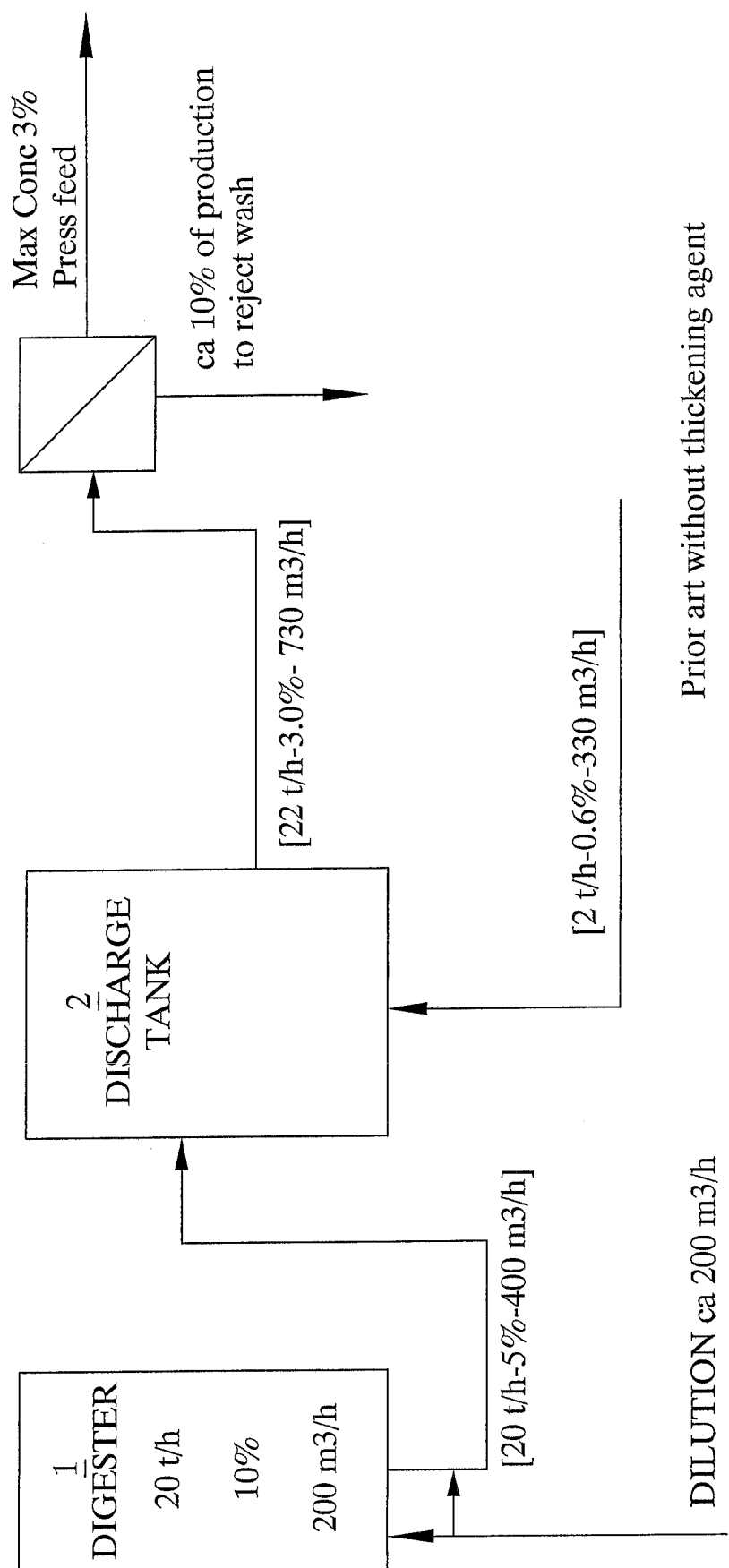


Fig. 2



Prior art without thickening agent

Fig. 3

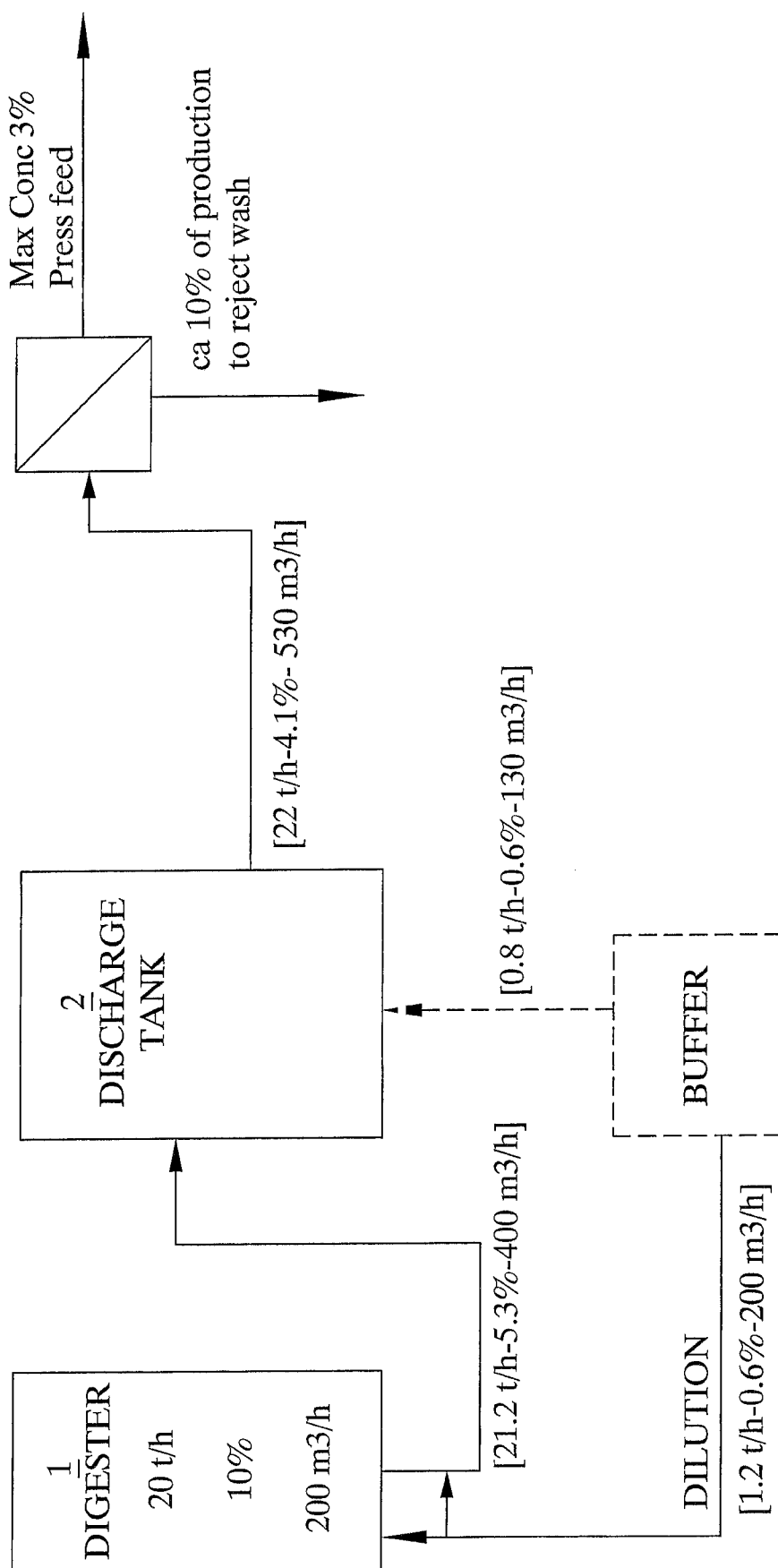


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Non-patent literature cited in the description

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