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(54) **Dryer structure for a pulp making process, control system for a dryer and method for a dryer**

(57) The invention refers to a dryer structure for a pulp making process. The dryer structure comprises a compact dryer unit, means (33, 34) for supplying air to the bottom part (23), and means (31) for exhausting air from the exhaust part (21). The compact dryer unit consists of an integrated exhaust part (21) on one end side

of said dryer unit, a dryer part (22) arranged adjacent to the exhaust part (21), and a bottom part (23) on the opposite end side of said dryer unit. The bottom part (23) is arranged adjacent to the dryer part (22).

The invention further refers to a control system for a dryer and a control method for a dryer.

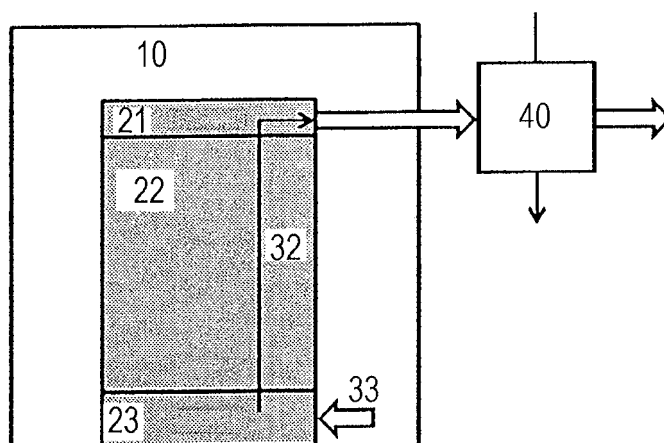


FIG. 3

Description

[0001] The present invention relates to an improved dryer structure for a pulp making process. Further, the present invention relates to an improved control system for a dryer and an improved control method for a dryer.

[0002] The most of such dryer structures according to the prior art usually operate in the following manner. A wet web such as a pulp web arrives with a dry matter content of approximately 50 % and is usually fed from above into the dryer structure. Several blowing fan levels act over the whole cross-sectional area of the web and over the dryer length. From the fan levels a drying gas is blown, which is e. g. hot air, steam or any other medium suitable for the purpose, through a nozzle from both sides towards the web. In such a contact-free drying the web travels inside the dryer structure back and forth moving from an upper level towards the lower part of the dryer structure. As the web is leaving the lower part of the dryer structure, the dry matter content of the web is typically about 90 %.

[0003] Such a known dryer structure for a pulp web is for example shown in Fig. 1 and Fig. 2.

[0004] A building 100 contains a dryer section made of a lower part 123, a supply part 124, a dryer main part 122, and an upper exhaust part 121 in that order. The dryer section is designed as an entity as indicated in Fig. 1 and Fig. 2 by shading. The lower part 123 acts as a cooling section having integrated cooling section fans for supplying cooling air to the cooling section 123 and away from the cooling section into the building 100. The supply part 124 receives supply air from outside the building 100 and sends the supply air to the dryer main part 122 to perform the drying of the pulp web, and from there to the upper exhaust part 121. From the upper exhaust part 121 the exhaust air is exhausted to outside the building 100. From the upper exhaust part 121 the exhaust air is exhausted to a heat recovery 131 where supply air can be preheated and delivered to the supply part 124.

[0005] The cooling section 123 receives the cooling air from within the building 100 or from outside the building 100, see reference sign 133, and supplies the cooling air to the building 100, see reference sign 139. From the supply part 124, the air is supplied to the dryer main part 122 to perform the drying of the pulp web, and from there to the upper exhaust part 121, as is shown by reference sign 132. From the upper exhaust part 121 the exhaust air is exhausted to a heat recovery system, see reference sign 131.

[0006] In such a dryer structure, there is still room for improvement.

[0007] Therefore, it is the object of the present invention to provide an improved dryer structure. Further, an improved control system for a dryer and an improved control method for a dryer shall be provided. Regarding the dryer structure, the above object is solved by a dryer structure having the features of claim 1. Regarding the control system, the above object is solved by a control

system having the features of claim 7. Regarding the control method, the above object is solved by a control method having the features of claim 12. Further developments are stated in the dependent claims.

[0008] In the present invention, a dryer structure for a pulp making process comprises a compact dryer unit consisting of an integrated exhaust part on one end side of said dryer unit, a dryer part arranged adjacent to the exhaust part, and a bottom part on the opposite end side of said dryer unit. The dryer structure further comprises means for supplying air to the bottom part and means for exhausting air from the exhaust part. Further, the bottom part can be arranged adjacent to the dryer part.

[0009] In the dryer structure, air is supplied into the bottom part and from there directly into the dryer inner part where the drying takes place. The supply section hitherto used between bottom part and dryer part, is not needed. Such a dryer structure has the advantage that the supply air ducting and supply fans can be omitted, leading to a cost reduction.

[0010] Further, the dryer structure comprises air supply means for supplying air from the bottom part to the exhaust part. The supply air from the bottom part does not go to the building inner space beside the entity of bottom part, dryer section, and exhaust part but directly upwards to the sections above the bottom part. The air can immediately be used for drying. The ducting in the dryer entrance side up to the dryer sections becomes short, leading to a cost reduction.

[0011] In the dryer structure, the exhaust part can be arranged on the top side of the dryer unit, and the bottom part can be arranged on the bottom side of the dryer unit. The air supply means for supplying air from the bottom part to the exhaust part can be arranged such that it is able to supply cooling air from the bottom part as dryer part supply air.

[0012] Thus, the cooling air ducting used in the prior art to supply cooling air to the cooling section and from the cooling section into the building inner space, can be omitted. Less fans can be provided with the same air throughput leading to a cost reduction and to less power consumption for the fan operation.

[0013] In the dryer structure, the compact dryer unit can be arranged within a dryer building, and the means for supplying air to the bottom part can be arranged such that the air for the bottom part is taken from within the dryer building or from outside the dryer building.

[0014] Because the cooling air is not supplied from the cooling section into the building, the cooling air does not increase the heat and humidity load in the building.

[0015] In one application, the dryer structure of the invention can be used in a dryer control system. A control system for a dryer involved in a pulp making process, comprises such a dryer structure and means for detecting/estimating/calculating at least one variable that is in direct relation to a production level of the pulp making process in the dryer structure. The means for exhausting air from the exhaust part is controllable based on the

variable.

[0016] Such a control can exhaust the exhaust air from the exhaust part, thus under-pressurizing the dryer section, and in a particular embodiment even the whole building. When in the underpressurized state, the building supply air can be led via ducts and/or openings. There is no condensation in the building.

[0017] In the control system, the means for supplying air to the bottom part can be controllable such that the supply air is kept at a desired value.

[0018] Thus, the supply air amount can be controlled for example based on the pressure in the exhaust part.

[0019] The control system can further comprise a pressure sensor provided in the dryer structure, the pressure sensor detecting the pressure in the dryer structure as the variable; and / or a temperature sensor provided in the dryer structure, the temperature sensor detecting the temperature in the dryer structure as the variable.

[0020] In the control system, the bottom part can comprise no additional means for supplying cooling air beside the means for supplying air to the dryer structure.

[0021] Thus, the only air supply means bringing air into the dryer, is the air supplier into the bottom part (for example a fan) which can be arranged upstream the bottom part, in the bottom part or downstream the bottom part in the air supply direction. If the bottom part air supplier is arranged upstream the bottom part, it can blow air into the bottom part. If the bottom part air supplier is arranged in the bottom part, it can draw and blow air into the bottom part. If the bottom part air supplier is arranged downstream the bottom part, it can draw air into the bottom part.

[0022] In the control system, the means for supplying air to the bottom part, the means for exhausting air from the exhaust part, and the air supply means for supplying air from the bottom part to the exhaust part can be a fan, respectively, or a fan group. Further the control system can further comprise one or more speed controller(s), one or more temperature controller(s), and one or pressure controller(s) for controlling the speed, temperature and/or pressure of the air flows.

[0023] The control method for an airborne dryer involved in a pulp making process, comprises the steps detecting/estimating/calculating at least one variable that is in direct relation to a production level of the pulp making process in a dryer structure of the invention, supplying air to the bottom part, exhausting air from the exhaust part, and supplying air from the bottom part to the exhaust part is controlled based on the variable.

[0024] In a prior art dryer, exhaust air is regulated by measuring the exhaust flow and air water content. Both measurements are unreliable and difficult in practice. Supply air is not regulated at all. The method and structure of the invention solves both problems and contributes to energy savings and better runnability of the web.

[0025] In the method of the invention, a higher production rate demands higher steam pressure which results in higher exhaust air temperature. A higher production

rate means obviously also a higher evaporation and a higher water content in exhaust air. According to the invention, the exhaust air flow is regulated based on a variable that is in direct relation to a production level of the dryer, such as the exhaust air temperature. This measurement is easy and reliable and exhaust air humidity will remain at optimum level. The supply air flow is regulated by measuring air pressure in the upper part of the dryer. The supply air is optimized to maintain a desired air pad pressure for maintaining good floatation of web in upper part of the dryer. This will increase runnability and decrease web breaks and dust generation. By optimizing exhaust and supply air flow energy consumption is decreased.

[0026] In the method, supplying air to the dryer structure can be controlled such that the supply air is kept at a desired value.

[0027] The pulp dryer supply air flow is regulated so that the air pressure inside the pulp dryer keeps at the desired value. Pulp dryer exhaust air is regulated based on temperature measurement/or other variable that increases with increased production level (e.g. speed, steam pressure, calculated production level). In the method, the variable can be a pressure and / or a temperature in the production level of the pulp making process part. In the method, cooling air from the bottom part can be supplied as the supply air to the dryer structure.

[0028] The method can further comprise controlling the speed, temperature and/or pressure of the air flows.

[0029] The pressure condition inside the dryer has direct impact on web run ability, especially in the upper drying decks of the airborne pulp dryer. For example too low pressure lifts the web towards the top nozzles meaning unstable web run and dust formation. A correct pressure condition is maintained by controlling the air balance (that is controlling the air supply of the dryer based on the pressure and/or temperature in the drying section) as it is made in the method of the invention. With such a correct air balance control:

- The web run ability at the upper drying decks is stable.
- Dust formation is reduced and web breaks are avoided.
- Leakage air flow is minimized which saves heat energy.
- Higher air humidity reduces dryer electric energy consumption.
- Heat Recovery efficiency is better with balanced air flows.
- Tail threading is more secure.
- Maintenance is minimized using reliable measurements.

Brief description of the drawings

[0030]

FIG. 1 shows a dryer and building airflows according to the prior art.

FIG. 2 shows a further dryer and building airflows according to the prior art.

FIG. 3 shows a dryer and building airflows according to the first embodiment of the present invention.

FIG. 4 shows a dryer and building airflows according to the second embodiment of the present invention.

Fig. 5 shows a schematic diagram of a dryer and the air flows of the present invention.

Figures 6 to 9 show side views of a dryer and the air flows of the present invention in several examples and in comparison with the prior art.

[0031] In the following, the present invention is explained in more detail under reference of several embodiments.

Embodiment 1

[0032] FIG. 3 shows a dryer and building airflows according to the first embodiment of the present invention.

[0033] A building 10 contains a dryer section made of a lower part 23, a dryer main part 22, and an upper exhaust part 21 in that order. In other words, the dryer main part 22 is sandwiched by the upper exhaust part 21 and the lower part 23. The dryer section is designed as an entity as indicated in Fig. 3 by shading. This entity is arranged on the floor/foundation of the building 10 such that the side walls and the ceiling wall of the building 10 are distanced from the side walls and the ceiling wall of the entity, as is shown in Fig. 3.

[0034] The lower part 23 acts as a cooling section having integrated cooling section fans for supplying cooling air to the cooling section 23 and away from the cooling section. Thus, the dryer main part 22 is immediately adjacent to the cooling section 23. In the present invention, the cooling section fans supply the cooling air from the cooling section 23 to the dryer main part 22 to perform the drying of the pulp web, and from there to the upper exhaust part 21. From the upper exhaust part 21 the exhaust air is exhausted to outside the building 10.

[0035] In the dryer main part 22, the web drying is done. Similarly as in the prior art, a wet web such as a pulp web arrives and is fed from above into the dryer main part 22. In a contact-free drying the web travels inside the dryer main part 22 moving in a meandering way from an upper level towards the lower part of the dryer main part 22, and leaves the dryer main part 22 from the bottom thereof.

[0036] In the present first embodiment, the cooling section 23 receives the cooling air from within the building 10.

[0037] The dryer uses integrated cooling section fans

33 to bring the air within the building 10 into the cooling section 23. The cooling section fans 33 per se can be arranged within the building 10 or within the cooling section 23. Thus, in the dryer of the first embodiment, the cooling air of the lower cooling section 23 acts as the dryer supply air.

[0038] The dryer is functioning by building air, the so called building exhaust air enters from the building 10 via the cooling section 23 to the dryer main part 22.

[0039] Supply air for the building 10 is introduced through openings in the building wall or through fans at the building wall.

[0040] For that reason one or several fans 32 are arranged to transport the air from the cooling section 23 to the dryer main part 22 and further to the upper exhaust part 21. From the upper exhaust part 21 the exhaust air is exhausted to outside the building 10 by means of one or several fans.

[0041] The exhaust air can be exhausted to a heat recovery system 40. The heat in the heat recovery system 40 can be used for example to heat water. Thereby, an improved air-water heat recovery is reached.

[0042] Effects of the embodiment

[0043] The cooling air is not supplied to the interior of the building 10 as in the prior art of Fig. 1, but is supplied to the dryer main part 22. Thus, in the dryer of the first embodiment, the cooling air does not increase the heat and humidity load in the building 10.

[0044] According to the first embodiment, no supply air intermediate floor is needed and separate supply air fans or ducts are not necessary. In other words, there is no supply part as in the above discussed prior art.

[0045] In the first embodiment, the control for a fan/fan group can be operated via one or several different controllers. Further, in the first embodiment, the cooling air fans 33 can be integrated to the dryer construction that is either in the cooling section 23 or within the building 10 at a place between the cooling section 23 or and the building 10 outer wall, or they can be arranged outside from the building 10. The respective airflows (supply, exhaust, cooling) can be achieved with one or several fans each.

[0046] By the present invention a dryer upgrade and a rebuild on existing dryers can be made so that an existing supply air section underneath the dryer main part 22 can be converted to an active drying section.

[0047] In the present invention, all air that is needed in the drying process of the dryer main part 22 is introduced to the dryer main part 22 as cooling air from the cooling section 23.

Embodiment 2

[0048] FIG. 4 shows a dryer and building airflows according to the second embodiment of the present invention.

[0049] The second embodiment is similar to the first embodiment. In the following just the difference to the

first embodiment is discussed.

[0050] In the first embodiment of the present invention, the dryer uses integrated cooling section fans 33 to bring the air within the building 10 into the cooling section 23 as shown in Fig. 1.

[0051] In the second embodiment of the present invention, as shown in Fig. 2, the dryer uses cooling section fans 34 to bring the air outside the building 10 into the cooling section 23. The cooling section fans 34 per se can be arranged outside the building 10 as external cooling section fans. In an alternative, the cooling section fans 34 can be arranged within the cooling section 23 and are connected via one or more tubes with the outside of the building 10 to draw in the external air.

[0052] In the second embodiment, the dryer is not functioning by building supply air but rather by external air.

Air stream control

[0053] Fig. 5 shows a schematic diagram of a dryer and the air flows of the present invention. The schematic diagram of Fig. 5 applies for both the first and the second embodiment.

[0054] Fig. 5 shows the entity of the lower cooling section 23, the central dryer main part 22 and the upper exhaust part 21. The lower cooling section 23 is arranged on the floor of the entity and comprises one or more cooling section fans 33. In the example of this Figure four cooling section fans 33 are installed. The speed of the cooling section fans 33 is controlled by speed controllers SIC. In the Figure, the cooling section fans 33 are grouped in two groups, that is a left group of two cooling section fans 33 controlled by a left speed controller SIC, and a right group of two cooling section fans 33 controlled by a right speed controller SIC.

[0055] From within the building 10 (first embodiment) or outside the building 10 (second embodiment) air is drawn by the cooling section fans 33.

[0056] Between the lower cooling section 23 and the central dryer main part 22 a partition 221 is arranged through which the air streams from the cooling section fans 33 can pass into the dryer main part 22. Within the dryer main part 22, a temperature sensor 222 is arranged. The dryer main part 22 comprises a so called false ceiling 211 as a partition separating the dryer main part 22 from the upper exhaust part 21.

[0057] In the upper exhaust part 21 a pressure sensor 212 is arranged. Air is exhausted from the upper exhaust part 21 by exhausting fans 31. In the example of the Figure two exhausting fans 31 are provided outside the upper exhaust part 21, each in a line leading away from the upper exhaust part 21. The speed of each of the exhausting fans 31 is controlled by a respective dedicated speed controller SIC, that is the speed of the left exhausting fans 31 is controlled by a left speed controller SIC, and the speed of the right exhausting fans 31 is controlled by a right speed controller SIC. The speed controllers SIC of the exhausting fans 31 perform its control based on a

temperature controller TIC supplied by temperature information from the temperature sensor 222.

[0058] The speed controllers SIC of the cooling section fans 33 perform its control based on a pressure controller PIC supplied by pressure information from the pressure sensor 212.

[0059] The pressure sensor 212 and the temperature sensor 222 detect the pressure and the temperature, respectively, in the dryer structure. Thus, the sensors 212 and/or 222 detect a variable that is in direct relation to a production level of the pulp making process in the dryer structure. The exhausting fans 31 are controlled based on this variable, that is the pressure and/or the temperature in the dryer structure.

[0060] In one favorite control, from the cooling section fans 33 are controlled such that the air drawn into the cooling section 23 and delivered to the central dryer main part 22, is kept at a desired value that is, a desired flow speed. The speed of the cooling section fans 33 is controlled based on the pressure and/or the temperature in the dryer structure.

[0061] In such a control, the pressure and/or the temperature in the dryer structure is/are a variable that is in direct relation to a production level of the pulp, since the output of the dryer section depends thereon. In the control, air is supplied to the bottom part 23, supplied from the bottom part 23 to the exhaust part 21 based on the pressure and/or the temperature in the dryer structure and exhausted from the exhaust part 21.

[0062] Thereby, the supplying of air to the dryer structure that is to the bottom part 23, is controlled such that the speed of supply air is kept at a desired value.

[0063] Figures 6 to 9 show side views of a dryer and the air flows of the present invention in several examples and in comparison with the prior art.

[0064] Fig. 6 shows a side view of a dryer of the present invention.

[0065] In Fig. 6, the cooling section 23 is supplied by cooling air from the inside of the building 10. From the cooling section 23, the cooling air is supplied to the dryer portion 22 per se, and further to the exhaust section 21. From the exhaust section 21, the air is exhausted out of the building 10 to a heat recovery tower 40 where the exhausted air undergoes a heat recovery process.

[0066] Fig. 7 shows a side view of a dryer of the prior art as a comparative example.

[0067] In Fig. 7, the cooling section 123 is supplied by cooling air from the inside of the building 100. From the cooling section 123, the cooling air is supplied to the building 100. Drying air is supplied to supply section 124 and from the supply section 124 to the dryer portion 122 per se, and further to the exhaust section 121. From the exhaust section 121, the air is exhausted out of the building 100 to a heat recovery tower 131 where the exhausted air undergoes a heat recovery process. Recovered heat energy is used to heat the air which is supplied as drying air to the supply section 124.

[0068] In the comparative example of Fig. 7 as in the

prior art of Figures 1 and 2, the cooling air exiting cooling section 123, increases the heat and humidity load in the building.

[0069] In this comparative example, supply air is led underneath the dryer portion 122 from a heat recovery 131 using fan(s) and ducting. Exhaust air is sucked out from the dryer top 121 and led out via heat recovery 131.

[0070] Fig. 8 shows a side view of another dryer of the present invention.

[0071] In Fig. 8, the cooling section 23 is supplied by cooling air from outside of the building 10. From the cooling section 23, the cooling air is supplied to the dryer portion 22, and further to the exhaust section 21. From the exhaust section 21, the air is exhausted out of the building 10 to a heat recovery tower 40 where the exhausted air undergoes the heat recovery process.

[0072] Fig. 9 shows a side view of again another dryer of the present invention.

[0073] In Fig. 9, a prior art dryer, for example a dryer as in the comparative example of Fig. 7, is rebuilt under use of the principle of the present invention. The cooling section 23 is supplied by cooling air from the inside or outside of the building 10. The former supply section is converted into a part 24 of the dryer portion per se and forms the lower part of the dryer portion 22. The freed space in this converted supply section 24 is equipped now with drying nozzles of the same type as in the above upper portion of the dryer portion 22 that is the main dryer portion 22, thereby the drying capacity is increased.

[0074] Drying air is supplied to the converted supply section 24 from the cooling section 23 of the dryer portion. From the converted supply section 24 the drying air is supplied to the main dryer portion 22, and further to the exhaust section 21.

[0075] From the exhaust section 21, the air is exhausted out of the building 10 to the heat recovery tower 40 where the exhausted air undergoes the heat recovery process.

[0076] Recovered heat energy is used to heat for example water. Thereby, an improved air-water heat recovery is reached similar as in the embodiment of Fig. 3.

Alternatives

[0077] In the above embodiments, a dryer structure for drying a pulp web is discussed. The same principle can be applied in a dryer structure for drying a paper web or a board web.

[0078] Further, in the above embodiments, the at least one variable that is in direct relation to a production level of the pulp making process is detected by one or more sensors. In an alternative, the variable does not need to be detected, the variable can be estimated or calculated.

[0079] In the embodiment an improved dryer structure for a pulp making process is explained. Nevertheless, the dryer structure could also be used for a paper making process or a board making process.

List of reference signs

[0080]

5	10 building
	21 upper exhaust part
	22 central dryer main part
	23 lower cooling section
	24 converted supply section
10	31 exhausting fans
	33 cooling section fans
	40 heat recovery system in the invention
	100 building
	121 upper exhaust part
15	122 dryer main part
	123 lower cooling section
	124 supply section
	211 false ceiling
	212 pressure sensor
20	221 partition
	222 temperature sensor
	131 heat recovery system in the prior art
	132, 133, 139, 140, 141 air flows in the prior art
25	PIC pressure controller
	SIC speed controllers
	TIC temperature controller

Claims

- 30 1. Dryer structure for a pulp making process, comprising
a compact dryer unit consisting of
an integrated exhaust part (21) on one end side of
said dryer unit,
35 a dryer part (22) arranged adjacent to the exhaust part, and
a bottom part (23) on the opposite end side of said dryer unit;
means (33, 34) for supplying air to the bottom part (23); and
means (31) for exhausting air from the exhaust part (21);
40 **characterized in that**
said bottom part (23) is arranged adjacent to the dryer part (22).
- 45 2. Dryer structure according to claim 1, wherein the dryer structure comprises air supply means (32) for supplying air from the bottom part (23) to the exhaust part (21).
- 50 3. Dryer structure according to claim 1 or 2, wherein said exhaust part (21) is arranged on the top side of the dryer unit, and
said bottom part (23) is arranged on the bottom side of the dryer unit,
55 wherein said air supply means (32) for supplying air

from the bottom part (23) to the exhaust part (21) is arranged such that it is able to supply cooling air from the bottom part (23) as dryer part (22) supply air.

4. Dryer structure according to one of the claims 1 to 3, wherein
said compact dryer unit is arranged within a dryer building (10), and
said means (33) for supplying air to the bottom part (23) is arranged such that the air for the bottom part (23) is taken from within the dryer building (10). 5
5. Dryer structure according to one of the claims 1 to 3, wherein
said compact dryer unit is arranged within a dryer building (10), and
said means (34) for supplying air to the bottom part (23) is arranged such that the air for the bottom part (23) is taken from outside the dryer building (10). 10
6. Dryer structure according to one of the claims 1 to 5, wherein
the dryer structure is structured such that only air used in the bottom part (23) is used in the dryer structure. 15
7. Control system for a dryer involved in a pulp making process, comprising
the dryer structure according to one of the claims 1 to 6, and
means (212, 222) for detecting/estimating/calculating at least one variable that is in direct relation to a production level of the pulp making process in the dryer structure,
wherein
said means (31) for exhausting air from the exhaust part (21) is controllable based on said variable. 20
8. Control system according to claim 7, wherein
said means (33, 34) for supplying air to the bottom part (23) is controllable such that the supply air is kept at a desired value. 25
9. Control system according to claim 7 or 8, wherein
the variable is a pressure and / or a temperature in the production level of the pulp making process part, and
the control system further comprises
a pressure sensor (212) provided in the dryer structure, said pressure sensor detecting the pressure in the dryer structure as the variable; and / or
a temperature sensor (222) provided in the dryer structure, said temperature sensor detecting the temperature in the dryer structure as the variable. 30
10. Control system according to one of the claims 7 to 9, wherein
said bottom part (23) comprising no additional 35

means for supplying cooling air beside said means for supplying air to the dryer structure.

11. Control system according to one of the claims 7 to 10, wherein
said means for supplying air to the bottom part (23), said means for exhausting air from the exhaust part (21), and said air supply means for supplying air from the bottom part (23) to the exhaust part (21) are a fan, respectively, or a fan group, and
the control system further comprises one or more speed controller(s), one or more temperature controller(s), and one or pressure controller(s) for controlling the speed, temperature and/or pressure of the air flows. 40
12. Control method for an airborne dryer involved in a pulp making process, comprising the steps
detecting/estimating/calculating at least one variable that is in direct relation to a production level of the pulp making process in a dryer structure according to one of the claims 1 to 6,
supplying air to the bottom part (23), and
exhausting air from the exhaust part (21),
characterized in that
supplying air from the bottom part (23) to the exhaust part (21) is controlled based on said variable. 45
13. Method according to claim 12, wherein
supplying air to the dryer structure is controlled such that the supply air is kept at a desired value, and/or the variable is a pressure and / or a temperature in the production level of the pulp making process part. 50
14. Method according to one of the claims 12 or 13, wherein
cooling air from the bottom part (23) is supplied as said supply air to the dryer structure. 55
15. Method according to one of the claims 12 to 14, wherein
the method further comprises controlling the speed, temperature and/or pressure of the air flows.

FIG. 1 PRIOR ART

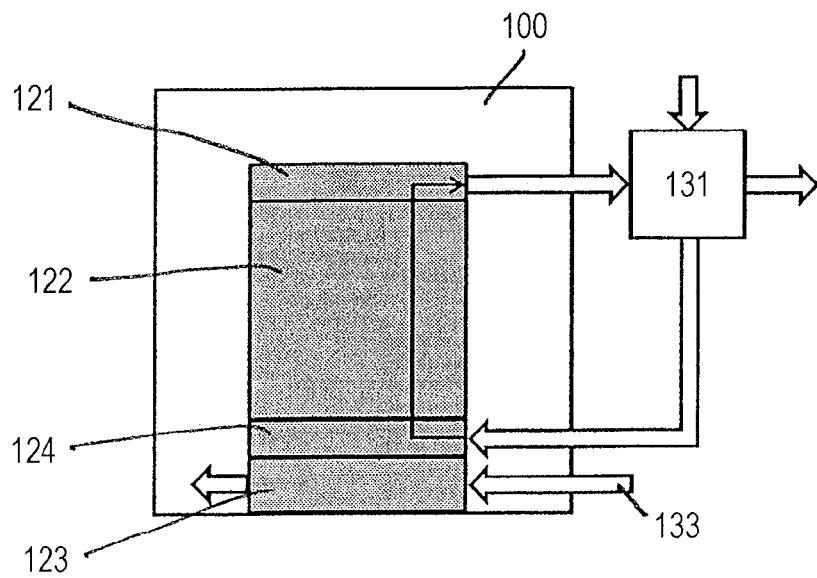
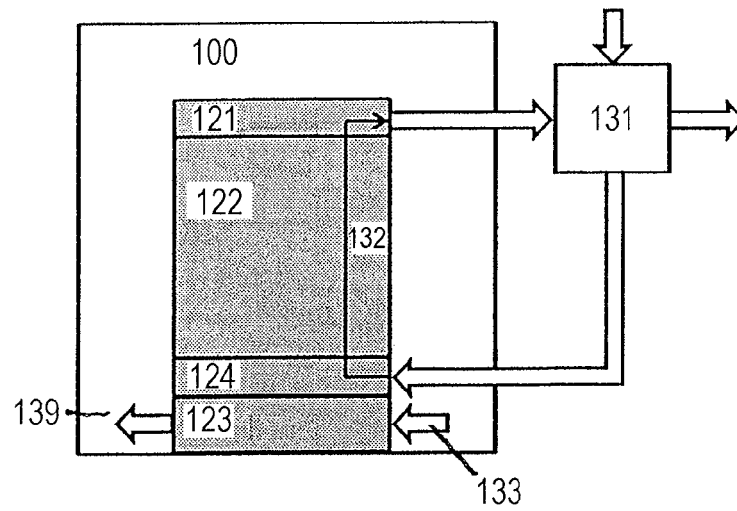


FIG. 2 PRIOR ART

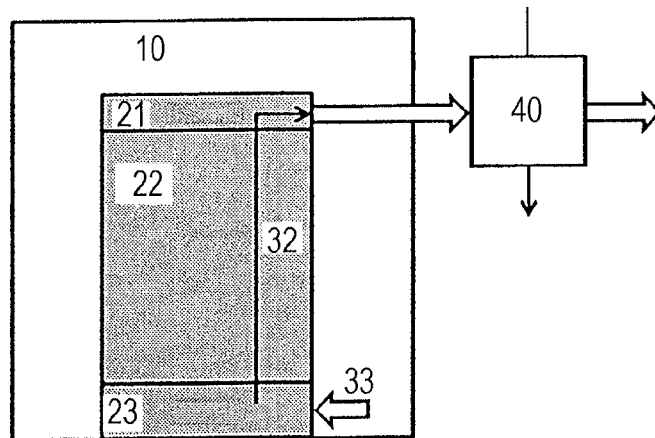


FIG. 3

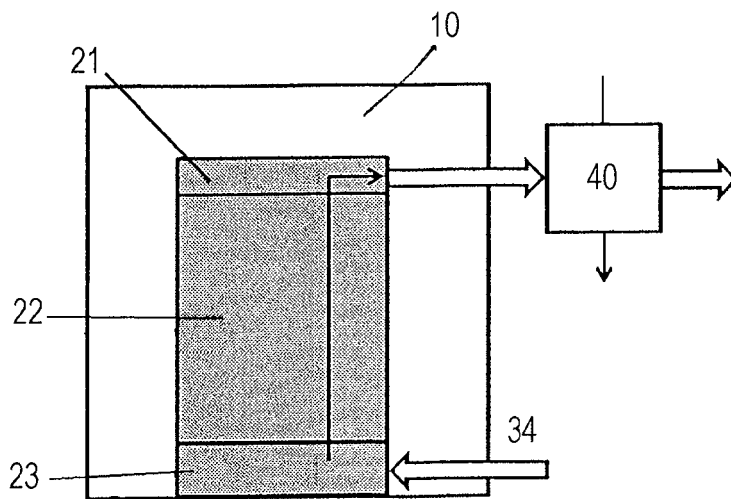


FIG. 4

FIG. 5

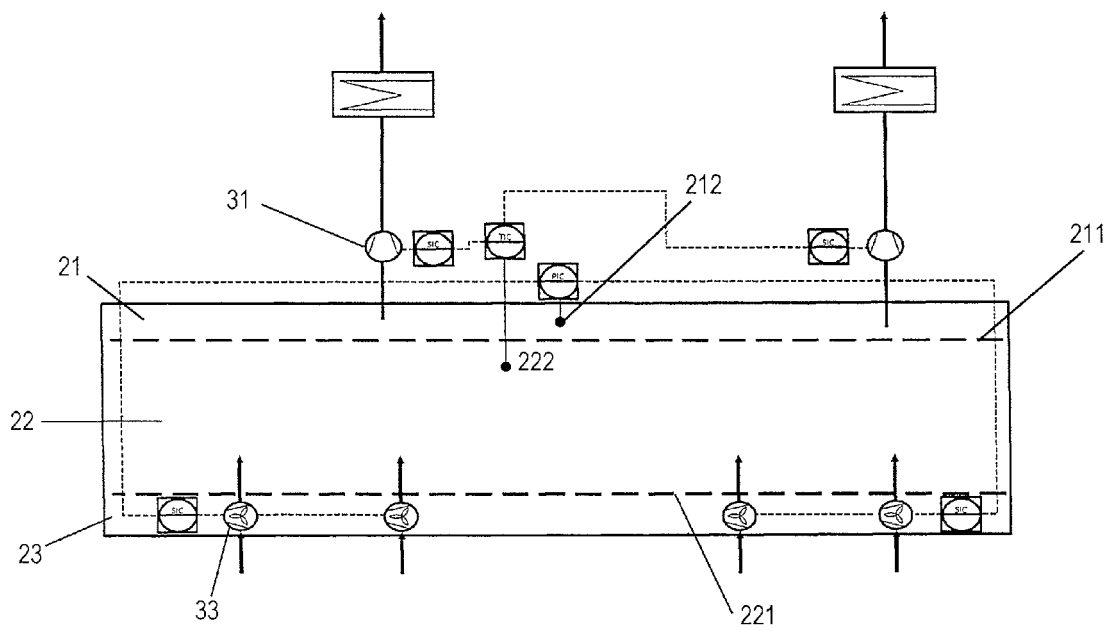


FIG. 6

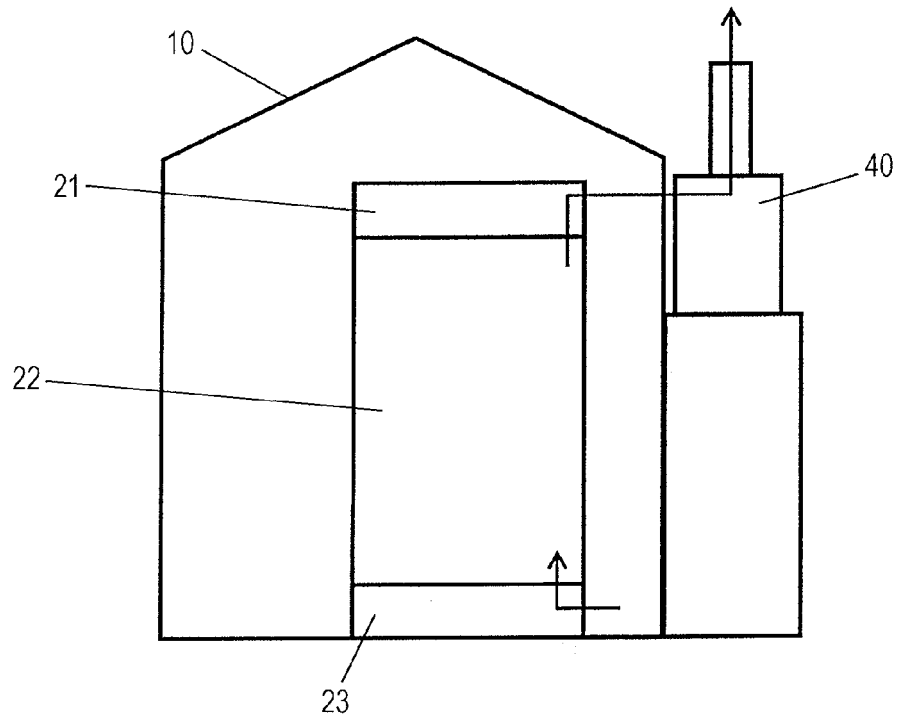


FIG. 7

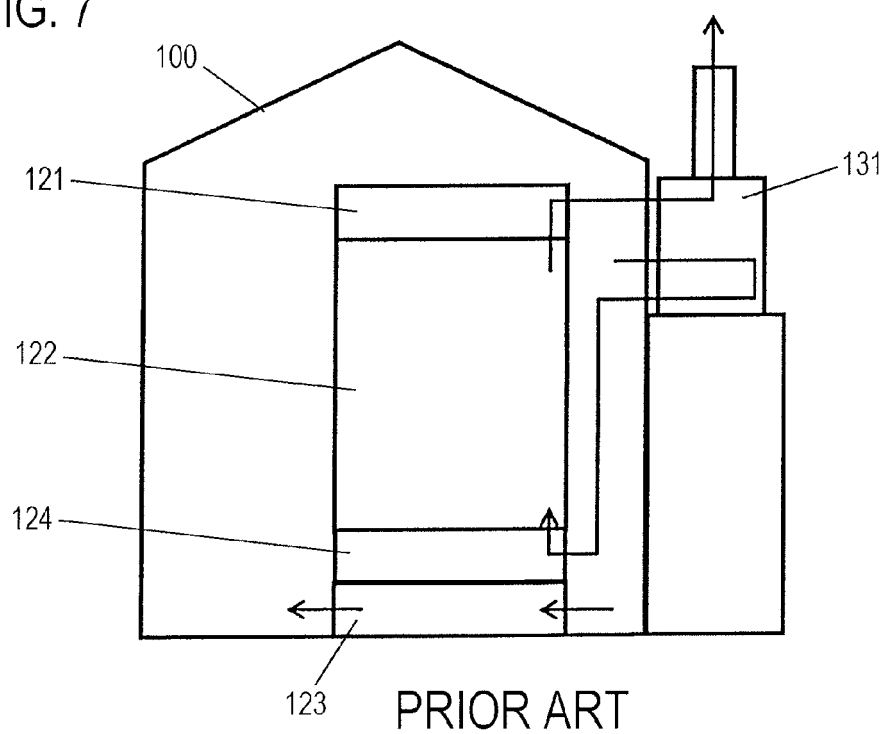


FIG. 8

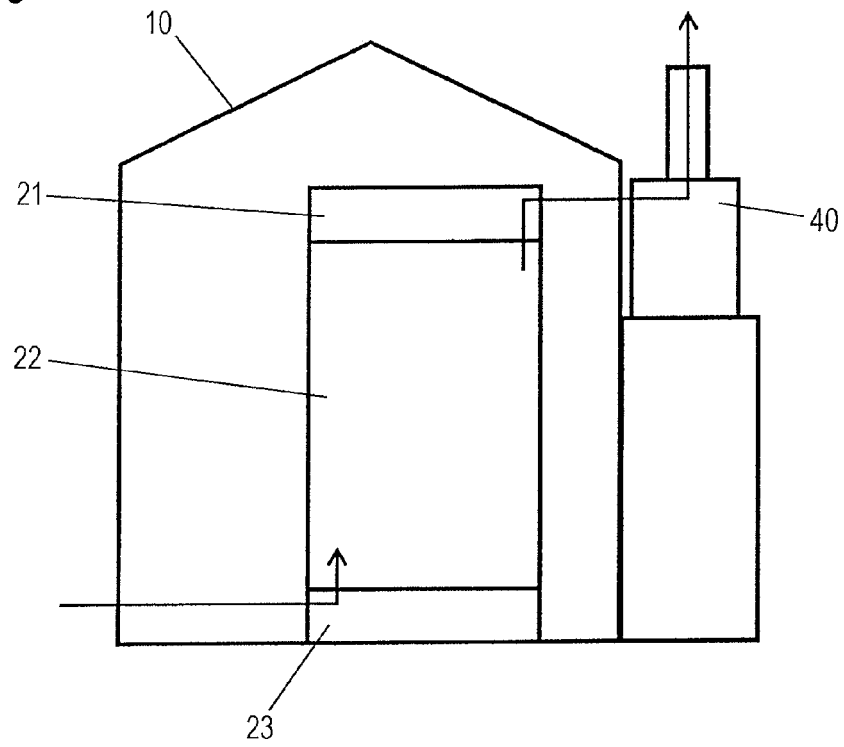
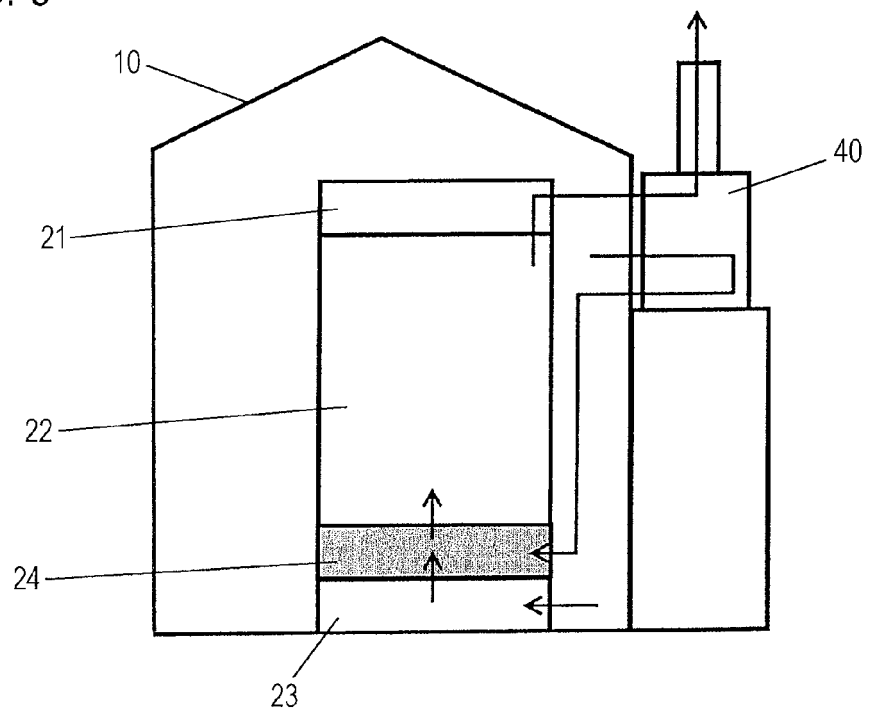


FIG. 9





EUROPEAN SEARCH REPORT

Application Number
EP 13 17 6610

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Place of search Munich		Date of completion of the search 20 September 2013	Examiner Sabatucci, Arianna
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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