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(54) PULPER AND METHOD FOR MANUFACTURING FIBRE MASS SUSPENSION

(57) A secondary pulper (12) for manufacturing fibre mass suspension comprises a pulping space (13) equipped with a screen plate (16) for dividing the fibre mass suspension into accept and reject fractions, the screen plate (16) comprising a screening surface (17) provided with screen openings extending through the screen plate (16). The secondary pulper (12) further comprises at least two accept chambers (19a, 19b) separate from each other for receiving different accept fractions into different accept chambers (19a, 19b).
Furthermore a process (1) and a method for manufacturing fibre mass suspension.

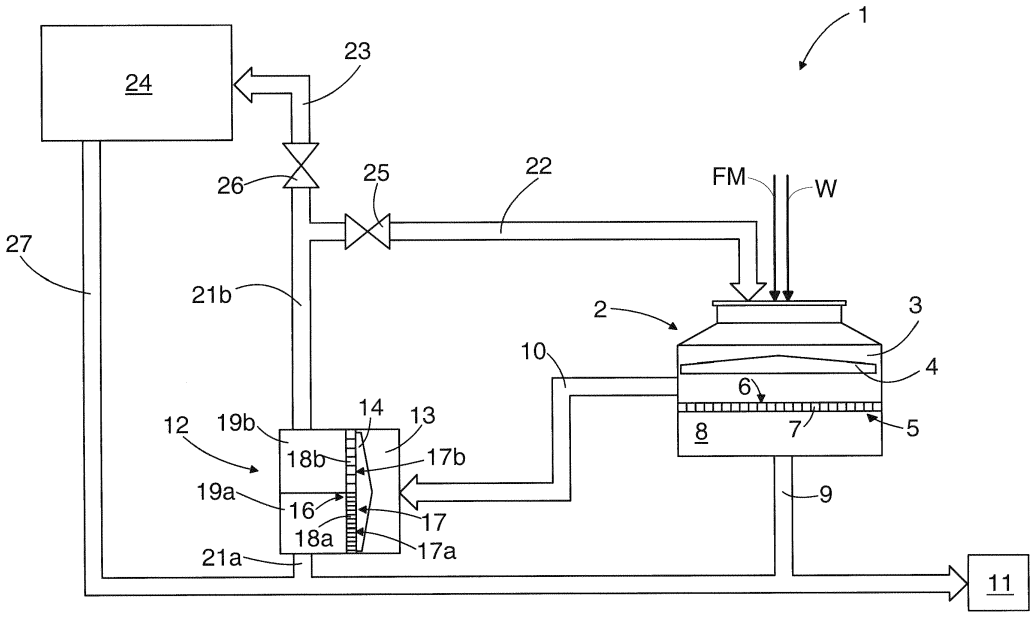

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The invention relates also to a secondary pulper for manufacturing fibre mass suspension, the secondary pulper comprising a pulping space equipped with a screen plate for dividing the fibre mass suspension into accept and reject fractions.

[0002] The invention relates also to a process for manufacturing fibre mass suspension, the process comprising at least one primary pulper for mixing together fibre material and water so as to produce the fibre mass suspension and for dividing the fibre mass suspension into accept and reject fractions in the at least one primary pulper, and at least one secondary pulper for receiving at least a portion of the reject fraction from the at least one primary pulper and for dividing the reject fraction received from the at least one primary pulper into accept and reject fractions in the at least one secondary pulper.

[0003] The invention relates also to a method for manufacturing fibre mass suspension, the method comprising producing the fibre mass suspension by mixing together fibre material and water in at least one primary pulper, dividing the fibre mass suspension into accept and reject fractions in the at least one primary pulper, supplying the reject fraction from the at least one primary pulper to at least one secondary pulper, and dividing the reject fraction received from the at least one primary pulper into accept and reject fractions in the at least one secondary pulper.

BACKGROUND OF THE INVENTION

[0004] At an initial stage of manufacturing fibre mass suspension, such as the fibre mass suspension to be used for manufacturing paper and cardboard, pulping may be used as one part of the process. The purpose of pulping is to defibre the fibre material to be fed to a primary pulper provided in the pulping system as well as to mix the fibre material with water to be fed to the primary pulper so as to produce the fibre mass suspension. The fibre material to be used may be e.g. cellulose or a recycled fibre material or a fibre-containing material from a paper or cardboard factory.

[0005] Accept fraction, which is a portion of the fibre mass suspension that has passed through a screen plate remaining in the primary pulper, is supplied further to a further treatment process in the fibre mass suspension manufacturing process. A portion of the fibre mass suspension that has not passed the screen plate of the primary pulper, i.e. reject fraction of the primary pulper, is supplied further to a secondary pulper for further processing. The secondary pulper continues processing the reject received from the primary pulper, dividing it into accept and reject fractions. The accept fraction of the secondary pulper may be supplied from the secondary pulper to the further treatment process in the fibre mass suspension manufacturing process. Alternatively the accept fraction from the secondary pulper may be supplied back to the primary pulper for further processing in the primary pulper. The reject of the secondary pulper is supplied from the secondary pulper to a reject processing, which may for example be provided with a drum screen, the purpose of that being recovering fibres still remaining in the reject of the secondary pulper. Remaining material, i.e. the reject formed at the drum screen, in turn, is removed from the process, to be burned outside the process, for instance.

BRIEF DESCRIPTION OF THE INVENTION

[0006] An object of the present invention is to provide a novel secondary pulper and a novel process and method for manufacturing fibre mass suspension.

[0007] The invention is characterized by the features of the independent claims.

[0008] The invention is based on the idea of providing in a secondary pulper for manufacturing fibre mass suspension a number of accept fractions, whereby at least one fine accept fraction may be supplied from the secondary pulper to a further treatment process in the fibre mass suspension manufacturing process and at the same time at least one coarse accept fraction may be supplied from the secondary pulper to a further processing of the coarse accept fraction.

[0009] An advantage of the invention is that it may be provided from a single secondary pulper at the same time both a fine accept fraction flow to the further treatment process as well as a coarse accept fraction flow for further processing of the coarse accept fraction, wherein fibres may be recovered from the coarse accept fraction. Concurrent flows of the fine accept fraction and the coarse accept fraction out of the secondary pulper allows for example a volume of the primary pulper to be decreased.

[0010] Some embodiments of the invention are disclosed in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] In the following the invention will be described in greater detail by means of preferred embodiments with reference to the accompanying drawings, in which

Figure 1 shows schematically a pulping system;
Figure 2 shows schematically a front view of a secondary pulper and a screen plate therein;
Figure 3 shows schematically a front view of a second screen plate;
Figure 4 shows schematically another pulping system;
Figure 5 shows schematically a front view of a third screen plate; and
Figure 6 shows schematically a front view of a fourth screen plate.

[0012] For the sake of clarity, the figures show some embodiments of the invention in a simplified manner. Like reference numerals identify like elements in the figures.

DETAILED DESCRIPTION OF THE INVENTION

[0013] Figure 1 shows schematically a pulping system 1, i.e. a process 1 for manufacturing fibre mass suspension. The process 1 comprises at least one primary pulper 2 and at least one secondary pulper 12 arranged in series with the at least one primary pulper 2. For the sake of clarity Figure 1 discloses only one primary pulper 2 and only one secondary pulper 2 but a number of the primary pulpers 2 and the secondary pulpers 12 may be higher than one in the fibre mass suspension manufacturing processes.

[0014] The primary pulper 2 is used for producing fibre mass suspension by mixing together fibre material and water. The primary pulper 1 may be a vertical pulper and it comprises a pulping space 3, or a vat 3, into which water, as shown by arrow W, and fibre material, as shown by arrow FM, are supplied. The pulping space 3 is provided with a rotor 4 which is rotated by a not shown motor and which, when rotating at a high speed, defibres the fibre material FM supplied to the pulper 2, mixing it with water W. The consistency of the fibre mass suspension in the pulper 2 is typically 3 to 8%, but may also be 1 to 20%. Typically, the fibre material FM is a recycled fibre material but may also be a waste material recovered from a paper or cardboard manufacturing process or cellulose. The rotation of the rotor 4 generates a strong turbulence in the pulper 2 such that particles that are heavier than fibres, such as large fibre bundles and various impurities originating from the recycled fibre material, such as sand and pieces of plastic and metal, constituting a heavier matter, drift to the edges of the pulper 2.

[0015] Over a middle part of the pulper 2, the fibre material slowly settles downwards. The lower part of the pulper 2 is provided with a screen plate 5 having a screening surface 6 provided with screen openings 7 extending through the screen plate 5 so as to enable a sufficiently defibred material to pass therethrough into an accept chamber 8 of the primary pulper 2. The portion of the fibre mass suspension which has passed through the screen openings 7 in the screen plate 5 into the accept chamber 8, is called the accept fraction of the primary pulper 2. The accept fraction is forwarded from the accept chamber 8 along an accept channel 9 of the primary pulper 2 to a further treatment process 11 in the fibre mass suspension manufacturing process. The further treatment process 11 in the fibre mass suspension manufacturing process may comprise, depending on an embodiment thereof, e.g. a number of, i.e. one or more, screening stages and, therebetween or thereafter, removal of sand by means of vortex cleaners. After these phases, the fibre mass suspension may be supplied via precipitation to a short circulation of a paper or cardboard machine in order to be used in the manufacture of paper or cardboard.

[0016] The portion of the fibre mass suspension which accumulates on the edges of the pulper 2 and contains various impurities, i.e. the reject fraction of the primary pulper 2, is transferred substantially continuously along a reject channel 10 of the primary pulper 2 to the secondary pulper 12. The reject channel 10 of the primary pulper 2 may be provided with a not shown valve, which in normal use is usually kept completely open, but when necessary, may be closed if, for one reason or another, the flow of the reject from the primary pulper 2 to the secondary pulper 12 is to be prevented. The lower part of the primary pulper 2 may also be provided with a junk trap (also omitted from Figure 1 for the sake of clarity) into which the heaviest components in the fibre mass suspension fall and wherefrom such components may be removed occasionally. Since the structure and operational principle of various pulpers suitable for use as the primary pulper 2 are generally known to a person skilled in the art, they will not be discussed in further detail herein.

[0017] An embodiment of the process 1 and a structure and operation thereof, as well as an embodiment of a secondary pulper 12 and a structure and operation thereof are discussed next in more detail and referring to Figures 1, 2 and 3, wherein Figure 2 shows schematically a front view of a secondary pulper 12 and a screen plate 16 therein and Figure 3 shows schematically a front view of a second screen plate 16.

[0018] The reject fraction received from the primary pulper 2 is further screened and defibred in the secondary pulper 12. The secondary pulper 12 comprises a pulping space 13, or a pulping chamber 13, provided with a rotor 14 comprising rotor blades 15, the rotor 14 being rotated by a not shown motor. The secondary pulper 12 comprises further the screen plate 16 comprising a screening surface 17, the rotor blades 15 substantially extending over a radial extension of the screening surface 17 and rotating close to the screening surface 17. When rotating the rotor 14 and the blades thereof generate a strong turbulence close to the screening surface of the screen plate, thus effectively defibering the fibre material FM and forcing the defibered fibre material through screen openings in the screening surface of the screen plate into an accept chamber of the secondary pulper. The secondary pulper 12 is thus a screening and defibring pulper wherein the screening and defibring are carried out by means of the rotor and the screen plate. Since the structure and operational principle of various pulpers suitable for use as the secondary pulper 12 are generally known to a person skilled in the art, they will not be discussed in further detail herein.

[0019] The screening surface 17 of the screen plate 16 of the secondary pulper 12 of Figures 1, 2 and 3 comprises two screening surface areas 17a, 17b, i.e. a first screening surface area 17a and a second screening surface area 17b, comprising respective screen openings 18a, 18b, i.e. first screen openings 18a and second

screen openings 18b extending through the screen plate 16. Sizes of the first screen openings 18a in the first screening surface area 17a are substantially same over the first screening surface area 17a, as well as sizes of the second screen openings 18b in the second screening surface area 17b are substantially same over the second screening surface area 17b, but, however, the sizes of the first screen openings 18a in the first screening surface area 17a being smaller than the sizes of the second screen openings 18b in the second screening surface area 17b. The effect of this is that the screen plate 16 of Figures 1, 2 and 3 allows fibre material pieces of different sizes to pass the screening surface 17 of the screen plate 16 at different areas of the screening surface 17, fibre material pieces of only smaller size being able to pass the screen plate 16 only through the first screening surface area 17a and fibre material pieces of also bigger size being able to pass the screen plate 16 through the second screening surface area 17b.

[0020] The fibre material passed through the screening surface 17 of the screen plate 16 forms the accept fraction of the fibre material to be processed. In the example of Figures 1, 2 and 3 the screening surface 17 provides two different accept fractions, i.e. a fine accept fraction passed through the first screening surface area 17a and a coarse accept fraction passed through the second screening surface area 17b.

[0021] The secondary pulper 12 further comprises respective separate accept chambers 19a, 19b for receiving the accept fractions passed through the screening surface 17 of the screen plate 16, i.e. a first accept chamber 19a or a fine accept chamber 19a for receiving the fine accept fraction passed through the first screening surface area 17a and a second accept chamber 19b or a coarse accept chamber 19b for receiving the coarse accept fraction passed through the second screening surface area 17b. In the secondary pulper 12 the first screening surface area 17a of the screen plate 16 is thus set at the first accept chamber 19a and the second screening surface area 17b of the screen plate 16 is set at the second accept chamber 19b.

[0022] The first accept chamber 19a comprises an aggregate 20a for discharging the fine accept fraction out of the first accept chamber 19a of the secondary pulper 12 and the second accept chamber 19b comprises an aggregate 20b for discharging the coarse accept fraction out of the second accept chamber 19b of the secondary pulper 12. In addition to the aggregates 20a, 20b the secondary pulper 12 typically comprises an aggregate for supplying dilution water to the pulping space 13 in order to decrease the consistency of the fibre mass suspension in the pulping space 13, as well as an aggregate for discharging a reject fraction, i.e. the fibre mass suspension portion not penetrating the screen plate 16, out of the secondary pulper 12, and a junk trap into which the heaviest components in the fibre mass suspension fall and wherefrom such components may be removed occasionally. For the sake of clarity, of these aggregates only the reject fraction aggregate 20c is disclosed in Figure 2, the other two aggregates being omitted in the Figures.

[0023] The fine accept fraction is discharged from the first accept chamber 19a of the secondary pulper 12 through the respective aggregate 20a and is forwarded to the further treatment process 11 in the fibre mass suspension manufacturing process along a fine accept channel 21a of the secondary pulper 12.

[0024] The coarse accept fraction is discharged from the second accept chamber 19b of the secondary pulper 12 through the respective aggregate 20b and a coarse accept channel 21b of the secondary pulper 12 for further processing wherefrom it may be supplied to the further treatment process 11.

[0025] According to an embodiment, at least a portion of the coarse accept fraction of the secondary pulper 12, but in some operating situations all of the coarse accept fraction, is supplied through a back flow channel 22 or a recirculation channel 22 back to the primary pulper 2 for further processing. In this operating situation the secondary pulper 12 is able to provide, at the same time, a fine accept fraction flow to the further treatment process 11 as well as a coarse accept fraction flow back to the primary pulper 2, wherein the coarse accept fraction may be further processed for breaking it into smaller pieces of fibre material.

[0026] In prior art solutions, there has been only a single accept chamber in the secondary pulper as well as a single screening surface area with screen openings of one size, thus providing only one accept fraction. Depending on the operation situation in the prior art, this accept fraction has been supplied at a time either back to the primary pulper 2 for further processing or forwarded towards the further treatment process 11 in the fibre mass suspension manufacturing process 1.

[0027] In the present invention, a number of separate accept fraction flows, in the example of Figures 1 to 3, two separate accept fraction flows are provided at the same time, the fine accept fraction flow being forwarded towards the further treatment process 11 and, at the same time, the coarse accept fraction flow may be supplied back to the primary pulper 2 for further processing. This means that all the time at least a portion of the accept fraction of the secondary pulper 12 may be forwarded to the further treatment process 11, whereby for example a volume of the primary pulper 2 may be decreased in view to the prior art solutions. Also the energy consumption of the pulping process is reduced because the fine accept fraction is continuously supplied out of the actual pulping process whereby no energy is used for pulping the fibre mass suspension portion that has already been sufficiently slushed.

[0028] According to an embodiment, at least a portion of the coarse accept fraction of the secondary pulper 12, but in some operating situations all of the coarse accept fraction, may be supplied through a forward flow channel 23 forward to a coarse accept treatment process 24,

wherein fibre material of the coarse accept fraction may still become at least to some extent slushed further for recovering fibres from the coarse accept fraction. In this operating situation the secondary pulper 12 is able to provide, at the same time, a fine accept fraction flow to the further treatment process 11 as well as a coarse accept fraction flow to the coarse accept treatment process 24 including at least one of at least one screening stage, washing and deflaking. After the coarse accept treatment process 24 at least a portion of the processed coarse accept may be supplied to the further treatment process 11. The reject fraction of the secondary pulper 12, i.e. the fraction of the fibre material not passing through the screening surface 17 of the screen plate 16 may be supplied to a reject treatment including for example a drum screen for recovering fibres still remaining in the reject fraction.

[0029] According to an embodiment, a portion of the coarse accept fraction of the secondary pulper 12 may be supplied through the back flow channel 22 back to the primary pulper 2 and at the same time a portion of the coarse accept fraction of the secondary pulper 12 may be supplied through the forward flow channel 23 forward to the coarse accept treatment process 24.

[0030] A possible division of the coarse accept fraction into different flows, i.e. a flow back to the pulping space 3 of the primary pulper 2 and a flow forward to the coarse accept treatment process 24, may be provided by controlling openings of valves 25, 26 arranged in the back flow channel 22 and the forward flow channel 23 respectively. In this operating situation the secondary pulper 12 is able to provide, at the same time, a fine accept fraction flow to the further treatment process 11 as well as a coarse accept fraction flows to the primary pulper 2 and to the coarse accept treatment process 24 for further processing the coarse accept fraction.

[0031] In the example above the screening surface 17 of the screen plate 16 of the secondary pulper 12 comprises two different screening surface areas 17a, 17b with the screen openings 18a, 18b having different sizes. However, the number of the screening surface areas 17a, 17b with the screen openings 18a, 18b having different sizes may also be higher than two in the screen plate 16 of the secondary pulper 12. Thus, in general terms, the screening surface of the screen plate may comprise two or more screening surface areas, i.e. at least two screening surface areas, and the size of the screen openings in each screening surface area is substantially same within the individual screening surface area but different from the size of the screen openings in any other screening surface area.

[0032] A diameter of the screen openings 18a in the first screening surface area 17a may for example be substantially between 1 - 15 mm. A diameter of the screen openings 18b in at least one other screening surface area may for example be substantially between 6 - 32 mm. According to the solution disclosed herein, the diameter of the screen openings 18b is selected to be larger than the diameter of the screen openings 18a in spite of the partially overlapping ranges of the possible dimensioning of the openings 18a, 18b. According to an embodiment the diameter of the screen openings 18a in the first screening surface area 17a is about 12 mm and the diameter of the screen openings 18b in the second screening surface area 17b is about 20 mm.

[0033] In the embodiments disclosed above a shape of the screen opening 18a, 18b is substantially round but many other shapes of the screen openings may be used.

[0034] Referring back to Figure 2, the screen plate 16 comprises altogether six separate screen plate segments 16a, 16b, 16c, 16d, 16e, 16f. The screen plate segments 16a, 16b, 16c having the screen openings 18a with smaller size provide the first screening surface area 17a in the screen plate 16 and the screen plate segments 16d, 16e, 16f having the screen openings 18b with larger size provide the second screening surface area 17b in the screen plate 16. The screen plate segments 16a to 16f may be supported to a screen plate frame 16' of which an outer ring is visible in Figures 2 and 3.

[0035] Referring to Figure 3, which discloses an example of a second screen plate 16, the screening surface 17 of the screen plate 16 comprises also two different screening surface areas 17a, 17b with the screen openings 18a, 18b having different sizes, each screening surface area 17a, 17b, however, being provided by a single screen plate segment 16g, 16h having a shape of a semicircle and being supported to the screen plate frame 16'.

[0036] Further referring to Figures 1, 2 and 3, surface areas of the screening surface areas 17a, 17b are about half, i.e. about 50 per cent, of the complete surface area of the screening surface 17 of the screen plate 16 but generally a surface area of a single screening surface are 17a, 17b may be between 20 - 80 per cent of the complete surface area of the screening surface 17. The division of the screening surface 17 into a number of different screening surface areas may, however, vary from that shown in Figures 1, 2 and 3 in such a way that a surface area of at least one screening surface area is different from a surface area of any other screening surface area or from at least one other screening surface area provided in the screening surface 17 of the screen plate 16. An example of that kind of screen plate 16 and screening surface 17 therein is disclosed for example in Figures 5 and 6 later.

[0037] Figure 4 shows schematically another pulping system 1, i.e. another process 1 for manufacturing fibre mass suspension. The process 1 of Figure 4 and the operation thereof resembles the process 1 of Figure 1 and the operation thereof, the differences between the embodiments of Figures 1 and 4 relating to the structure and operation of the primary pulper 2.

[0038] The primary pulper 2 of Figure 4 comprises a pulping space 3, a rotor 4 and a screen plate 5 comprising a screening surface 6. The screening surface 6 comprises two screening surface areas 6a, 6b, i.e. a first screening surface area 6a and a second screening surface area

6b, comprising respective screen openings 7a, 7b, i.e. first screen openings 7a and second screen openings 7b extending through the screen plate 5. Sizes of the first screen openings 7a in the first screening surface area 6a are substantially same over the first screening surface area 6a, as well as sizes of the second screen openings 7b in the second screening surface area 6b are substantially same over the second screening surface area 6b, but, however, the size of the first screen openings 7a in the first screening surface area 6a being smaller than the size of the second screen openings 7b in the second screening surface area 6b.

[0039] In the embodiment of the screen plate 6 of the primary pulper 2 of Figure 4, the first screening surface area 6a is located at an outer region of the pulping space 3 and the second screening surface area 6b is located at a central region of the pulping space 3 in such a manner that the first screening surface area 6a and the second screening surface area 6b have a common central axis and the first screening surface area 6a is arranged to surround the second screening surface area 6b. The same can be observed in Figure 5, which shows schematically a front view of the screen plate 6 of the primary pulper 2 of Figure 4.

[0040] Figure 6 shows schematically a front view of another embodiment of the screen plate 5 which can be used in the primary pulper 2. In the embodiment of Figure 6 the second screening surface area 6b is arranged to surround the first screening surface area 6a so that they have a common central axis. By using the screen plate 5 of Figure 6 the first screening surface area 6a is to be located at a central region of the pulping space 3 and the second screening surface area 6b is to be located at an outer region of the pulping space 3.

[0041] In the embodiments of Figures 5 and 6 the screen plate 16 comprises two separate screen plate segments 5a, 5b, i.e. an outer segment 5a having a shape of a ring and an inner segment 5b having a shape of a circle. In the embodiment of Figure 5 the screen plate segment 5a having the screen openings 7a with smaller size provides the first screening surface area 6a in the screen plate 5 and the screen plate segment 5b having the screen openings 7b with larger size provides the second screening surface area 6b in the screen plate 5. In the embodiment of Figure 6 that is the other way around.

[0042] The screen plate segments 5a, 5b may be supported to a screen plate frame 5' of which an outer ring is visible in Figures 5 and 6. Each of the plate segments 5a, 5b could also be provided by a number of smaller segments.

[0043] Referring back to Figure 4, the primary pulper 2 comprises respective separate accept chambers 8a, 8b for receiving the accept fractions passed through the screening surface 6 of the screen plate 5, i.e. a first accept chamber 8a or a fine accept chamber 8a for receiving the fine accept fraction passed through the first screening surface area 6a and a second accept chamber 8b or a coarse accept chamber 8b for receiving the coarse accept fraction passed through the second screening surface area 6b. The accept chambers 8a, 8b thus have a common central axis, the first accept chamber 8a being arranged around the second accept chamber 8b, but the order of the accept chambers 8a, 8b could also be the other way around, in view of the embodiment of the screen plate 5 according to Figure 6. In the primary pulper 2 the first screening surface area 6a of the screen plate 5 is thus set at the first accept chamber 8a and the second screening surface area 6b of the screen plate 5 is set at the second accept chamber 8b.

[0044] The fine accept fraction is discharged from the first accept chamber 8a of the primary pulper 2 and forwarded to the further treatment process 11 in the fibre mass suspension manufacturing process along a fine accept channel 9a of the primary pulper 2.

[0045] The coarse accept fraction is discharged from the second accept chamber 8b of the primary pulper 2 through a coarse accept channel 9b of the primary pulper 2 to the coarse accept treatment process 24 for further processing. In this embodiment the primary pulper 2 is thus able to provide, at the same time, a fine accept fraction flow to the further treatment process 11 as well as a coarse accept fraction flow to the coarse accept treatment process 24. After the coarse accept treatment process 24 at least a portion of the processed coarse accept may be supplied to the further treatment process 11 for example through a fine accept channel 27 of the coarse accept treatment process 24.

[0046] In the example of Figures 4 to 6 the screening surface 6 of the screen plate 5 of the primary pulper 12 comprises two different screening surface areas 6a, 6b with the screen openings 7a, 7b having different sizes. However, the number of the screening surface areas with the screen openings having different sizes in the screen plate 5 of the primary pulper 2 may also be higher than two, in which case the primary pulper 2 is arranged to comprise respective number of separate accept chambers.

[0047] Furthermore, instead of using the screen plates 5 of Figures 5 and 6 in the primary pulper 2, the screen plates 16 of Figures 2 and 3 could also be utilized in the primary pulper 2. Similarly, instead of using the screen plates 16 of Figures 2 and 3 in the secondary pulper 12, the screen plates 5 of Figures 5 and 6 could also be utilized in the secondary pulper 12. In these cases the accept chambers in the respective pulper should be arranged accordingly.

[0048] If the primary pulper 2 is equipped with the screen plate 5 comprising at least two different screening surface areas 6a, 6b and respective separate accept chambers 8a, 8b, a conventional secondary pulper with a screen plate with openings of one size and a single accept chamber may also be used as the secondary pulper instead of the secondary pulper 12 shown in Figure 1.

[0049] It will be obvious to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and

its embodiments are not limited to the examples described above but may vary within the scope of the claims.

Claims

1. A secondary pulper (12) for manufacturing fibre mass suspension, the secondary pulper (12) comprising a pulping space (13) equipped with a screen plate (16) for dividing the fibre mass suspension into accept and reject fractions, the screen plate (16) comprising a screening surface (17) provided with screen openings extending through the screen plate (16), **characterized in that**
the screening surface (17) of the screen plate (16) comprises at least two screening surface areas (17a, 17b), a size of at least one screen opening (18a, 18b) in at least one screening surface area (17a, 17b) being different from a size of at least one screen opening (18a, 18b) in at least one other screening surface area (17a, 17b), and that
the secondary pulper (12) comprises at least two accept chambers (19a, 19b) respective to the screening surface areas (17a, 17b) and separate from each other for receiving different accept fractions into different accept chambers (19a, 19b).

2. A secondary pulper as claimed in claim 1, **characterized in that** the secondary pulper (12) comprises a first accept chamber (19a) for receiving a fine accept fraction and a second accept chamber (19b) for receiving a coarse accept fraction.

3. A secondary pulper as claimed in claim 1 or 2, **characterized in that** the sizes of the screen openings (18a, 18b) in each individual screening surface area (17a, 17b) are substantially same but different from the sizes of the screen openings (18a, 18b) in any other screening surface area (17a, 17b).

4. A secondary pulper as claimed in any one of the preceding claims, **characterized in that** screen plate (16) comprises a number of separate screen plate segments (16a, 16b, 16c, 16d, 16e, 16f, 16g, 16h), each screen plate segment (16a, 16b, 16c, 16d, 16e, 16f, 16g, 16h) providing at least a part of a single screening surface area (17a, 17b) and comprising screen openings (18a, 18b) having substantially same size.

5. A secondary pulper as claimed in any one of the preceding claims, **characterized in that** a surface area of at least one screening surface area (17a, 17b) is at least 50 per cent of a surface area of a complete screening surface (17) of the screen plate (16).

6. A secondary pulper as claimed in any one of the preceding claims, **characterized in that** the screen plate (16) comprises two screening surface areas (17a, 17b) with different sizes of the screen openings (18a, 18b) in each screening surface area (17a, 17b).

7. A secondary pulper as claimed in claim 6, **characterized in that** the screening surface (17) of the screen plate (16) is divided into two screening surface areas (17a, 17b) along a diameter of the screen plate (16).

8. A secondary pulper as claimed in any one of the preceding claims, **characterized in that** the screening surface areas have a common central axis, whereby one screening surface area is arranged around the other screening surface area.

9. A process (1) for manufacturing fibre mass suspension, the process (2) comprising at least one primary pulper for mixing together fibre material (FM) and water (W) so as to produce the fibre mass suspension and for dividing the fibre mass suspension into accept and reject fractions in the at least one primary pulper (2), and at least one secondary pulper (12) for receiving at least a portion of the reject fraction from the at least one primary pulper (2) and for dividing the reject fraction received from the at least one primary pulper (2) into accept and reject fractions in the at least one secondary pulper (12),
characterized in that
the at least one secondary pulper (12) comprises at least two accept chambers (19a, 19b) separate from each other for receiving different accept fractions into different accept chambers (19a, 19b).

10. A process as claimed in claim 9, **characterized in that**
the at least one secondary pulper comprises a first accept chamber (19a) for receiving a fine accept fraction and a second accept chamber (19b) for receiving a coarse accept fraction, and that the fine accept fraction from the at least one secondary pulper (12) is arranged to be supplied to a further treatment process (11) and the coarse accept fraction is arranged to be supplied for further processing.

11. A process as claimed in claim 9 or 10, **characterized in that** the at least one secondary pulper (12) comprises the first accept chamber (19a) for receiving the fine accept fraction and the second accept chamber (19b) for receiving the coarse accept fraction, and that the fine accept fraction from the at least one secondary pulper (12) is arranged to be supplied to the further treatment process (11) and at least a portion of the coarse accept fraction from the at least one secondary pulper (12) is arranged to be supplied to the pulping space (3) of the at least one primary

pulper (2) for further processing.

12. A process as claimed in any one of claims 9 to 11, **characterized in that** the process (1) comprises a coarse accept treatment process (24) including at least one of at least one screening stage, washing and deflaking of the coarse accept, the coarse accept treatment process (24) arranged to receive at least a portion of the coarse accept fraction from at least one of the at least one primary pulper (2) and the at least one secondary pulper (12) for further processing.

13. A method for manufacturing fibre mass suspension, the method comprising producing the fibre mass suspension by mixing together fibre material (FM) and water (W) in at least one primary pulper (2), dividing the fibre mass suspension into accept and reject fractions in the at least one primary pulper (2), supplying the reject fraction from the at least one primary pulper (2) to at least one secondary pulper (12), and dividing the reject fraction received from the at least one primary pulper (12) into accept and reject fractions in the at least one secondary pulper (12), **characterized by** dividing the accept fraction in the at least one secondary pulper (12) into a fine accept fraction and a coarse accept fraction in the respective pulper (12), and supplying the fine accept fraction to a further treatment process (11) and supplying the coarse accept fraction for further processing.

14. A method as claimed in claim 13, **characterized by** supplying at least a portion of the coarse accept fraction from the at least one secondary pulper (12) to a pulping space (3) of the at least one primary pulper (2) for further processing.

15. A method as claimed in claim 13 or 14, **characterized by** supplying at least a portion of the coarse accept fraction from the at least one secondary pulper (12) to a coarse accept treatment process (24) including at least one of at least one screening stage, washing and deflaking of the coarse accept.

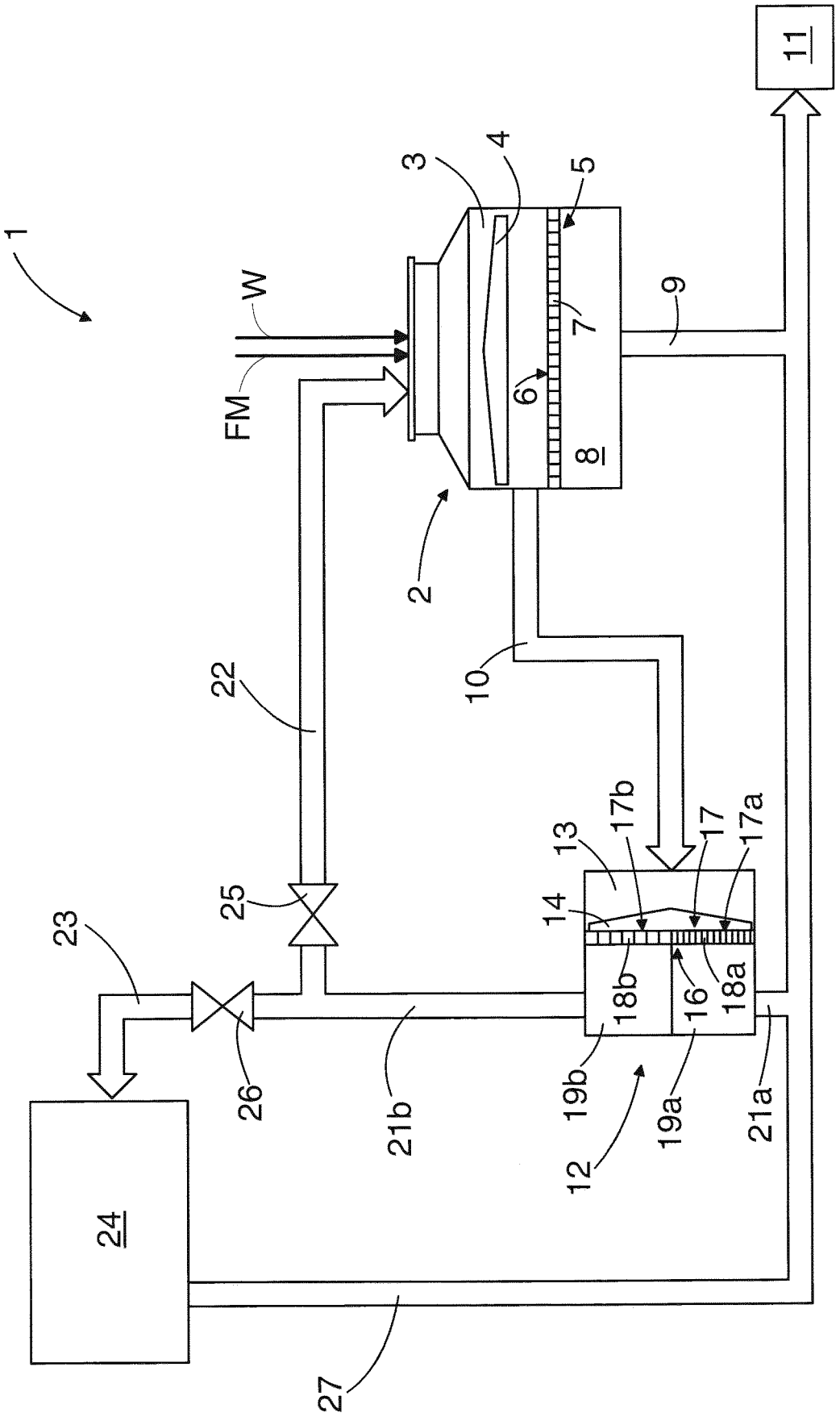
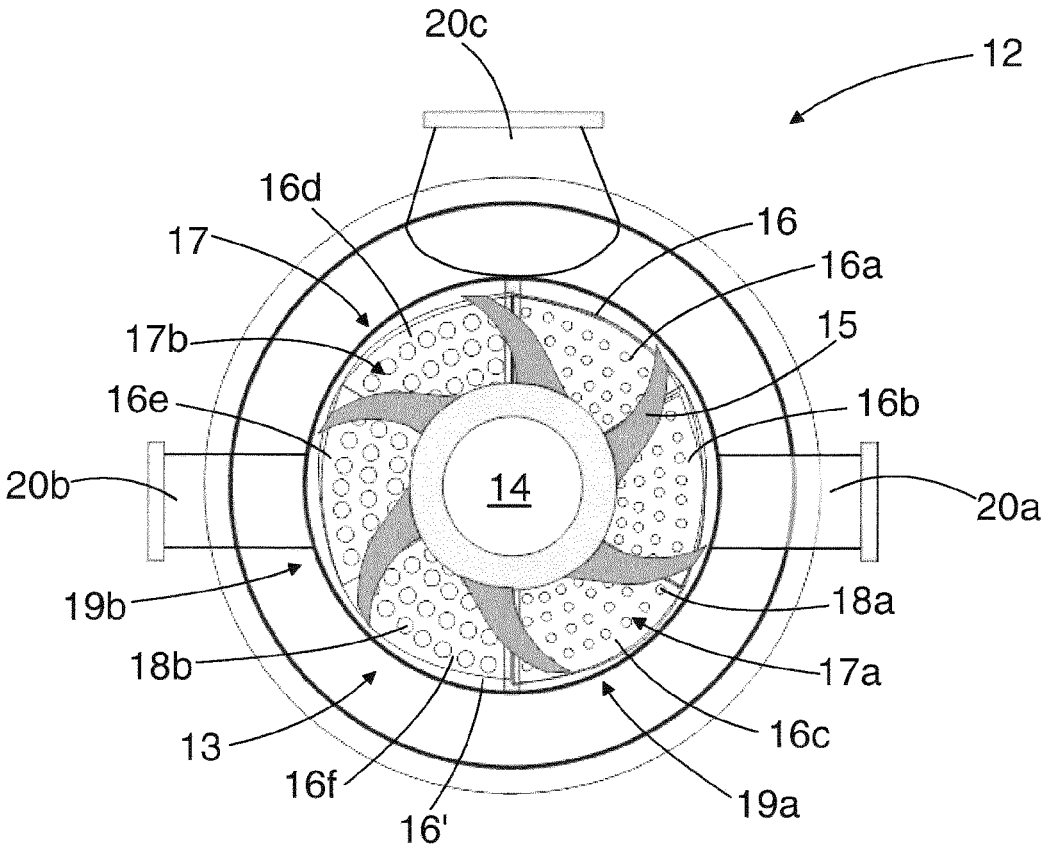

1
W
FM
2
3
4
5
6
7
8
9
10
11
12
13
14
16
17
17a
17b
18a
18b
19a
19b
21a
21b
22
23
24
25
26
27

FIG. 1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12
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16
17
16a
17b
15
16e
16b
20b
14
20a
19b
18a
18b
17a
16c
13
16f
19a
16'

FIG. 2

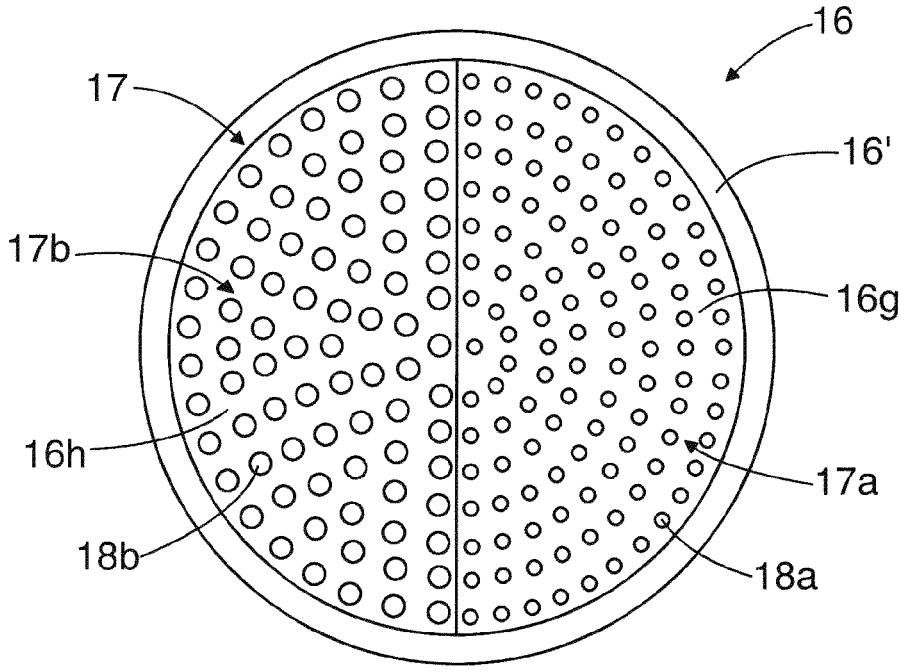
16
17
16'
17b
16g
16h
17a
18b
18a

FIG. 3

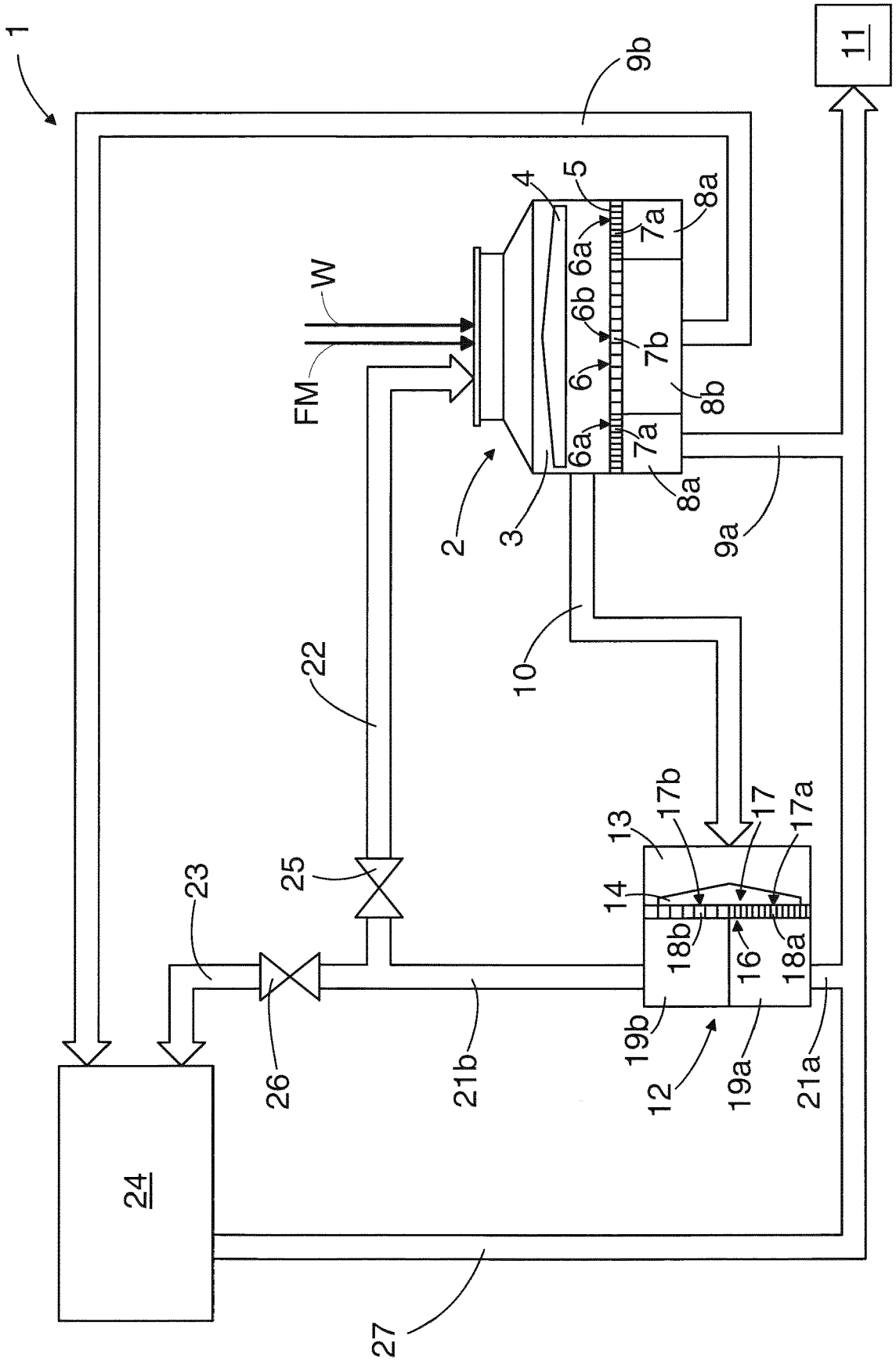
1
11
9b
4
5
8a
7a
6a
6b
7b
6
8b
W
FM
2
3
9a
10
22
13
17b
17
17a
14
18b
16
18a
25
23
26
21b
19b
12
19a
21a
24
27

FIG. 4

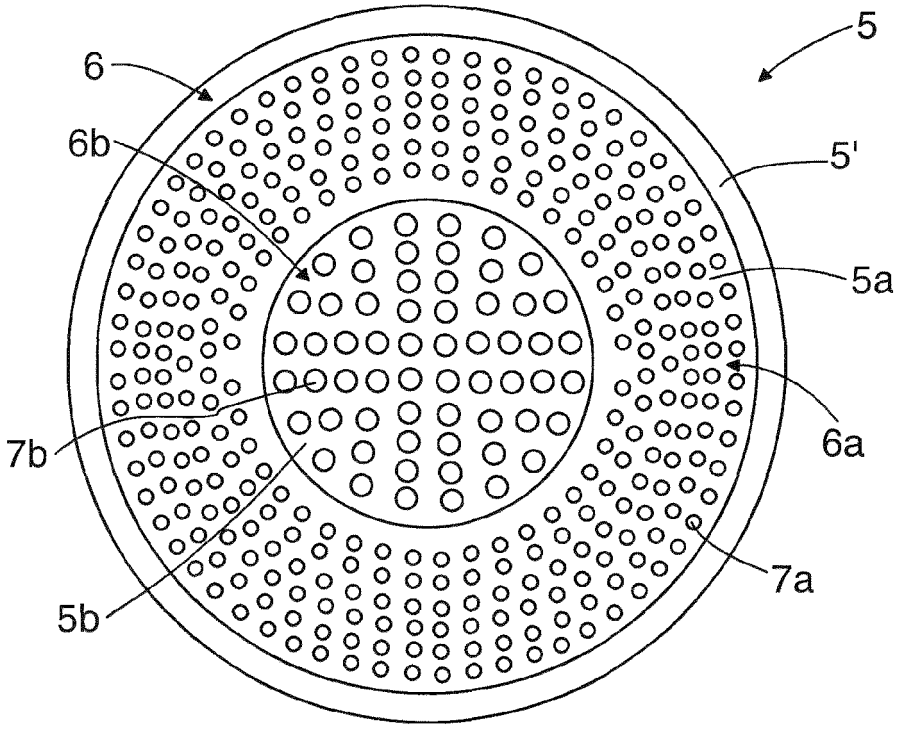

FIG. 5

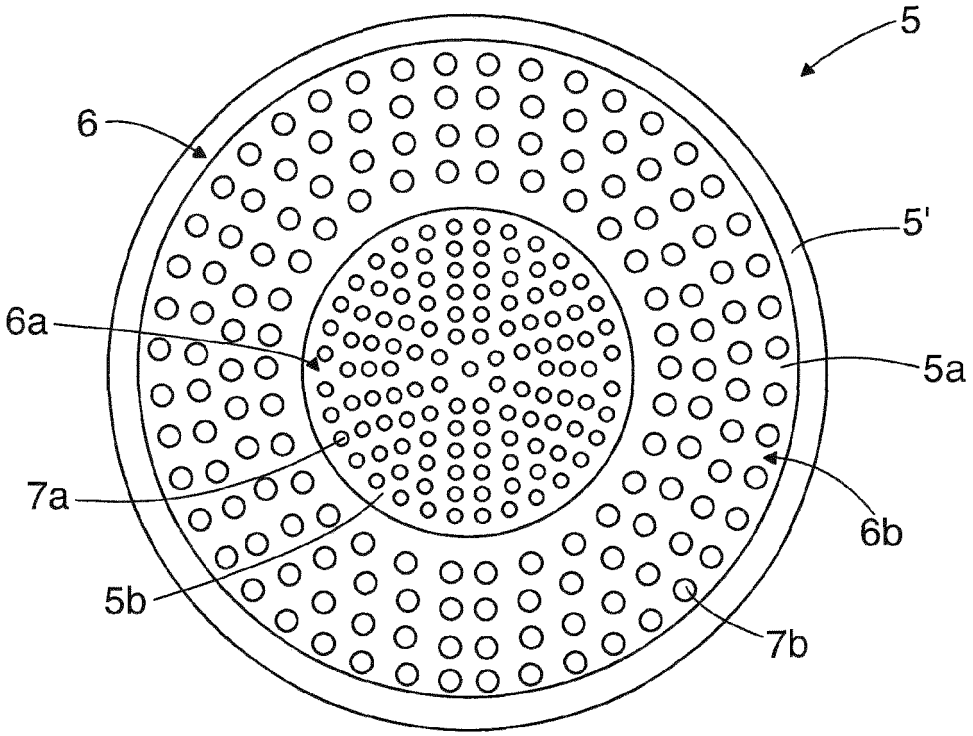

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 March 2020	Maisonnier, Claire

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