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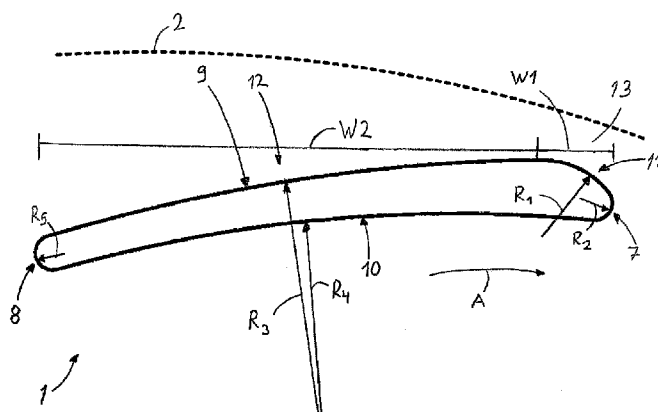
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(54) Title: SCREEN BLADE AND SCREEN FOR SCREENING PULP



(57) Abstract: A screen (1) blade (6) including in a longitudinal direction (L) of the blade (6) a first edge (7) and a second edge (8) and in a width direction (W) of the blade (6) a first surface (9) and a second surface (10) connecting the first edge (7) and the second edge (8). The blade (6) comprises in its width direction (W) a first part (11) and a second part (12), a portion of the first part (11) of the first surface (9) of the blade (6) being arranged to curve towards the first edge (7) of the blade (6) and a portion of the second part (12) of the first surface (9) of the blade (6) being arranged to curve towards the second edge (8) of the blade (6). A ratio of a thickness (T) of the blade (6) to a width (W) of the blade (6) is 0.06 to 0.14, a curvature radius (R₁) of the first surface (9) of the blade (6) in the first part (11) of the blade (6) is 10 mm to 30 mm and a ratio of a width (W₁) of the first part (11) of the blade (6) to the width (W) of the blade (6) is 0.12 to 0.26. Furthermore, a screen comprises at least one such blade (6).

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SCREEN BLADE AND SCREEN FOR SCREENING PULP

BACKGROUND OF THE INVENTION

[0001] The invention relates to a blade for a screen, the blade including in a longitudinal direction of the blade a first edge and a second edge, in a width direction of the blade a first surface and a second surface connecting the first edge and the second edge, the blade comprising in its width direction a first part and a second part, a portion of the first part of the first surface of the blade being arranged to curve towards the first edge of the blade, a portion of the second part of the first surface of the blade being arranged to curve towards the second edge of the blade, and a ratio of a thickness of the blade to a width of the blade being 0.06 to 0.14.

[0002] The invention further relates to a screen comprising a screen cylinder for screening a pulp mixture.

[0003] Pulp used in paper and paperboard manufacture is screened in one of its processing phases before feeding the pulp to a paper or paperboard machine or a corresponding device in order to remove various impurities, slivers and other such elements which deteriorate the quality of the paper or paperboard web being manufactured. A device used for screening pulp is typically called a screen or a screening device. A commonly used screen type comprises a screen cylinder provided with a cylindrical screening surface equipped with apertures for screening pulp. The apertures in the screening surface may be e.g. circular or elongated holes, or mutually parallel slots provided in the surface of the screen cylinder. A screen equipped with a screen cylinder typically further includes a rotor arranged inside the cylindrical screening surface for rotating the pulp in the screen and foil blades or blades supported against the frame of the rotor such that when the rotor rotates, the blades produce on the screening surface a suction pressure pulse on account of which reject pulp and fibres collected onto the screening surface become released from the screening surface and return to the pulp mixture. EP 0 764 736 A2 discloses a blade for a screen for screening fibre suspension.

[0004] Flow technical properties of blades may cause many problems, one major one being that a blade may start to rotate pulp along with and cause the pulp to precipitate, thus deteriorating the screening capacity and increasing fibre losses. Another major problem is also that a considerable part of the flow coming to a suction zone part of the blade is allowed to pass from a

front part of the blade to a rear part thereof from between the blade and the screening surface of the screen cylinder rather than through a screening surface of the screen cylinder, thus deteriorating the flushing and cleaning effect on the screening surface.

BRIEF DESCRIPTION OF THE INVENTION

[0005] An object of the present invention is to provide a novel screen blade with improved flow technical properties.

[0006] A blade for a screen according to the invention is characterized in that a curvature radius of the first surface of the blade in the first part of the blade is 10 mm to 30 mm and a ratio of a width of the first part of the blade to the width of the blade is 0.12 to 0.26.

[0007] A screen according to the invention is characterized in that the screen comprises a screen blade according to any one of claims 1 to 10.

[0008] The screen blade has in a longitudinal direction of the blade a first edge and a second edge and in a width direction of the blade a first surface and a second surface connecting the first edge and the second edge. The blade comprises in its width direction a first part and a second part, a portion of the first part of the first surface of the blade being arranged to curve towards the first edge of the blade and a portion of the second part of the first surface of the blade being arranged to curve towards the second edge of the blade. A ratio of the thickness of the blade to a width of the blade is 0.06 to 0.14, a curvature radius of the first surface of the blade in the first part of the blade is 10 mm to 30 mm and a ratio of the width of the first part of the blade to the width of the blade is 0.12 to 0.26.

[0009] The disclosed blade enables the capacity of the screen to be utilized efficiently for producing a pulp flow passing through the screen cylinder, instead of using the blade for producing a flow in the pulp in a tangential direction of the screen cylinder. At the same time, the blade produces a relatively drastically increasing and eventually high suction pressure, which cleans the screening surface of the screen cylinder efficiently. The blade also makes the pulp to be screened to be forced in a flow technically advantageous manner in to a throat space provided between the screen cylinder and the front part of the blade, i.e. in to the pressure zone, so that the pulp flow entering a suction zone provided between the rear part of the blade and the screen cylinder and flushing the screening surface of the screen cylinder primarily passes

through the screen cylinder rather than from in front of the blade from between the blade and the screen cylinder. At the same time, however, this makes it possible to avoid the pulp from becoming tightly packed into a dense layer in between the blade and the screen cylinder, which is caused by the too narrow and too long throat space and which prevents the screen cylinder from being cleaned on account of the suction pressure and which causes impurities to be transferred to the acceptable pulp fraction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Some embodiments of the invention will be described in closer detail in the accompanying drawings, in which

[0011] Figure 1 is a schematic end view showing a part of a screen,

[0012] Figure 2 is a schematic perspective view showing a screen blade,

[0013] Figure 3 is a schematic end view showing the screen blade according to Figure 2,

[0014] Figures 4 and 5 are schematic views showing how a blade according to the solution and a prior art blade affect pulp flow behaviour.

[0015] For the sake of clarity, the figures show some embodiments of the invention in a simplified manner. Like reference numerals identify like elements.

DETAILED DESCRIPTION OF SOME EMBODIMENTS OF THE INVENTION

[0016] Figure 1 is a schematic end view showing a part of a screen 1 for screening pulp to be used for paper and paperboard manufacture. The screen 1 according to Figure 1 is provided with a screen cylinder 2 whose cylinder surface, which is equipped with apertures 3, constitutes a screening surface of the screen 1. The screen 1 according to Figure 1 further includes a rotor 4 which is arranged inside the screen cylinder 2 and in connection with which blades 6 or foil blades 6 are supported by means of support elements 5 such that when the rotor 4 rotates in the direction indicated by arrow A in Figure 1, the blades 6 or foil blades 6 produce a strong suction pressure pulse on the screening surface, enabling reject pulp and fibres collected onto the screening surface to be released from the screening surface and return to the pulp mixture. Typically, one screen comprises at least three support elements 5 and at least three blades 6 supported against such elements. For the sake of clarity, Figure 1 comprises no detailed disclosure of the frame structure of the

screen 1 and the equipment necessary for rotating the rotor. The general structure and operating principle of a screen for screening pulp are known per se to one skilled in the art, so they will not be discussed in further detail herein.

[0017] Figure 2 is a schematic perspective view showing a blade 6 for a screen 1. Figure 3 is a schematic, cross-sectional end view showing the blade 6 for the screen 1 according to Figure 2. The blade 6 comprises a first edge 7 of the blade 6, i.e. a front edge 7 of the blade 6, and a second edge 8 of the blade 6, i.e. a rear edge 8 of the blade 6. The blade 6 further comprises a first surface 9 of the blade 6, i.e. a front surface 9 of the blade 6, connecting the front edge 7 and the rear edge 8, which is directed substantially towards a screening surface constituted by the screen cylinder 2 of the screen 1. The blade 6 further comprises a second surface 10 of the blade 6, i.e. a back surface 10 of the blade 6, connecting the front edge 7 and the rear edge 8 of the blade 6, which is directed substantially away from the screening surface of the screen 1, in the embodiments of Figures 1 and 3 substantially towards the centre of the screen cylinder 2. The blade 6 has a blade length L which depends on the length of the screen cylinder 2, and the blade 6 is installed in the screen 1 such that the blade 6, in this longitudinal direction L thereof, often becomes substantially parallel to a direction of the axis of the screen cylinder 2. On the other hand, the blade 6 may also be installed obliquely with respect to the axis of the screen cylinder 2. Reference mark L may be used both for the longitudinal direction of the blade 6 and for the length of the blade 6. Furthermore, the blade 6 has a width W, the width direction W of the blade 6 being located substantially perpendicularly to the axis of the screen cylinder 2. The width W of the blade 6 thus refers to the extent of the blade 6 in a direction of the blade 6 which corresponds to that of rotation direction A of the rotor 4. Reference mark W may be used both for the width direction of the blade 6 and for the width of the blade 6. Furthermore, the blade 6 has a thickness T, comprising a distance between the front surface 9 and the back surface 10 of the blade. Reference mark T may be used both for the thickness direction of the blade 6 and for the thickness of the blade 6. In the width direction W of the blade 6, between the front edge 7 and the rear edge 8 of the blade 6, the blade 6 comprises a first part 11, i.e. a front part 11, and a second part 12, i.e. a rear part 12. The front part 11 of the blade 6 is directed, as shown by Figure 1, in rotation direction A of the rotor 4, and its portion of the front surface 9 of the blade 6 is arranged to curve towards the front edge 7 of the blade 6. The portion of the rear part 12 of

the blade 6 of the front surface 9 of the blade 6, in turn, is arranged to curve towards the rear edge 8 of the blade 6. A total width W of the blade 6 consists of a width W_1 of the front part 11 and a width W_2 of the rear part 12. The blade 6 is directed such that the front part 11 of the blade 6 meets the pulp to be screened whereas the rear part 12 of the blade 6 leaves the pulp to be screened.

[0018] A ratio of the thickness T of the blade 6 to the width W of the blade 6 may be selected to be 0.06 to 0.14. This ratio is achieved e.g. by selecting the largest thickness T , i.e. the largest distance between the front surface 9 and the back surface 10, to be 10 mm, and the width of the blade to be preferably 70 to 150 mm. More preferably, the width of the blade is 80 to 120 mm, and most preferably 90 to 110 mm. A curvature radius R_1 of the front part 11 of the blade 6 may be selected to be preferably 10 to 30 mm, in which case a ratio of the curvature radius R_1 of the front part 11 of the blade 6 to the width W of the blade 6 is 0.07 to 0.43. The curvature radius of the front part 11 of the blade 6 is more preferably 10 to 20 mm, and most preferably 13 to 17 mm. A ratio of the width W_1 of the front part 11 of the blade 6 to the width W of the blade 6 may be selected to be 0.12 to 0.26. This ratio is achieved by the aforementioned width W of the blade 6 when the width of the front part 11 of the blade 6 is selected to be 18 mm.

[0019] When the blade 6 is thin in relation to the width W of the blade 6, the capacity of the screen is used efficiently for producing a pulp flow directed through the screen cylinder 2, instead of using the blade 6 for producing a flow in the pulp in a tangential direction of the screen cylinder 2. With the disclosed range of the width W of the blade 6, a blade can be provided which enables a desired pressure pulsation to be achieved for cleaning the screening surface of the screen cylinder 2. On account of the relatively small curvature radius R_1 of the front surface 9 of the front part 11, it is possible to produce a relatively drastically increasing and eventually high suction pressure, which cleans the screening surface of the screen cylinder 2 efficiently. The width W_1 of the front part 11 of the blade 6, in turn, is thus relatively small in relation to the width W of the blade 6 but the width W_1 of the front part 11 is, however, sufficient in order to make the pulp to be screened to be forced in a suitable manner in to a throat space 13 provided between the screen cylinder 2 and the front part 11 of the blade 6, i.e. in to the pressure zone, so that the pulp flow entering a suction zone provided between the rear part 12 of the blade 6 and

the screen cylinder 2 and flushing the screening surface of the screen cylinder 2 primarily passes through the screen cylinder 2 rather than from in front of the blade 6 from between the blade 6 and the screen cylinder 2. This enables too small a suction pressure, which is caused by too low-gradient and long a throat space 13 and which is insufficient for flushing the screen cylinder 2, to be avoided. Furthermore, this makes it possible to avoid the pulp from becoming tightly packed into a dense layer in between the blade 6 and the screen cylinder 2, which is caused by the too low-gradient and too long throat space and which prevents the screen cylinder from being cleaned on account of the suction pressure. In addition, this enables transfer of slivers and other reject materials to the accept space of the screen 1, caused by the too low-gradient and too long throat space, to be avoided. A large opening angle of the front part 11 of the blade 6, i.e. a small curvature radius R_1 of the front part 11, and a relatively short front part 11 in relation to the total width W of the blade 6, i.e. a relatively short throat 13, contribute to the forming of a high screening capacity without, however, substantially affecting the quality of the acceptable pulp fraction, or accept pulp. All the aforementioned blade properties are thus characterized in that they make the pulp mixture flow more efficiently through the screen cylinder 2, which results in more efficient screening and flushing of the screening surface.

[0020] The disclosed properties also make the structure of the blade 6 extremely thin and streamline, which is very advantageous for the flow such that the particular blade only slightly contributes to rotating the pulp around it, so no disadvantageous pulp precipitation occurs and the screening capacity is high while fibre loss is small. When no pulp precipitation occurs, a gap or clearance between the blade 6 and the screen cylinder 2 may be decreased. At its smallest this clearance is at a point at which the front surface 9 of the front part 11 and the front surface 9 of the rear part 12 of the blade 6 join, and, depending on the application, such a clearance may be selected to be 2 to 5 mm, preferably 3 mm. Naturally, depending on the application, the clearance may also be smaller or larger than this. When the blade 6 may be placed very close to the screen cylinder 2, the pressure variation affecting the cleaning of the blade becomes more efficient and access of the pulp flow directly from between the blade 6 and the screen cylinder 2 to the rear part of the blade 6 is prevented.

[0021] Thanks to the advantageous flow properties of the blade 6, the pulp to be screened is made to move by means of a lower blade rate, i.e. the blade 6 consumes less energy than the previous blade solutions at a similar blade rate. Consequently, the blade rate may even be lowered as compared with the previous blade rate, since the blade produces an ideal flow field for cleaning the screen cylinder 2 already at low blade rates. Thus, the amount of energy used for screening may be decreased while at the same time, however, the same screening result is achieved eventually.

[0022] Preferably, a curvature radius R_2 of the front edge 7 of the blade 6 may be selected to be 2 to 10 mm. More preferably, the curvature radius R_2 of the front edge 7 is selected to be 2 to 6 mm, and most preferably 2.5 to 4 mm. On account of the very small curvature radius R_2 of the front edge 7 of the blade 6, the pulp mixture to be screened is sharply divided in two without the single fibres or fibre clumps in the pulp mixture becoming attached to the blade 6.

[0023] A ratio of a curvature radius R_3 of the front surface 9 of the rear part 12 of the blade 6 to the width W of the blade 6 may be selected to be 2.03 to 4.36. Such a ratio is achieved by selecting the curvature radius R_3 of the front surface 9 of the rear part 12 of the blade 6 to be 305 mm. When the curvature radius R_3 of the front surface 9 of the rear part 12 of the blade 6 is sufficiently small, a large flow space can be quickly opened for a flush flow passing through the screen cylinder 2 to the rear part 12 of the blade 6, which makes the flushing of the screening surface of the screen cylinder 2 more efficient. Too small a curvature radius, in turn, is disadvantageous since in such a case a vacuum being generated at the front of the screen is allowed to be filled from the edges of the blade, instead through the screen cylinder. A large flow space can be quickly opened for a flush flow passing through the screen cylinder 2 to the rear part 12 of the blade 6 also by arranging the blade 6 movably with respect to the support element 5 such that the blade 6 may be rotated with respect to the support element 5 and the screen cylinder 2.

[0024] The blade 6 may be arranged fixedly in the support elements 5. The blade 6 may also be arranged rotatably with respect to the screen cylinder 2. A blade which is rotatable with respect to the screen cylinder 2 may be used for affecting the smallest distance or clearance between the rear edge 8 of the blade 6 and the screen cylinder 2, which may vary e.g. between 10 and 50 mm when using a wide blade and between 10 and 30 mm if the blade is

narrower, e.g. less than 100 mm. A blade which is rotatable with respect to the screen cylinder 2 may also be used for affecting the smallest distance or clearance between the entire blade 6 and the screen cylinder 2. Thus, a blade which is rotatable with respect to the screen cylinder 2 may be used for affecting the size of a flow space provided between the rear part 12 of the blade 6 and the screen cylinder 2 in many ways.

[0025] When the width of the front part 11 of the blade 6 is selected to be 18 mm, the width of the rear part 12 of the blade 6 is 52 to 132 mm, in which case a ratio of the width W_2 of rear part 12 of the blade 6 to the width W of the blade 6 is between 0.74 and 0.88 mm. Depending on the application, the width of the front part of the blade 6 may, however, vary between 8 and 40 mm. When the rear part 12 of the blade 6 is clearly wider than the front part 11 of the blade 6, a sufficiently long time is provided for the pulp mixture flow to settle down in order to enhance the good flushing of the screening surface of the screen cylinder 2.

[0026] The back surface 10 of the blade 6 may be straight but, preferably, it is made to curve in a manner shown in Figures 3 such that the back surface 10 of the blade 6 constitutes a slightly concave surface. A curvature radius R_4 of the back surface 10 of the rear part 12 of the blade 6 may be selected to be 250 mm, in which case a ratio of the curvature radius R_4 to the width W of the blade 6 is between 1.67 and 3.57, the centre of the curvature radius R_4 being, in the case disclosed in Figures 1 and 3, directed towards the inside of the screen cylinder 2. Thanks to the curved back surface, the pulp takes a direction which is more parallel to a radius of the screen cylinder 2 than that of the previous solutions, which makes the blade 6 mix the pulp more efficiently. The curved back surface also makes the pulp move more efficiently, so that the pulp is made to move by using a lower blade rate, which means that the screening consumes less energy. As compared to a solution wherein the flow direction is to be changed by rotating the blade 6 with respect to the screen cylinder 2, the curved back surface enables a flow-technically better change in the flow direction of the pulp flow to be achieved.

[0027] A curvature radius R_5 of the rear edge 8 of the blade 6 may be selected to be 1 to 6 mm, in which case a ratio of the curvature radius R_5 of the rear edge 8 to the width W of the blade 6 is between 0.01 and 0.04. Preferably, the curvature radius R_5 of the rear edge 8 of the blade 6 is 1 to 4 mm, more preferably 1 to 3 mm, and most preferably 1 to 2 mm. A rear edge 8 of

the blade 6 which has a very acute shape enables the formation of unnecessary, energy-consuming vortexes to be avoided in connection with the rear edge 8 of the blade 6. Furthermore, the structure of the rear edge 8 of a blade 6 with a small curvature radius is also clearly less susceptible to damage during use than that of a completely acute rear edge.

[0028] Figures 4 and 5 are schematic views showing how a presently disclosed blade and a prior art blade affect pulp flow behaviour in a screen cylinder. In Figures 4 and 5, the thick line refers to a blade according to the present solution while the thin line refers to a prior art blade. Figure 4 shows an effect of the blades on a pulp flow rate profile parallel to the circumference of the screen cylinder while Figure 5, in turn, shows an effect of the blades on a pulp flow rate profile parallel to a radius of the screen cylinder. In Figures 4 and 5, the horizontal axis shows the time such that time runs from right to left while the vertical axis shows the pulp flow rate, the positive rate, i.e. the rate above the horizontal axis, corresponding to a pressure pulse and the negative rate, i.e. the rate below the horizontal axis, corresponding to a suction pulse. Consequently, when the blade approaches a reference point, the tangential rate increases and the maximum rate is achieved in the area of the front part of the blade. After this, the tangential rate decreases and the minimum is achieved at the narrowest point between the blade and a screen cage. After the narrowest gap at the reference point the tangential rate again increases to a level prevalent in the portion between the blades of the screen. The curve in Figure 5 is formed in a manner similar to that disclosed in connection with the above-described curve in Figure 4.

[0029] It can be seen in Figure 4 that the tangential pulp flow rate profile caused by the blade according to the disclosed solution is clearly more uniform than the tangential pulp flow rate profile produced by the prior art solution. In other words, this means that the blade according to the presently disclosed solution rotates the pulp around it clearly less than the prior art blade does. The capacity of the screen is thus efficiently used in the manner shown in Figure 5 for producing a pulp flow passing through the screen cylinder, instead of using the blade for producing in the pulp a flow in a tangential direction of the screen cylinder.

[0030] Figure 5 shows that the suction pulse of the radial pulp flow rate profile caused by the blade according to the present solution is clearly wider but, however, substantially of the same magnitude as the suction pulse

of the radial pulp flow rate profile produced by the prior art blade. A wider suction pulse means higher screening capacity, since the screen cage is cleaned more efficiently. It could be possible to increase the width of the suction pulse by narrowing and elongating the throat part 13 provided between the front part 11 of the blade 6 and the screen cylinder 2, but this, in turn, would cause impurities to be packed in to the throat part 13 such that the impurities would become transferred to the accepted pulp fraction, thus deteriorating the quality of the pulp.

[0031] In some cases the features set forth in the present application may be used as such, irrespective of other features. On the other hand, when necessary, the features disclosed in the present application may be combined in order to provide different combinations. In Figure 1, the blade 6 is shown to be attached to the rotor 4 such that when the rotor 4 rotates, the blade 6 moves along with the rotor 4. Alternatively, in coarse screens in particular, but also in other screens wherein the screen cylinder 2 constituting the screening surface is rotatable, the blade 6 may also be supported fixedly against the frame structure of the screen 1, so that when the screen cylinder 2 is rotated, the blade 6 remains immobile but, however, produces an effect similar to that while rotating along with the rotor 4 when the screen cylinder 2 remains immobile. In such a case, the blade is directed in a manner opposite to that used in a case wherein the blade rotates such that the rear part of the blade meets the pulp to be screened while the front part of the blade is directed such that the front part of the blade leaves the pulp to be screened.

[0032] It is of course possible to construct the screen blade from a plurality of pieces that are attached to one another or, alternatively, the blade constitutes one uniform structure made of the same material. The screen blade may be manufactured e.g. by casting, extruding or bending and machining from sheet bars. The blade is usually manufactured from steels, such as cast steel, extrudable steel or another type of steel. Naturally, the blade may also be manufactured from other metals, plastic materials, or it may be manufactured as a composite structure.

[0033] The drawings and the related description are only intended to illustrate the idea of the invention. The details of the invention may vary within the scope of the claims.

CLAIMS

1. A blade (6) for a screen (1), the blade (6) including in a longitudinal direction (L) of the blade (6) a first edge (7) and a second edge (8), in a width direction (W) of the blade (6) a first surface (9) and a second surface (10) connecting the first edge (7) and the second edge (8), the blade (6) comprising in its width direction (W) a first part (11) and a second part (12), a portion of the first part (11) of the first surface (9) of the blade (6) being arranged to curve towards the first edge (7) of the blade (6), a portion of the second part (12) of the first surface (9) of the blade (6) being arranged to curve towards the second edge (8) of the blade (6), and a ratio of a thickness (T) of the blade (6) to a width (W) of the blade (6) being 0.06 to 0.14, characterized in that a curvature radius (R_1) of the first surface (9) of the blade (6) in the first part (11) of the blade (6) is 10 mm to 30 mm and a ratio of a width (W1) of the first part (11) of the blade (6) to the width (W) of the blade (6) is 0.12 to 0.26.

2. A screen blade as claimed in claim 1, characterized in that the first edge of the blade (6) is the front edge (7) of the blade (6), the second edge of the blade (6) is the rear edge (8) of the blade (6), the first surface of the blade (6) is the front surface (9) of the blade (6) which connects the front edge (7) and the rear edge (8) of the blade (6) and which is to be directed towards a screening surface of the screen (1), the second surface of the blade (6) is the back surface (10) of the blade (6) which connects the front edge (7) and the rear edge (8) of the blade (6) and which is to be directed away from the screening surface of the screen (1), and the first part of the blade (6) is the front part (11) of the blade (6).

3. A screen blade as claimed in claim 1 or 2, characterized in that the width (W) of the blade (6) is preferably 70 to 150 mm, more preferably 80 to 120 mm, and most preferably 90 to 110 mm.

4. A screen blade as claimed in any one of the preceding claims, characterized in that the largest thickness (T) of the blade (6) is 10 mm.

5. A screen blade as claimed in any one of the preceding claims, characterized in that the curvature radius (R_1) of the first part (11) of the blade (6) is preferably 10 to 30 mm, more preferably 10 to 20 mm, and most preferably 13 to 17 mm.

6. A screen blade as claimed in any one of the preceding claims, characterized in that the width (W_1) of the first part (11) of the blade (6) is 8 to 40 mm.

7. A screen blade as claimed in any one of the preceding claims, characterized in that a curvature radius (R_2) of the first edge (7) of the blade (6) is preferably 2 to 10 mm, more preferably 2 to 6 mm, and most preferably 2.5 to 4 mm.

8. A screen blade as claimed in any one of the preceding claims, characterized in that the second surface (10) of the blade (6) is curved.

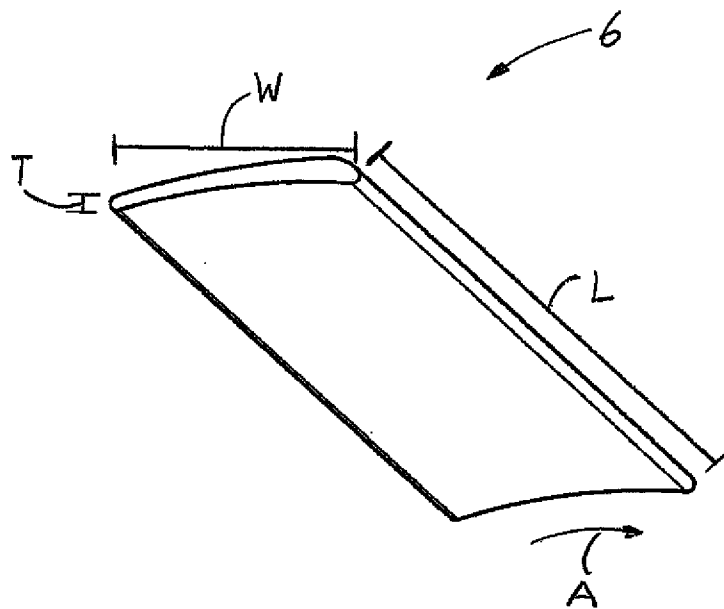
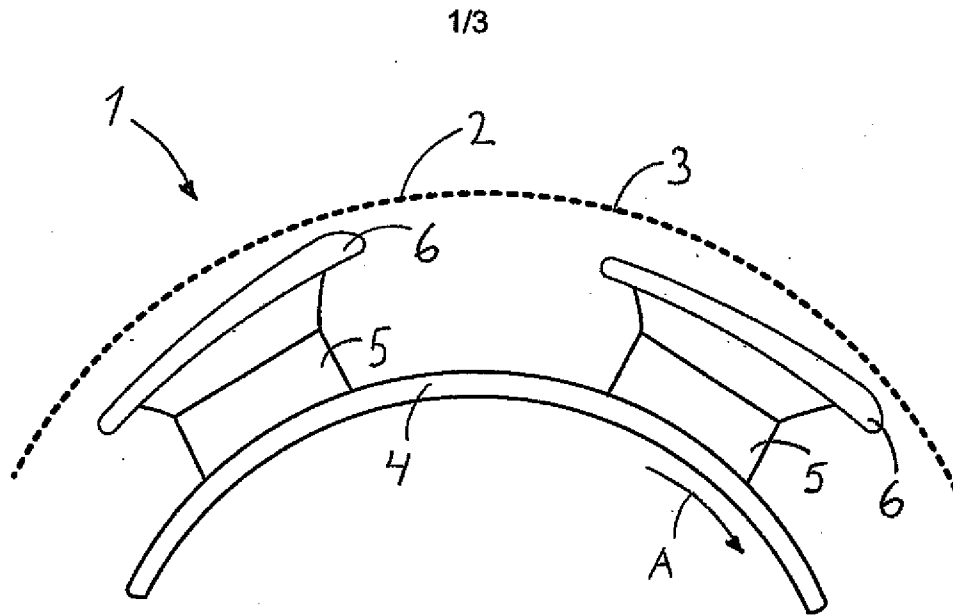
9. A screen blade as claimed in claim 8, characterized in that a ratio of a curvature radius (R_4) of the second surface (10) of the second part (12) of the blade (6) to the width (W) of the blade (6) is 1.67 to 3.57.

10. A screen blade as claimed in any one of the preceding claims, characterized in that a curvature radius (R_5) of the second edge (8) of the blade (6) is 1 to 6 mm, preferably 1 to 4 mm, more preferably 1 to 3 mm, and most preferably 1 to 2 mm.

11. A screen (1) comprising a screen cylinder (2) for screening a pulp mixture, characterized in that the screen (1) comprises a screen (1) blade (6) according to any one of claims 1 to 10.

12. A screen as claimed in claim 11, characterized in that the screen (1) comprises a rotatable rotor (4) which is arranged inside the screen cylinder (2) and which comprises at least three blades (6) supported against the rotor (4) of the screen (1) by means of support elements (5).

13. A screen as claimed in claim 11 or 12, characterized in that the blade (6) is arranged with respect to the support element (5) such that the blade (6) is rotatable with respect to the support element (5) and the screen cylinder (2).



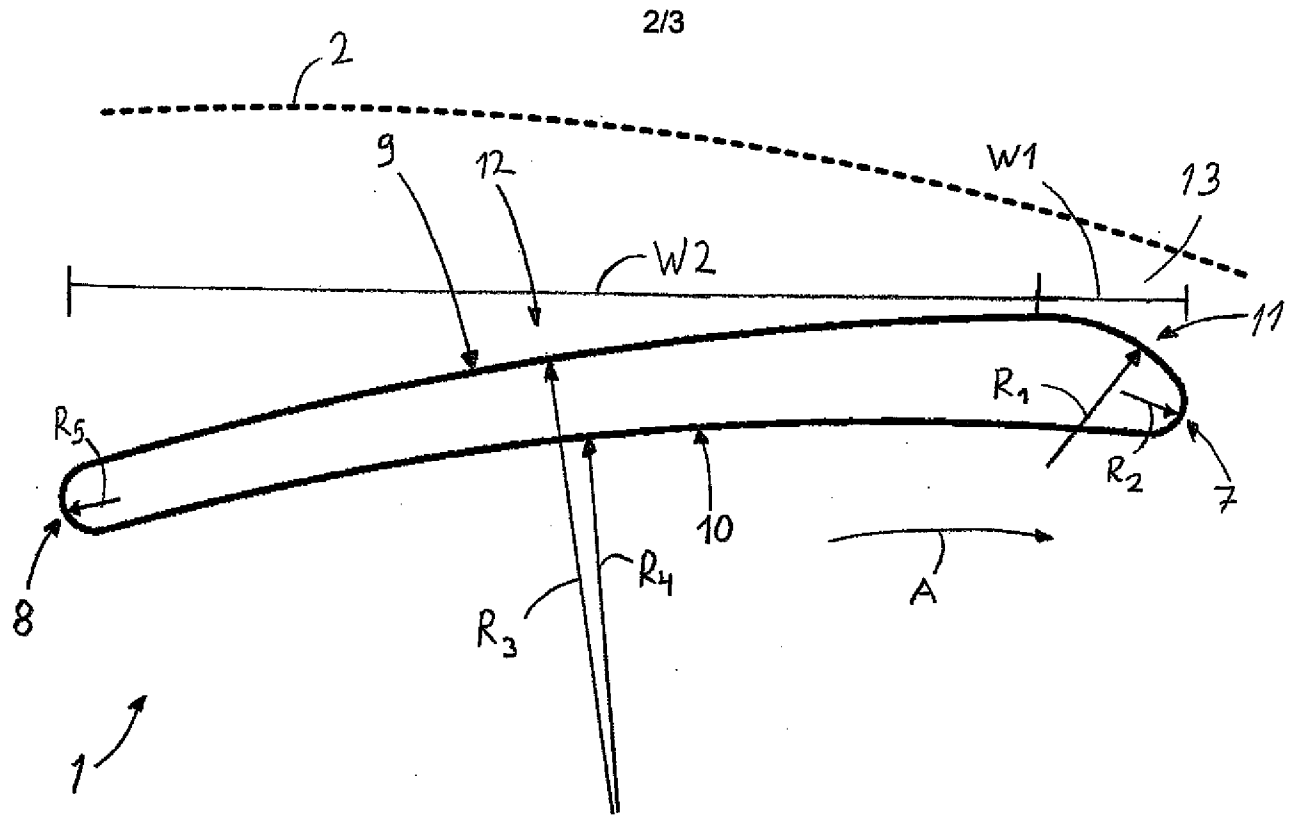


FIG. 3

Pulp flow rate profile parallel to circumference of screen cylinder

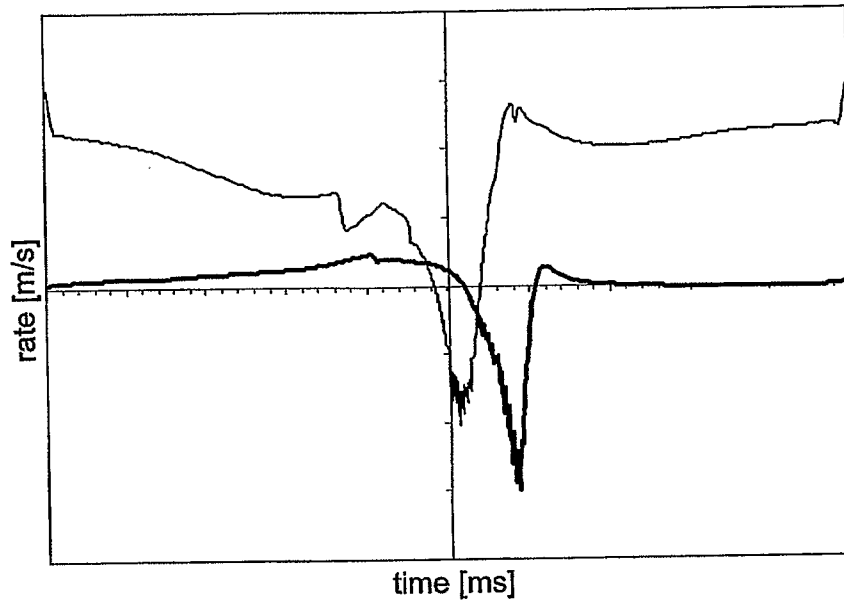


FIG. 4

Pulp flow rate profile parallel to radius of screen cylinder

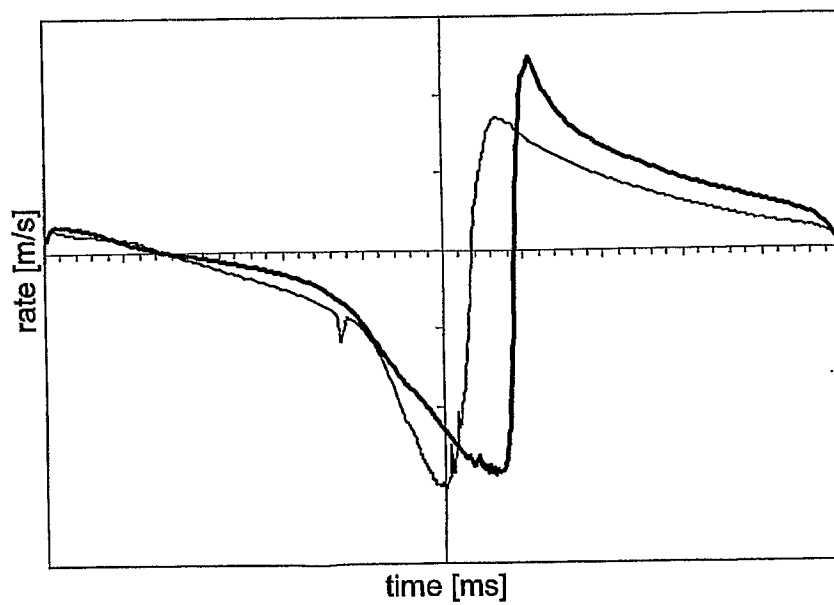


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/050068

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8: D21D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-internal & WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0764736 A2 (FIEDLER HEINRICH GMBH) 26 March 1997 (26.03.1997) FIG. 1; CLAMES 2 AND 3 WHOLE DOC. (cited in the application)	1, 11 2-10, 12-13
Y	WO 02064884 A1 (COMER SPA et al.) 22 August 2002 (22.08.2002) FIG. 4 AND 5 WHOLE DOC.	1, 11 2-10, 12-13

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

27 April 2007 (27.04.2007)

Date of mailing of the international search report

07 May 2007 (07.05.2007)

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INTERNATIONAL SEARCH REPORT

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PCT/FI2007/050068

CLASSIFICATION OF SUBJECT MATTER

Int.Cl.
D21D 5/06 (2006.01)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2007/050068

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