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(54) Procedure for the refining of a pulp mixture or equivalent in a refiner.

(57) 1. Procedure for the refining of a pulp mixture or equivalent in a refiner comprising oppositely placed refiner blades (1, 2), of which the rotor blade (1) rotates and the stator blade (2) is stationary, a pulp refining zone being formed between the blades. In the refiners currently used, there is no adequate provision for ensuring that the refiner will refine that fraction which has not yet been refined or that the fractions already refined will not be over-refined. The procedure of the invention solves this problem in that, by making use of the forces generated by the rotation of the rotor blade (1), the pulp mixture is separated into fractions or part of the pulp mixture is directed away from the area of the refiner blades for fractionation.

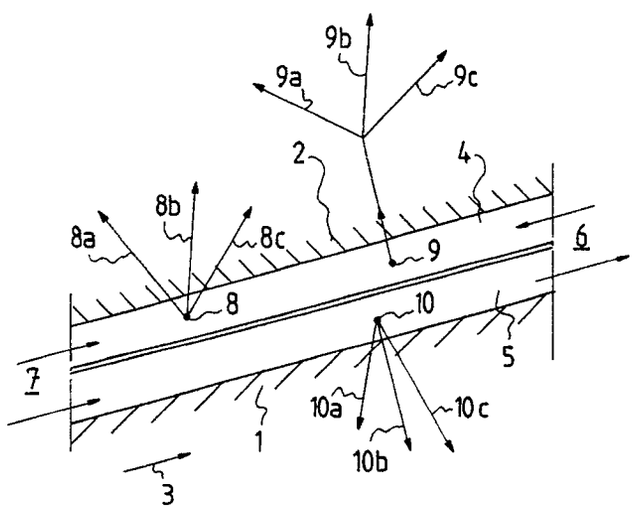

Fig.3

EP 0 423 092 A2

PROCEDURE FOR THE REFINING OF A PULP MIXTURE OR EQUIVALENT IN A REFINER

The present invention relates to a procedure for the refining of a pulp mixture or equivalent in a refiner comprising oppositely placed refiner blades, of which the rotor blade rotates and the stator blade is stationary, a pulp refining zone being formed between the blades.

As is well known, the motion of the rotor blade relative to the stator blade gives rise to a strong turbulence of the pulp mixture in the grooves of the blades. During the refining process, the pulp flows in the refiner in various directions. At the infeed end of the refining zone, the pulp flows towards the delivery side in the grooves of both blades. In the refining zone, in addition to the flow towards the delivery side, the pulp also flows transversely from the rotor blade to the stator blade and vice versa, and in the grooves of the stator blade the pulp also flows back towards the infeed side.

As the pulp mixture fed into the refiner is inhomogeneous, containing different fibre fractions, it is essential for the achievement of good refining results that it should be possible to refine those fractions which need refining and to avoid over-refining fractions already refined as well as to avoid superfluous and damaging refining of fractions which need no refining at all. The object of the invention is to create a procedure that achieves this aim. The procedure of the invention is characterized in that, by making use of the forces generated by the rotation of the rotor blade, the pulp mixture is separated into fractions or part of the pulp mixture is directed away from the area of the refiner blades for fractionation.

A preferred embodiment of the invention is characterized in that at least one of the fractions obtained is returned to the same refiner.

Another preferred embodiment of the invention is characterized in that at least one of the fractions obtained is returned to a separate refiner designed for this fraction.

Yet another preferred embodiment of the invention is characterized in that the fraction to be returned is returned to the infeed side of the refiner.

An advantage provided by the procedure of the invention is that it makes it possible to refine those fractions which need refining and to avoid over-refining fractions already refined.

In the following, the invention is described in detail by the aid of examples of preferred embodiments by referring to the attached drawings, in which

Fig. 1 illustrates the priniciple of the turbulence occurring in the grooves of the refiner blades at two different stages.

Fig. 2 illustrates the principle of pulp flow within the refiner.

Fig. 3 illustrates the principle of fractionation by the procedure of the invention.

Fig. 1 illustrates the turbulent flow occurring in the grooves 5, 4 between the rotor blade 1 and the stator blade 2. The rotor blade rotates in the direction indicated by arrow 3. In the first picture the grooves of the rotor blade are directly opposite to those of the stator blade. In the second picture, the rotor blade 1 has turned a little to the right.

Fig. 2 illustrates the internal pulp flow within the refiner. During refining, the pulp flows in several directions. At the entry end of the refining zone, the pulp flows in the grooves 4, 5 of both the stator 2 and the rotor 1 blades towards the delivery side 6. In the refining zone, besides flowing towards the delivery side 6, the pulp also flows transversely from the rotor blade 1 to the stator blade 2 and from the stator blade back to the rotor blade, and in the grooves 4 of the stator blade 2 the pulp also flows back towards the infeed side 7. The different directions of flow are indicated with arrows in fig. 2.

Fig. 3 illustrates the principle on which the refiner is utilized for separating pulp into fractions. The direction of rotation of the rotor blade 1 is again indicated by arrow 3. The procedure of the invention makes use of the motion of the rotor blade 1 (circumferential speed approx. 15-40 m/s) to achieve fractionation at points 8 and 10, where the pulp mixture is separated into corresponding fractions 8a, 8b, 8c and 10a, 10b, 10c. It is also possible to direct part of the pulp mixture out of the refiner at point 9 for external fractionation, resulting in fractions 9a, 9b, 9c. At least one of the fractions obtained is returned either to the same refiner or to a different refiner designed for the refining of this particular fraction. This fraction can be returned either to the infeed side 7, to the area of the refining zone or to the return flow taking place from the delivery side 6 to the stator blade 2.

The invention is in no way restricted by the manner in which the forces generated by the rotary motion of the rotor blade are utilized for fractionation. Among the possible alternatives are e.g. the use of top separators in conjunction with the refiner blades, a hole or holes made through the blades, various screens etc.

It is obvious to a person skilled in the art that of the invention is not restricted to the examples of its embodiments described above, but that it may instead be varied within the scope of the following claims.

Claims

1. Procedure for the refining of a pulp mixture or equivalent in a refiner comprising oppositely placed refiner blades (1, 2), of which the rotor blade (1) rotates and the stator blade (2) is stationary, a pulp refining zone being formed between the blades, **characterized** in that, by making use of the forces generated by the rotation of the rotor blade (1), the pulp mixture is separated into fractions or part of the pulp mixture is directed away from the area of the refiner blades for fractionation.

2. Procedure according to claim 1, **characterized** in that at least one of the fractions obtained (8a-c, 9a-c, 10a-c) is returned to the same refiner.

3. Procedure according to claim 1, **characterized** in that at least one of the fractions obtained (8a-c, 9a-c, 10a-c) is returned to a separate refiner designed for this fraction.

4. Procedure according to claim 2 or 3, **characterized** in that the fraction to be returned (8a-c, 9a-c, 10a-c) is returned to the infeed side of the refiner.

5. Procedure according to claim 2 or 3, **characterized** in that the fraction to be returned (8a-c, 9a-c, 10a-c) is returned to the area of the refining zone of the refiner.

6. Procedure according to claim 2 or 3, **characterized** in that the fraction to be returned (8a-c, 9a-c, 10a-c) is returned to the return flow taking place from the delivery side (6) of the refiner to the stator blade (2).

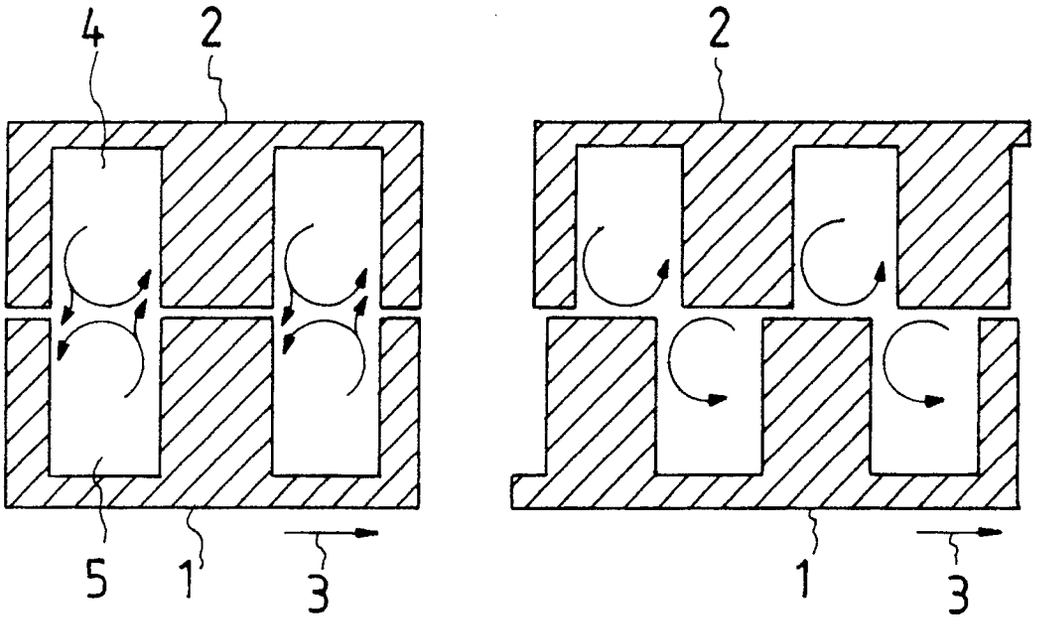

Fig.1

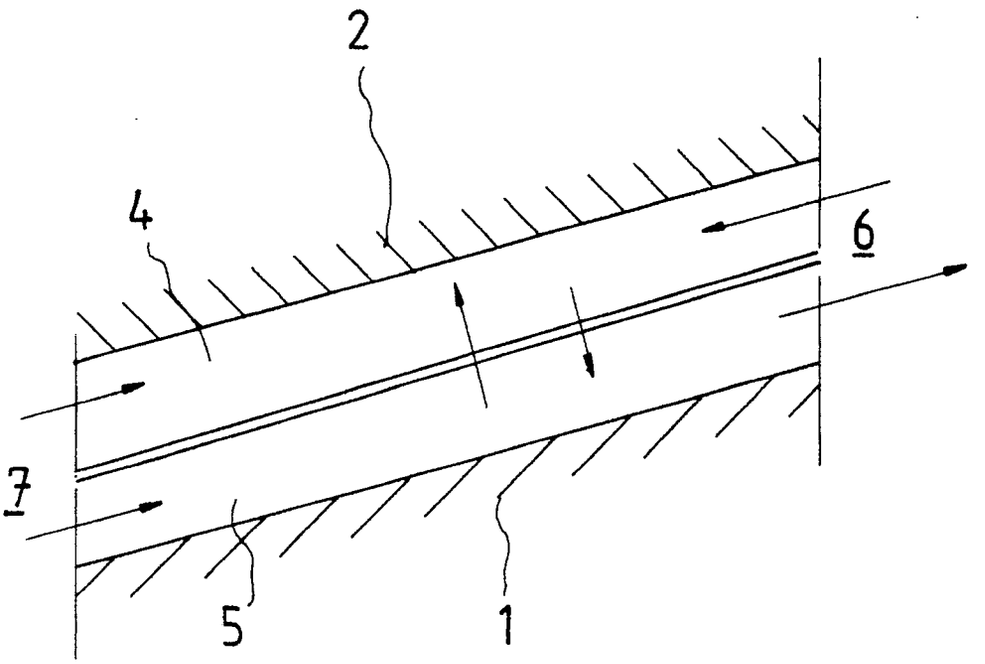

Fig.2

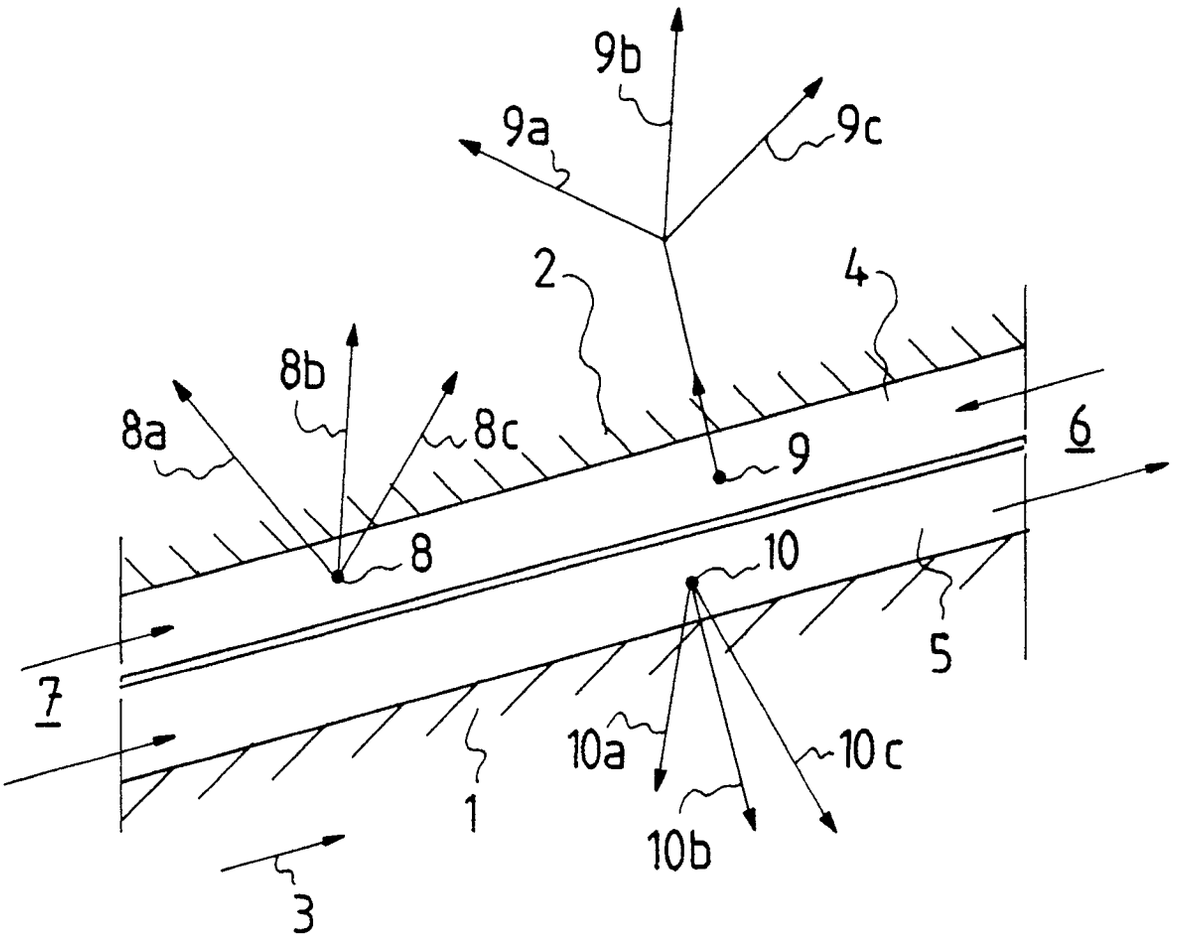

Fig.3