(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 182 109 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.05.2010 Bulletin 2010/18

(51) Int Cl.:
D21D 1/30 *(2006.01)*

(21) Application number: **09174199.1**

(22) Date of filing: **27.10.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **31.10.2008 FI 20086034**

(71) Applicant: **Metso Paper Inc.**
00130 Helsinki (FI)

(72) Inventors:
- **Vuorio, Petteri**
  37630 Valkeakoski (FI)
- **Seppälä, Veikko**
  37600 Valkeakoski (FI)
- **Touvinen, Olli**
  33530 Tampere (FI)

(74) Representative: **TBK-Patent**
Bavariaring 4-6
80336 München (DE)

(54) **Method of manufacturing a refiner, and refiner**

(57) A method of manufacturing a refiner (14, 16, 18), and a refiner. The method comprises changing a structure of at least one disc refiner (1). The refiner comprises a frame structure (2) which comprises a pressure frame (3) surrounding a refiner chamber (5) and a base frame (4) supporting the pressure frame (3) and at least one rotor (7) rotatable via a shaft (6). The method comprises changing the frame structure (2) of the disc refiner (1) at least over a section belonging to the pressure frame (3) such that the refiner chamber (5) of the refiner (14) is arrangeable to comprise a rotor (7) comprising a conical refining surface section (10') and a stator (9) comprising a conical refining surface section (11') or changing the frame structure (2) of the disc refiner (1) at least over a section belonging to the pressure frame (3) such that two single disc refiners (1) are combinable into one double disc refiner (16, 18) comprising two rotors (7).

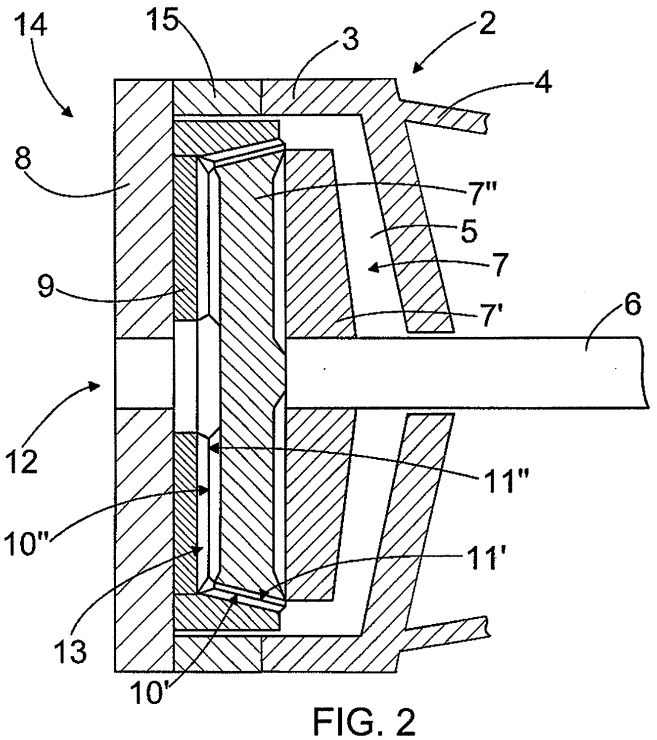


FIG. 2

EP 2 182 109 A2

Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a method of manufacturing a refiner, the method comprising changing a structure of at least one disc refiner, and which refiner comprises a frame structure, the frame structure comprising a pressure frame surrounding a refiner chamber and a base frame supporting the pressure frame, and the refiner further comprising at least one rotor rotatable via a shaft.

[0002] The invention further relates to a refiner comprising a frame structure, the frame structure comprising a pressure frame surrounding a refiner chamber and a base frame supporting the pressure frame, and which refiner further comprises an end element of the refiner being in connection with the frame structure, a stator of the refiner arranged in connection with the end element of the refiner, and a rotor rotatable via a shaft.

[0003] The invention still further relates to a double disc refiner comprising a frame structure, which frame structure comprises a pressure frame surrounding a refiner chamber and a base frame supporting the pressure frame, and which refiner further comprises at least two oppositely arranged rotors, each rotor being rotatable via a shaft of its own.

[0004] Refiners are used in a pulp making process to refine lignocellulose-containing material. The refiners comprise a frame which houses a refiner chamber generally, depending on the refiner type, provided with one or more fixed refiner element, i.e. a stator or a stator element, arranged fixedly, i.e. non-rotatingly, in connection with the frame of the refiner, as well as one or more refiner element, i.e. a rotor, rotatable via a shaft.

[0005] As manufacturing processes change, e.g. when production volumes change, a refiner being used may become redundant. Since particularly the frame structures of refiners last for decades, it may cause significant economic losses to purchase an entirely new refiner and remove the redundant one. These losses could be reduced by utilizing some parts of the old refiner. However, particularly in situations wherein the line of production changes regarding either the raw material to be used or the quality of pulp to be produced, it is extremely difficult to even to some extent utilize the old refiner.

BRIEF DESCRIPTION OF THE INVENTION

[0006] An object of the present invention is to provide a novel solution for utilizing an old refiner.

[0007] A method according to the invention is charartcterized by changing the frame structure of the disc refiner at least over a section belonging to the pressure frame such that the refiner chamber of the refiner is arrangeable to comprise a rotor comprising a conical refining surface section and a stator comprising a conical refining surface section or such that two single disc refiners are combinable into one double disc refiner comprising two rotors.

[0008] A refiner according to the invention is **characterized in that** in connection with the frame structure of the refiner an extension sleeve or an extension structure is arranged in order to increase extent of the refiner chamber in a direction of the shaft of the refiner.

[0009] A double disc refiner according to the invention is **characterized in that** the frame structure of the double disc refiner comprises a first frame structure section provided by removing from a first used disc refiner an end element and a stator, and in that the frame structure of the refiner comprises a second frame structure section provided by removing from a second used disc refiner an end element and a stator, and in that the rotors are placed towards one another such that a blade gap is provided between the rotors, and in that the frame structure sections are supported against one another by one or more support elements arranged in connection with said frame structure sections.

[0010] The method of manufacturing a refiner comprises changing the structure of at least one disc refiner. The refiner comprises a frame structure which comprises a pressure frame surrounding a refiner chamber and a base frame supporting the pressure frame. The refiner further comprises at least one rotor rotatable via a shaft. The method comprises changing the frame structure of the disc refiner at least over a section belonging to the pressure frame such that the refiner chamber of the refiner is arrangeable to comprise a rotor comprising a conical refining surface section and a stator comprising a conical refining surface section or such that two single disc refiners are combinable into one double disc refiner comprising two rotors.

[0011] The process of changing an old disc refiner to be removed from use into a refiner of another type enables a vast majority of the structure of the refiner to be removed from use and actuators associated therewith to be used when manufacturing a new refiner. On account of such utilization of parts, it is also rather an inexpensive procedure to change an old refiner into a refiner of another type. In addition, the energy consumption per mass ton of a refiner produced by such a changing procedure is clearly lower than the energy consumption of the disc refiner being changed.

[0012] According to an embodiment, the method comprises removing an end element being in connection with the frame structure of at least one disc refiner from the connection with the frame structure of the disc refiner, arranging in the rotor of the refiner a rotor element comprising a conical refining surface section, arranging in connection with the end element a stator comprising a conical refining surface section, arranging in the frame structure of the refiner, in connection with the pressure frame, an extension sleeve or an extension structure in order to increase extent of the refiner chamber in a direction of the shaft of the refiner, and fastening the end element in connection with the pressure frame of the re-

finer such that the extension sleeve or the extension structure remains located between the end element and the pressure frame of the refiner.

[0013] The extension sleeve or the extension structure enables the extent of the refiner chamber of the refiner to be increased in the direction of the shaft of the refiner in a simple manner such that a stator comprising a conical refining surface section and a rotor comprising a conical refining surface section may be arranged in the refiner chamber of the refiner.

[0014] According to another embodiment, the method comprises removing from a first disc refiner an end element and a stator arranged in connection therewith, thereby forming a first frame structure section of the refiner, removing from a second disc refiner an end element and a stator arranged in connection therewith, thereby forming a second frame structure section of the refiner, placing the rotors of the refiners towards one another such that a blade gap is provided between the rotors, and supporting the frame structure sections against one another by one or more support elements to be arranged in connection with said frame structure sections, thus forming a double disc refiner.

[0015] By removing from two disc refiners to be removed from use the end element and the stators arranged in connection therewith, two partial refiner structures are provided which, when combined with one another, enable a double disc refiner comprising two rotors to be manufactured.

BRIEF DESCRIPTION OF THE FIGURES

[0016] Some embodiments of the invention are described in closer detail in the accompanying drawings, in which

Figure 1 is a schematic cross-sectional side view showing a prior art refiner,

Figure 2 is a schematic cross-sectional side view showning a disc cone refiner according to the invention,

Figure 3 is a schematic cross-sectional side view showing a double disc refiner according to the invention,

Figure 4 is a schematic cross-sectional side view showing another double disc refiner according to the invention, and

Figure 5 is a schematic end view showing a double disc refiner similar to that of Figure 4.

[0017] For the sake of clarity, the figures show some embodiments of the invention in a simplified manner. In the figures, like reference numbers identify like elements.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Figure 1 is a schematic cross-sectional side view showing a prior art disc refiner 1. The disc refiner 1 comprises a frame structure 2 which comprises a pressure frame 3 and a base frame 4 of the refiner to support the pressure frame 3; Figure 1 only shows part of the base frame 4. The pressure frame 3 houses a refiner chamber 5 provided with a refiner element, i.e. a rotor 7, rotatable, i.e. rotating, via a shaft 6 as well as a fixed, i.e. non-rotating, refiner element, i.e. a stator 9, arranged in connection with an end element 8 of the refiner 1. The end element 8 is fastened to the pressure frame 3, the end element 8 thus forming part of the pressure frame 3. The rotor 7 is provided with a refining surface 10 of the rotor 7 while the stator 9 is provided with a refining surface 11 of the stator 9. The stator 9 and the end element 8 are further provided with feed openings 12 through which fibrous material to be refined may be fed to a blade gap 13 located between the stator 9 and the rotor 7. With respect to the rest of the structure of the refiner 1, Figure 1 shows the blade gap 13 substantially larger than it really is. The refiner naturally further comprises a discharge opening (not shown in the figure) for discharging already refined material from the refiner chamber. Further, the general structure and operational principle of refiners are known per se to those skilled in the art, so they do not have to be discussed in closer detail herein.

[0019] Figure 2 is a schematic cross-sectional side view showning a refiner 14. The refiner 14 shown in Figure 2 is a disc cone refiner and it comprises a frame structure 2 which comprises a pressure frame 3 and a base frame 4 of the refiner to support the pressure frame 3; Figure 2 only shows part of the base frame 4. The pressure frame 3 houses a refiner chamber 5 which is provided with a rotor 7 rotatable via a shaft 6 as well as a stator 9 arranged in connection with an end element 8 of the refiner 14. The stator 9 and the end element 8 comprise feed openings 12 through which fibrous material to be refined may be fed to a blade gap 13 located between the stator 9 and the rotor 7. Figure 2 further shows an extension sleeve 15 or an extension structure 15 which is placed between the pressure frame 3 and the end element 8 of the refiner 1 and by means of which the extent of the refiner chamber has been increased in a direction of the shaft of the refiner 1.

[0020] In the refiner 14 according to Figure 2, the rotor 7 is formed from a first rotor element 7' and a second rotor element 7". The second rotor element 7" is arranged in connection with the first rotor element 7' such that when the first rotor element 7' rotates, also the second rotor element 7" rotates. The second rotor element 7" is provided with a refining surface 10 comprising both a conical refining surface section 10' and a disc-like refining surface section 10". The stator 9 of the refiner 1 is further provided with a refining surface 11 which comprises both a conical refining surface section 11' and a disc-like refining surface section 11".

[0021] The refiner 14 according to Figure 2 may be formed from a disc refiner 1 which is in use and which is similar to that shown in Figure 1 by removing the end

element 8 from connection with the frame structure 2, i.e. the pressure frame 3, and at some stage by removing the stator 9 of the original disc rerfiner 1 from connection with the end element 8. Next, the second rotor element 7" of the rotor 7 which comprises a refining surface 10 and which is shown in Figure 2 is fastened in connection with the rotor of the original disc refiner 1, the rotor of the original disc refiner corresponding with the first rotor element 7' of the rotor 7 shown in Figure 2. In such a case, it may also be considered that the first rotor element 7' forms the frame of the rotor 7. When necessary, the first rotor element 7' may be machined in order to fasten the second rotor element 7" in connection with the first rotor element 7'. In addition, in the manner shown in Figure 2, the second rotor element 7" may also be supported in connection with the shaft 6 or a possible extension thereof.

[0022] At some stage, the stator 9 intended for the refiner being manufactured is fastened in connection with the end element 8. At some stage, the extension sleeve 15 or the extension structure 15 is placed between the end element 8 and the pressure frame 3. The extension sleeve 15 may be placed between the end element 8 and the pressure frame 3 while end assembling the refiner 14, in which case the end element 8, the extension sleeve 15 and the pressure frame 3 of the refiner 1 are at the same time fastened to one another by simultaneosly using the same fastening means, such as fastening bolts (for the sake of clarity not shown in the figures), thus closing the structure of the refiner 14. The extension sleeve 15 may be situated between the end element 8 and the pressure frame 3 also earlier, in which case the extension sleeve 15 is fastened separately to the pressure frame 3 of the refiner 14. The extension sleeve 15 is used for increasing the extent of the refiner chamber 5 of the refiner 14 in the direction of the shaft 6 of the refiner 1 since it would be impossible to accommodate the stator 9 and the rotor 7 comprising both a disc-like refining surface section 10", 11" and a conical refining surface section 10', 11' in the refiner chamber 5 provided in the original disc refiner.

[0023] In the above-disclosed manner, an ordinary disc refiner may be modified into a refiner comprising both a disc-like refining surface section and a conical refining surface section, i.e. into a so-called disc cone refiner. When modernizing a refiner, the old disc refiner may be utilized almost completely, the original disc-like stator being the only somewhat important redundant part, if not being used for forming a disc-like refining surface section 11" in the modernized refiner. The extension sleeve 15 enables the extent of the refiner chamber 5 to be increased in the direction of the shaft 6 in a very simple manner. In the embodiment according to Figure 2, the extension sleeve 15 forms an extension element structure within the area of the refiner chamber 5 in order to increase the extent of the refiner chamber 5 in the direction of the shaft 6 of the refiner.

[0024] Instead of using in the refiner 14 an old end element 8, it is possible to form a novel end element 8 e.g. by casting, the novel end element 8 also comprising a section which corresponds with the extension sleeve 15 and which elongates a section corresponding with the frame structure, i.e. the pressure frame, of the refiner, and fasten this novel end element to the frame structure 2, i.e. the pressure frame 3, of the refiner 1, thus changing the frame structure of the original, used refiner within the area of the refiner chamber such that the extent of the refiner chamber increases in the direction of the shaft of the refiner. In such a case, in addition to the end element, the novel end element also comprises an extension element structure for increasing the extent of the refiner chamber in the direction of the shaft of the refiner.

[0025] The rotor 7 of the refiner 14 may also be implemented such that in addition to the old stator, also the old rotor is removed from the original disc refiner 1 from the shaft 6 of the refiner 1 and, in place thereof, a rotor 7 is installed which is formed from at least one rotor element and which comprises at least a conical refining surface 10' but possibly a disc-like refining surface 10" as well. This also enables a corresponding stator comprising at least a conical refining surface 11' but possibly also a disc-like refining surface 11" to be installed in place of the original disc-like stator. In a similar manner, both the original stator and rotor may be replaced by a stator and rotor comprising conical refining surfaces only, in which case the old disc refiner may be changed into a cone refiner.

[0026] Figure 3 is a schematic cross-sectional side view showing a double disc refiner 16. The refiner 16 according to Figure 3 is thus a double disc refiner or a DD refiner whose refiner chamber 5 is provided with two rotors 7 arranged towards one another such that a blade gap 13 is provided between the rotors 7. With respect to the rest of the structure of the refiner 16, Figure 3 shows the blade gap 13 substantially larger than it really is. The refiner 16 further comprises two shafts 6 such that the rotors 7 may be rotated irrespective of one another. In the refiner 16, the frame structure has two frame structure sections separate from one another: a first frame structure section 2' as seen in Figure 3 on the left side of the left-hand rotor 7, and a second frame structure section 2" on the right side of the right-hand rotor 7. The frame structure sections 2' and 2" are combined with one another by one or more support elements 17, whereby the frame structure 2 of the refiner 16 according to Figure 3 comprises a first frame structure section 2', a second frame structure section 2" and one or more support elements 17 which are arranged at least partly, in their entirety as seen in Figure 3, between the first frame structure section 2' and the second frame structure section 2", supporting the first frame structure section 2' and the second frame structure section 2" against one another and at the same time forming part of the pressure frame 3 surrounding the refiner chamber 5 of the refiner 16. The support element 17 may also be an element similar to the extension sleeve 15 or the extension structure 15

shown in Figure 2 if the support element 17 is formed from one part only.

[0027] The refiner 16 shown in Figure 3 may be formed from two used disc refiners 1 shown in Figure 1 by removing the end elements of said disc refiners from connection with the frame structure of the refiner. Together with the end element, the stator provided in connection with the end element is removed from the refiners. Next, when necessary, some frame structure is removed by machining from at least one or both of the used refiners from the area of the refiner chamber from the pressure frame surrounding the rotor 7 such that said refiners may be installed with respect to one another such that the refining surfaces of the rotors 7 thereof come towards one another such that a blade gap 13 is provided between said refining surfaces. Next, the frame structures of said refiners that are still separate from one another, the frame stuctures in Figure 3 thus corresponding with the first frame structure section 2' and the second frame structure section 2", are combined with one another by means of one or more support elements 17 such that one refiner structure is formed wherein the frame structures of the originally separate disc refiners and one or more support elements 17 form a substantially closed refiner chamber. The support elements 17 increase the extent of the refiner chamber in the direction of the shaft of the refiner such that the refiner unit formed from two rotors is more easily accommodated inside the refiner.

[0028] In the solution shown in Figure 3, two used disc refiners may thus be changed into one double disc refiner provided with two rotors which rotate irrespectively of one another. Such a change is easy to make only by removing the end elements and stators of the used disc refiners and, when necessary, by removing either from one disc refiner or from both disc refiners at least part of the frame structure surrounding the rotor as well as by combining with one another the remaining sections of the original refiners by suitable support elements. In addition to this, only feed openings 12 have to be arranged through one of the rotors and through the frame structure section in connection with said rotor in order to feed material to be refined into the blade gap 13 located between the rotors 7. The feed openings 12 are shown schematically in Figure 3 in the right-hand rotor 7 and in the second frame structure section 2". The gap between a background surface of the rotor and the frame structure may be sealed by a mechanical seal such that the material fed to be refined may enter the refiner chamber only via the blade gap 13. Naturally, a discharge opening or channel (not shown in the figure) for refined material is also provided in connection with the refiner chamber of the refiner.

[0029] Figure 4 is a schematic cross-sectional side view showing another double disc refiner 18, and Figure 5 is a schematic end view showing a double disc refiner similar to that of Figure 4. The refiner shown in Figures 4 and 5 has a frame structure 2 which comprises, as the refiner according to Figure 3, a first frame structure section 2' and a second frame structure section 2", a pressure frame 3 housing a refiner chamber 5, and a base frame 4 of the refiner to support the pressure frame. Inside the refiner chamber 5 are two rotors 7, each being rotatable irrespective of one another via a corresponding shaft 6. Between the rotors 7 a blade gap 13 is provided whereto the fibrous material to be refined is fed via feed openings 12 arranged in the right-hand rotor 7 as seen in Figure 4 as well as via a feed channel 19. The feed channel 19 may be provided with a screw conveyor for making the feed of the material to be refined more efficient. Figure 4 further schematically shows a discharge opening 21 for discharging refined material from the refiner.

[0030] The structure of the refiner according to Figures 4 and 5 is similar to that of Figure 3, differing, however, from the refiner according to Figure 3 in that the first frame structure section 2' and the second frame structure section 2" of the refiner 18 are supported against one another by a support element 20 connecting or fastening the base frame 4 of the first frame structure section 2' and the base frame 4 of the second frame structure section 2" to one another; Figure 4 shows the support element 20 schematically in dotted line. The pressure frame 3 resides between the first frame structure section 2' and the second frame structure section 2" but does not support the frame structure sections 2', 2" against one another. In addition, the refiner chamber 5 is formed by a separate pressure frame 3 added during the change of the refiner and formed from an upper part 3' and a lower part 3".

[0031] The refiner 18 shown in Figures 4 and 5 may be formed from two used disc refiners 1 shown in Figure 1 by removing the end elements of said disc refiners from connection with the frame structure of the refiner. Along with the end element, a stator provided in connection with the end element is removed from the refiners. Next, at least part of the pressure frame 3 is also removed from both refiners from connection with the rest of the frame structure. The rotors and frame structures remaining from the refiners are arranged in connection with one another such that the refining surfaces of the rotors 7 come towards one another such that a blade gap 13 is provided between said refining surfaces. A new pressure frame 3 is arranged around the rotors 7, the pressure frame 3 consisting of an upper part 3' and a lower part 3" and being received between a frame part corresponding with the first frame structure section 2' and remaining from one old disc refiner and a frame part corresponding with the second frame structure section 2" and remaining from the other old disc refiner. In this case, the frame structure of the old disc refiners is thus changed over the section belonging to the pressure frame of the refiner such that at least part of the old pressure frame is removed from both refiners and said two pressure frames or sections removed therefrom are replaced at least partly by one new pressure frame. However, the new pressure frame 3 does not support the first frame structure section 2' and the second frame structure section 2" against one another but one or more support elements 20 are arranged in

connection with the first frame structure section 2' and the second frame structure section 2" to fasten the first frame structure section 2' and the second frame structure section 2" to one another and to support them against one another. The support element 20 may be e.g. a disc-like structure, as shown in Figures 4 and 5, which may be made e.g. of metal.

[0032] In the disclosed manners, an old disc refiner may be changed e.g. into a disc cone refiner or two old disc refiners may be changed into a double disc refiner. This enables the structural parts and the related actuators of old refiners to be utilized in an extensive manner when updating the refining processes, which lowers the costs caused by the changes. For example, by changing two old disc refiners into one double disc refiner a considerable amount of energy can be saved since double disc refiners consume typically about 10 to 30% less energy than disc refiners. In addition, the quality of pulp produced by a double disc refiner is, however, usable for high-quality printing papers.

[0033] In some cases, the features disclosed in this application may be used as such, irrespective of other features. On the other hand, when necessary, the features disclosed in this application may be combined in order to provide different combinations.

[0034] 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.

[0035] In the implementation of a disc cone refiner, it may be necessary to machine the frame structure, i.e. in practice the pressure frame, of the original refiner inside the pressure frame within the area of the refiner chamber in order to enable the conical refining surface section of the stator to be installed in an easy manner concentrically with respect to the conical refining surface section of the rotor. In the case of a double disc refiner, the concentricity of the rotors does not set equally high requirements. The machining may be carried out such that the refiner chamber is at the same time carved out not only in a direction of the shaft but also in a direction of a radius, whereby the length and diameter of a refiner blade solution to be arranged in the refiner chamber may be larger. The machining of the frame structure of the refiner within the area of the refiner chamber may also be carried out because it enables refiner blades to be replaced or replacement of the refiner blades to be made easier to implement, which constitutes grounds for machining the frame structure of the refiner when applying the solution of the invention to the case of the double disc refiner in particular.

A method of manufacturing a refiner (14, 16, 18), and a refiner. The method comprises changing a structure of at least one disc refiner (1). The refiner comprises a frame structure (2) which comprises a pressure frame (3) surrounding a refiner chamber (5) and a base frame (4) supporting the pressure frame (3) and at least one rotor (7) rotatable via a shaft (6). The method comprises changing the frame structure (2) of the disc refiner (1) at least over a section belonging to the pressure frame (3) such that the refiner chamber (5) of the refiner (14) is arrangeable to comprise a rotor (7) comprising a conical refining surface section (10') and a stator (9) comprising a conical refining surface section (11') or changing the frame structure (2) of the disc refiner (1) at least over a section belonging to the pressure frame (3) such that two single disc refiners (1) are combinable into one double disc refiner (16, 18) comprising two rotors (7).

Claims

1. A method of manufacturing a refiner (14, 16, 18), the method comprising changing a structure of at least one disc refiner (1), and which refiner (1, 14, 16, 18) comprises a frame structure (2), the frame structure (2) comprising a pressure frame (3) surrounding a refiner chamber (5) and a base frame (4) supporting the pressure frame (3), and the refiner (14, 16, 18) further comprising at least one rotor (7) rotatable via a shaft (6),
characterized by

   changing the frame structure (2) of the disc refiner (1) at least over a section belonging to the pressure frame (3) such that the refiner chamber (5) of the refiner (14) is arrangeable to comprise a rotor (7) comprising a conical refining surface section (10') and a stator (9) comprising a conical refining surface section (11') or such that two single disc refiners (1) are combinable into one double disc refiner (16, 18) comprising two rotors (7).

2. A method as claimed in claim 1, **characterized by**

   removing an end element (8) being in connection with the frame structure (2) of at least one disc refiner (1) from the connection with the frame structure (2) of the disc refiner (1),
   arranging in the rotor (7) of the refiner (14) a rotor element (7") comprising a conical refining surface section (10'),
   arranging in connection with the end element (8) a stator (9) comprising a conical refining surface section (11'),
   arranging in the frame structure (2) of the refiner (14), in connection with the pressure frame (3), an extension sleeve (15) or an extension structure (15) in order to increase extent of the refiner chamber (5) in a direction of the shaft (6) of the refiner (14), and
   fastening the end element (8) in connection with the pressure frame, (3) of the refiner (14) such that the extension sleeve (15) or the extension structure (15) remains located between the end

element (8) and the pressure frame (3) of the refiner (14).

3. A method as claimed in claim 2, **characterized by**

arranging in the rotor (7) of the refiner (14) a rotor element (7") comprising both a conical (10') and a disc-like (10") refining surface section, and arranging in connection with the end element (8) a stator (9) comprising both a conical (11') and a disc-like (11") refining surface section.

4. A method as claimed in claim 1, **characterized by**

removing an end element (8) being in connection with the frame structure (2) of at least one disc refiner (1) from the connection with the frame structure (2) of the disc refiner (1),
removing the rotor (7) of the disc refiner (1) from the disc refiner (1),
arranging in the refiner (14) a rotor (7) comprising at least a conical refining surface section,
arranging in connection with the end element (8) a stator element comprising at least a conical refining surface section,
arranging in the frame structure (2) of the refiner (14), in connection with the pressure frame (3), an extension sleeve (15) or an extension structure (15) in order to increase the extent of the refiner chamber (5) in the direction of the shaft (6) of the refiner (14), and
fastening the end element (8) in connection with the pressure frame (3) of the refiner (14) such that the extension sleeve (15) or the extension structure (15) remains located between the end element (8) and the pressure frame (3) of the refiner (14).

5. A method as claimed in any one of claims 2 to 4, **characterized by**

forming an end element (8) which comprises an extension element structure for increasing the extent of the refiner chamber (5) in the direction of the shaft (6) of the refiner (14), and
fastening the end element (8) in connection with the pressure frame (3) of the refiner (14).

6. A method as claimed in claim 1, **characterized by**

removing from a first disc refiner (1) an end element (8) being in connection with the frame structure (2) and a stator (9) arranged in connection therewith, thereby forming a first frame structure section (2') of the refiner (16, 18),
removing from a second disc refiner (1) an end element (8) being in connection with the frame structure (2) and a stator (9) arranged in connection therewith, thereby forming a second frame structure section (2") of the refiner (16, 18),
placing the rotors (7) of the refiners towards one another such that a blade gap (13) is provided between the rotors (7), and
supporting the frame structure sections (2', 2") against one another by one or more support elements (17, 20) to be arranged in connection with said frame structure sections, thus forming a double disc refiner (16, 18).

7. A method as claimed in claim 6, **characterized by**

removing from the first and/or the second disc refiner (1) at least part of the pressure frame (3) of the frame structure (2) of the refiner prior to supporting the remaining frame structure sections (2', 2") of the refiners against one another by one or more support elements (17, 20) to be arranged in connection with said frame structure sections.

8. A refiner (14) comprising a frame structure (2), the frame structure (2) comprising a pressure frame (3) surrounding a refiner chamber (5) and a base frame (4) supporting the pressure frame (3), and which refiner further comprises an end element (8) of the refiner (14) being in connection with the frame structure (2), a stator (9) of the refiner (14) arranged in connection with the end element (8) of the refiner (14), and a rotor (7) rotatable via a shaft (6),
characterized in that
in connection with the frame structure (2) of the refiner (14) an extension sleeve (15) or an extension structure (15) is arranged in order to increase extent of the refiner chamber (5) in a direction of the shaft (6) of the refiner (14).

9. A refiner as claimed in claim 8, **characterized in that** an extension sleeve (15) or an extension structure (15) is arranged between the end element (8) of the refiner (14) and the pressure frame (3) of the frame structure (2) in order to increase the extent of the refiner chamber (5) in the direction of the shaft (6).

10. A refiner as claimed in claim 8 or 9, **characterized in that** both the stator (9) and the rotor (7) of the refiner (14) comprise a conical refining surface section (10', 11').

11. A refiner as claimed in claim 8 or 9, **characterized in that** both the stator (9) and the rotor (7) of the refiner (14) comprise both a conical (10', 11') and a disc-like (10", 11") refining surface section.

12. A double disc refiner (16, 18) comprising a frame

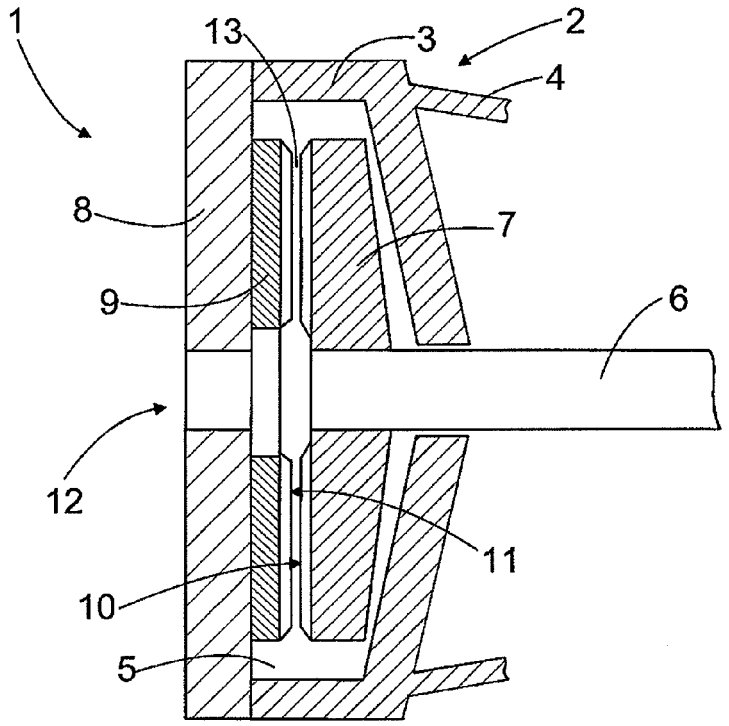
structure (2), which frame structure (2) comprises a pressure frame (3) surrounding a refiner chamber (5) and a base frame (4) supporting the pressure frame (3), and which refiner (16, 18) further comprises at least two oppositely arranged rotors (7), each rotor being rotatable via a shaft (6) of its own, **characterized in that**

the frame structure (2) of the double disc refiner (16, 18) comprises a first frame structure section (2') provided by removing from a first used disc refiner (1) an end element (8) and a stator (9), and **in that**
the frame structure (2) of the refiner (16, 18) comprises a second frame structure section (2") provided by removing from a second used disc refiner (1) an end element (8) and a stator (9), and **in that**
the rotors (7) are placed towards one another such that a blade gap (13) is provided between the rotors (7), and **in that**
the frame structure sections (2', 2") are supported against one another by one or more support elements (17, 20) arranged in connection with said frame structure sections (2', 2").

13. A double disc refiner (16, 18) as claimed in claim 12, **characterized in that** at least part of the pressure frame (3) of the first (2') and/or the second (2") frame structure sections (2' 2") has been removed during manufacture of the double disc refiner (16).

14. A double disc refiner (16, 18) as claimed in claim 12 or 13, **characterized in that** the frame structure sections (2', 2") are supported against one another by one or more support elements (17) arranged at least partly between the pressure frames (3) of said frame structure sections (2', 2") or sections remaining therefrom.

15. A double disc refiner (16, 18) as claimed in claim 12, **characterized in that** the frame structure sections (2', 2") are supported against one another by one or more support elements (20) arranged in connection with the base frames (4) of said frame structure sections (2', 2").



PRIOR ART

FIG. 1

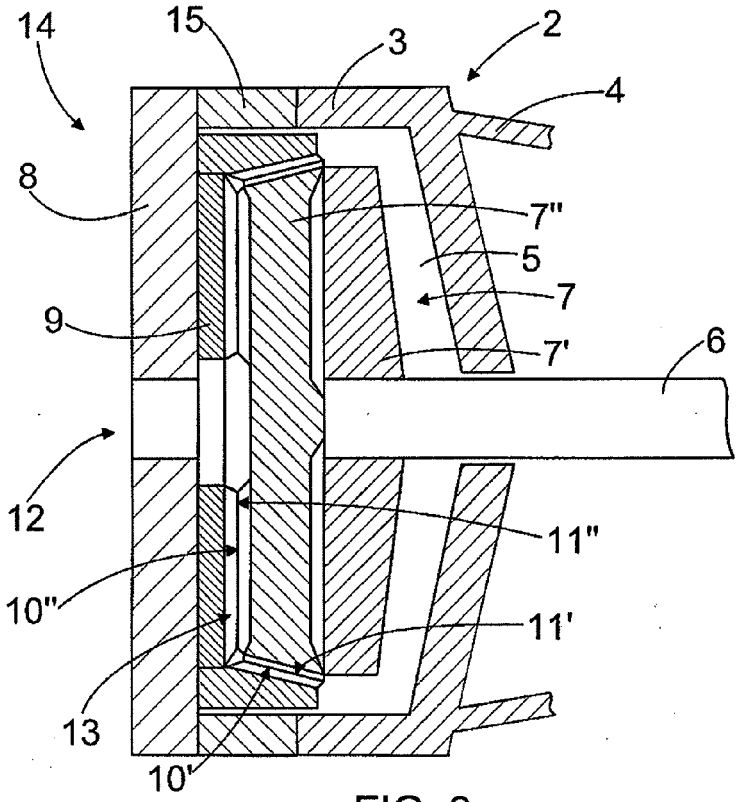


FIG. 2

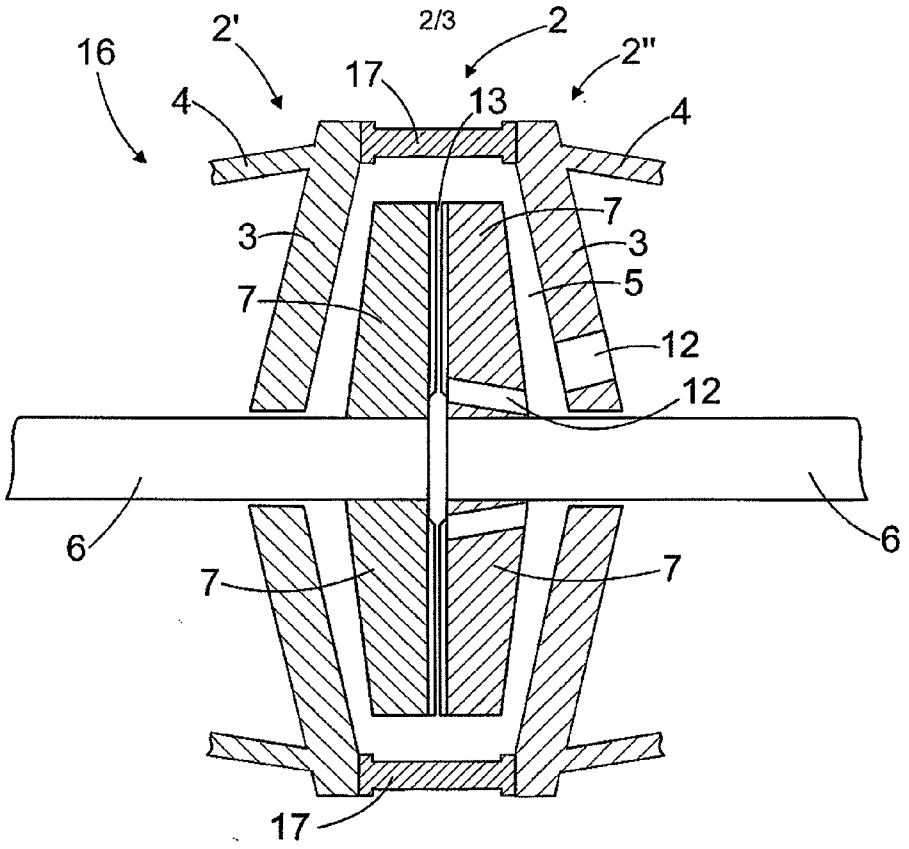

16
2'
2
2"
17
13
4
4
3
7
3
5
7
12
12
6
6
7
7
17

FIG. 3

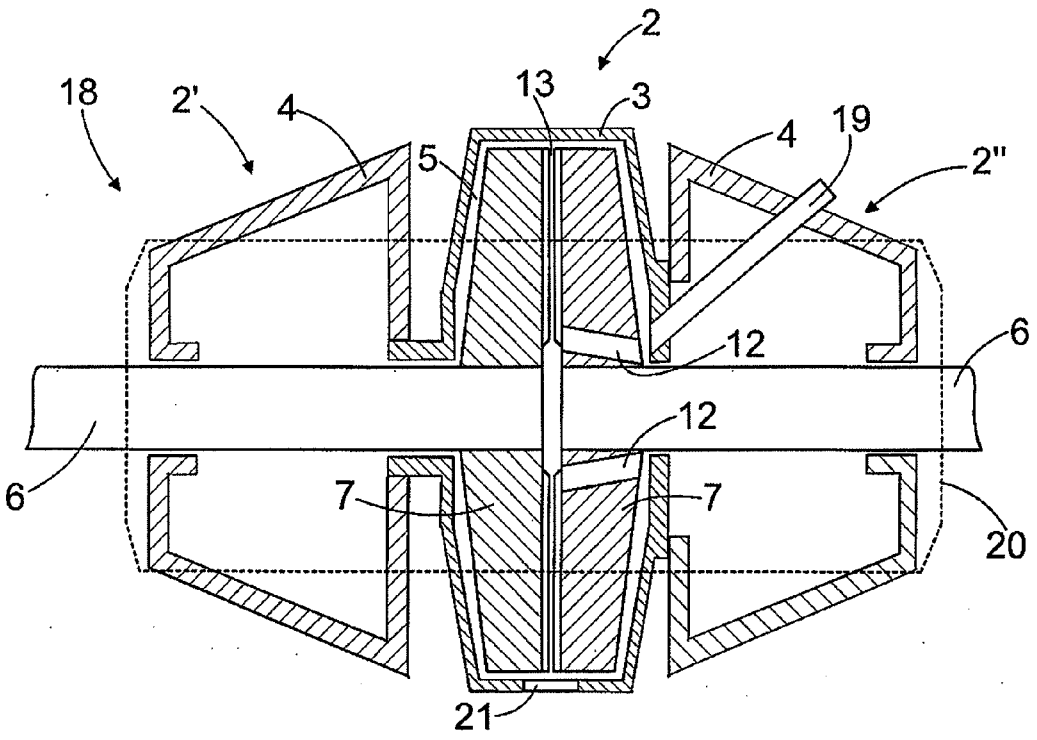

2
18
2'
4
13
3
4
19
2"
5
12
6
12
6
7
7
20
21

FIG. 4

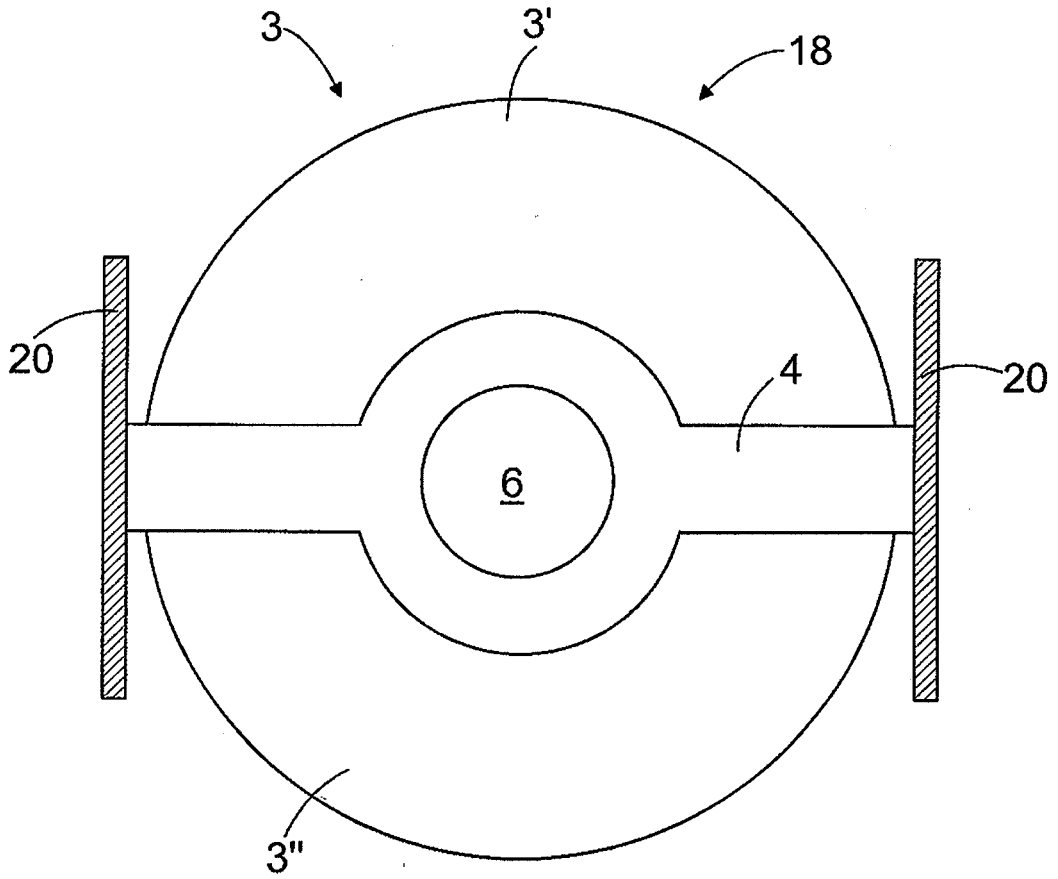


FIG. 5