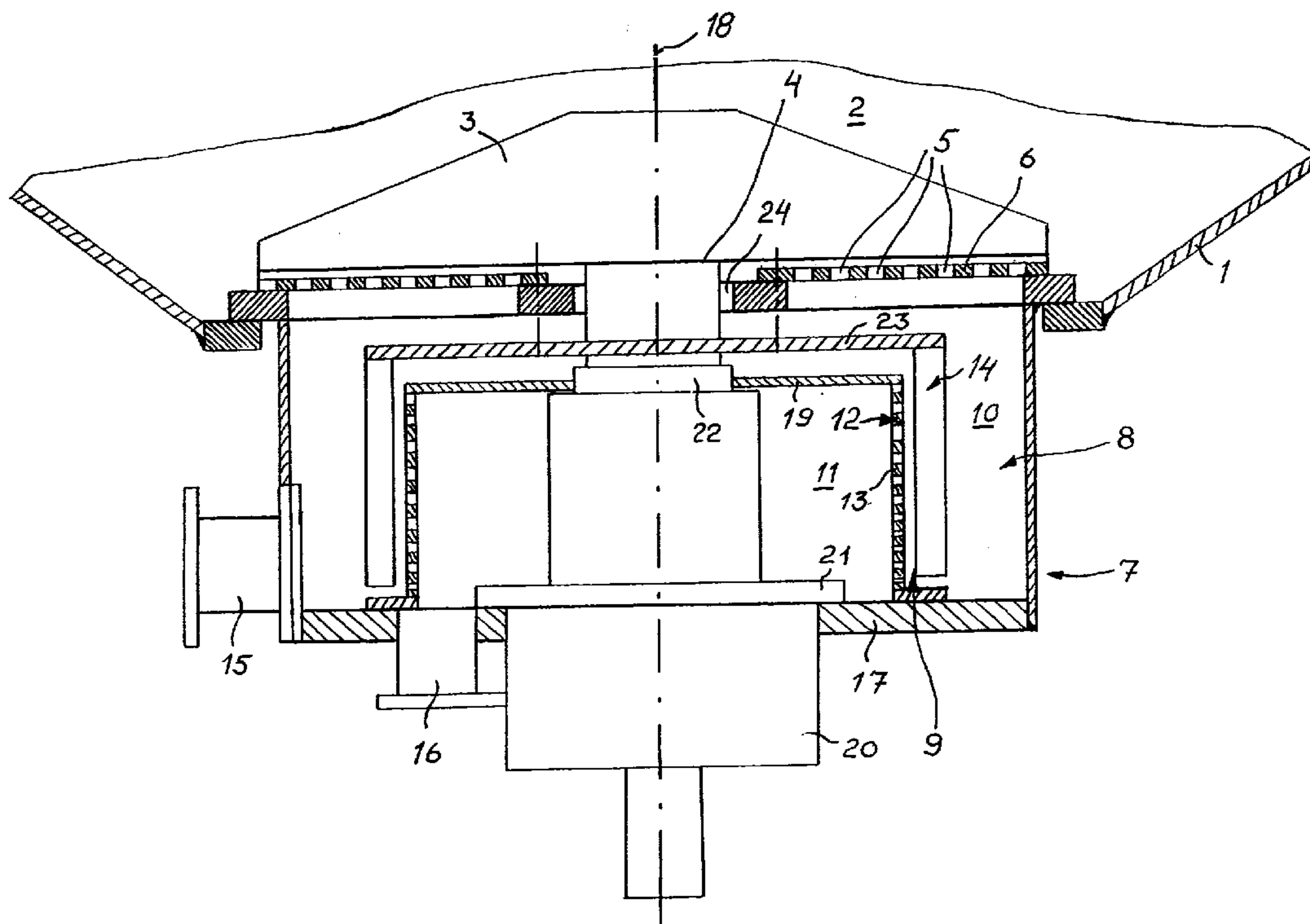




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(54) **DESINTEGRATEUR**  
(54) **PULPER**



(57) The invention relates to a pulper for breaking materials containing fibre pulp, more particularly for breaking materials containing paper pulp or corresponding. It comprises a feed chamber (2) restricted by the pulper housing (1), a rotor unit (3) or corresponding in the feed chamber (2) adapted to be moved by means of a drive unit, a screenplate (6) with perforations (5) in connection with the rotor unit (3) or corresponding and a space (8) restricted by a housing (7) or corresponding and situating on the opposite side of the perforated screenplate (6) as seen from the rotor unit (3) or corresponding for receiving the broken material. The space (8) consists of a screening unit (9) having a first partial space (10) which is in direct connection with the screenplate (6) connected with the rotor unit (3) or corresponding, and which has a discharge connection unit (15) for the rejected portion, a second partial space (11) for the accepted portion, which partial space (11) has a discharge connection unit (16) for the accepted portion, a partition wall construction (12) or corresponding in the middle of said first (10) and second (12) partial space, consisting at least partly of a perforated screenplate (13) and a cleaning device (14) adapted to be moved relative to the screenplate (13) by means of a drive unit.

## (57)Abstract

The invention relates to a pulper for breaking materials containing fibre pulp, more particularly for breaking materials containing paper pulp or corresponding. It comprises a feed chamber (2) restricted by the pulper housing (1), a rotor unit (3) or corresponding in the feed chamber (2) adapted to be moved by means of a drive unit, a screenplate (6) with perforations (5) in connection with the rotor unit (3) or corresponding and a space (8) restricted by a housing (7) or corresponding and situating on the opposite side of the perforated screenplate (6) as seen from the rotor unit (3) or corresponding for receiving the broken material. The space (8) consists of a screening unit (9) having a first partial space (10) which is in direct connection with the screenplate (6) connected with the rotor unit (3) or corresponding, and which has a discharge connection unit (15) for the rejected portion, a second partial space (11) for the accepted portion, which partial space (11) has a discharge connection unit (16) for the accepted portion, a partition wall construction (12) or corresponding in the middle of said first (10) and second (12) partial space, consisting at least partly of a perforated screenplate (13) and a cleaning device (14) adapted to be moved relative to the screenplate (13) by means of a drive unit.

**Pulper**

The invention relates to a pulper for breaking materials containing fibre pulp, more particularly for breaking materials containing paper pulp or corresponding. The pulper according to the invention comprises a feed chamber restricted by the pulper housing, a rotor unit or corresponding in the feed chamber adapted to be moved by means of a drive unit, a screenplate with perforations in connection with the rotor unit or corresponding, a space restricted by a housing or corresponding and situated, as seen from the rotor unit or corresponding, on the opposite side of the perforated screenplate for receiving the broken material.

Several different solutions are known for this kind of pulpers. So-called vertical pulpers, canal or horizontal pulpers are known in the field of fibre pulp handling. In addition, a so-called secondary pulper construction is known.

In known solutions, only breaking of the pulp is performed. The broken pulp is conducted to subsequent process stages, especially to different screening stages.

The purpose of this invention is to upgrade the state of the art in the field of fibre pulp handling so that the pulp broken in the pulper can be pre-screened in the pulper unit. In order to attain this pulper according to this invention comprises an apparatus for pulping and screening materials containing fiber pulp, said apparatus comprising: an upper part defining a pulping section for breaking down said materials and a lower part defining a screening section for prescreening said broken materials;

said pulping section including:

a feeding chamber delimited by a housing, a rotor unit



positioned in said feeding chamber, a drive unit for rotation of said rotor unit and a first perforated screenplate in a bottom portion of said pulping section through which an accepted portion of said broken material is fed into said screening section;

said screening section including:

a space also delimited by a housing and positioned on the opposite side of said first perforated screenplate, a stationary partition wall for dividing said space into a first partial space and a second partial space;

at least a portion of said partition wall including a second perforated screenplate;

said first partial space being in communication with said feeding chamber for receiving said accepted portion of said material through said first screenplate;

said second partial space being in communication with said first partial space through said second screenplate for receiving material accepted by said second screenplate;

a first partial discharge outlet in communication with said first space for discharging the portion of material rejected by said second screenplate;

a second discharge outlet in communication with said second partial space for discharge of the portion of said material accepted by said second screenplate; and

a cleaning device provided in said first partial space and rotatable with respect to said second screenplate of said partition wall.

Several improvements are attained by the above solution compared to the solutions of prior art. Particularly beneficial is the fact that broken pulp can be pre-screened immediately after breaking wherefore the rejected portion can be conducted immediately back into the feed chamber. The screening unit substitutes the so-called HC-cleaner (high consistency cleaner) e.g. in waste paper pulping. The screening unit according to the invention has a very simple structure. Also, several particularly constructional

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advantages are attained.

The invention is further illustrated in the following description by reference to the embodiment shown in the enclosed drawing. The drawing shows one embodiment of the pulper according to the invention as a partial cross-section at the bottom level of the pulper, wherein said screening unit is connected to the lower part of the pulper.

In the drawing, the pulper housing 1 restricts the feed chamber 2. The feed chamber 2 accommodates a rotor unit 3 or corresponding. The rotor unit 3 is attached to the vertical shaft 4, the drive unit for rotating rotor unit.

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3 being connected thereto. A screenplate 6 with perforations 5 is located under the rotor unit 3. As to the technical solutions concerning the rotor unit 3 and the perforated screenplate 6 reference can be made e.g. to the US patent publication 3,889,885. This kind of rotor units are commonly known in the field and they will not be explained further in this connection.

There is a space 8 restricted by the housing 7 and situated on the opposite side of the perforated screenplate 6 as seen from the rotor unit 3 or corresponding, to which space the fibre material in the feed chamber 2 is transferred via screenplate 6 guided by the rotor unit 3.

According to the invention the space 8 consists of the screening unit 9. The screening unit 9 consists of the first partial space 10, the second partial space 11, the partition wall construction 12, which at least partly consists of the perforated screenplate 13, and the cleaning device 14.

The first partial space 10 is in direct connection with the screenplate 6 which is in connection with the rotor unit 3. The first space 10 accommodates the discharge connection unit 15 which is placed on the outer surface of housing 7, on its lower part.

The second partial space 11 for the accepted portion consists of a discharge connection unit 16 preferably placed on the end part 17 of housing 7.

The housing 7 which restricts the space 8 has preferably a cylindrical form wherefore the centre line 18 of the cylindrical form is congruent with the centre line of shaft 4. Screenplate 13 has also a cylindrical form and it is so arranged that its centre line is congruent with



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the centre line 18 of housing 7. The end part 17 of housing 7 forms the first end part of the second partial space 11. The second end part of the second partial space 11 is formed by a closed part 19, which is essentially parallel with the perforated screenplate 6, of the partition wall construction 12.

The shaft 4 is fitted to pass through the second partial space 11 wherefore a bearing unit 20 is disposed on the outside of the end part 17 of the housing 7 and is supported by a flange 21 to said end part. The shaft 4 is provided with a sealing unit 22 by the closed part 19 of the partition wall construction 12, the sealing unit preferably comprising of a combination of a strip-like and/or a mechanical seal. A supporting structure 23 extending radially from the shaft 4 is attached to the shaft 4 in the first partial space 10 between the closed part 19 and the perforated screenplate 6. A cleaning device 14, extending downwards and comprising of blade-like elongated form parts, is attached to the end of the supporting structure 23. The blade-like form parts are disposed at specific distances on the circumference of the supporting structure 23. The purpose of the cleaning device is to keep the perforations of the screenplate 13 unplugged wherefore the form parts move along the screenplate 13 in the first partial space 10. In this connection it can be stated that the cleaning device 14 can also be placed on the side of the second partial space 11 by means of a similar supporting structure as shown in the drawing either as an alternative or in addition to the construction shown in the drawing.

The cleaning device 14 and the rotor unit 3 or corresponding, in the embodiment according to the invention, are provided with a common drive unit (not shown) by which the shaft 4 operates both assemblies moving relative to the pulper. As shown in the enclosed

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drawing the cleaning device 14 and the rotor unit 3 or corresponding are connected to the same shaft 4. The bearing unit 20 can be provided with a gear reducer.

5 Shaft 4 is adapted to pass through the perforated screenplate 6. Then an annular slot 24 can be left between the outer surface of the shaft 4 and the screenplate 6 which can serve preferably as part of the perforation of the screenplate 6.



**CLAIMS**

1. An apparatus for pulping and screening materials containing fiber pulp, said apparatus comprising: an upper part defining a pulping section for breaking down said materials and a lower part defining a screening section for prescreening said broken materials;

said pulping section including:

a feeding chamber delimited by a housing, a rotor unit positioned in said feeding chamber, a drive unit for rotation of said rotor unit and a first perforated screenplate in a bottom portion of said pulping section through which an accepted portion of said broken material is fed into said screening section;

said screening section including:

a space also delimited by a housing and positioned on the opposite side of said first perforated screenplate, a stationary partition wall for dividing said space into a first partial space and a second partial space;

at least a portion of said partition wall including a second perforated screenplate;

said first partial space being in communication with said feeding chamber for receiving said accepted portion of said material through said first screenplate;

said second partial space being in communication with said first partial space through said second screenplate for receiving material accepted by said second screenplate;

a first partial discharge outlet in communication with said first space for discharging the portion of material rejected by said second screenplate;

a second discharge outlet in communication with said second partial space for discharge of the portion of said material accepted by said second screenplate; and

a cleaning device provided in said first partial space and rotatable with respect to said second screenplate of said partition wall.

2. An apparatus according to claim 1, wherein said

housing defining said space is substantially cylindrical and wherein said second screenplate is also arranged to form a substantially cylindrical surface, the center line of which is parallel with the center line of said housing, said cylindrical surface formed by said second screenplate being restricted at least partly by the bottom of said housing and on the opposite end at least partly by a part of said partition wall.

3. An apparatus according to claim 1, wherein a shaft of said cleaning device, which is connected to a drive unit, is adapted to pass through the second partial space and wherein a supporting structure extending radially from said shaft is connected to said shaft, said supporting structure supporting, at its end part, elongated, blade-like members constituting said cleaning device.

4. An apparatus according to claim 3, wherein said shaft is sealed at a part of said partition wall between said first and said second partial spaces.

5. An apparatus according to claim 3, wherein a reduction gear is provided between said drive unit and said rotor unit and said cleaning device.

6. An apparatus according to claim 3, wherein said shaft is sealed at a part of the partition wall between said first and said second partial spaces.

7. An apparatus according to claim 3, wherein said shaft is adapted to pass through said first perforated screenplate in connection with said rotor unit, and wherein an annular slot remains present between the outer surface of said shaft and said first screenplate which functions as part of the perforation of said first screenplate.

8. An apparatus according to claim 3, wherein said rotor unit and said cleaning device are provided with a common drive unit and wherein said rotor unit and the supporting



structure of said cleaning device are connected to a common shaft.

9. An apparatus according to claim 8, wherein said shaft is adapted to pass through said first perforated screenplate in connection with the rotor unit, and wherein an annular slot remains present between the outer surface of said shaft and the screenplate which functions as part of the perforation of said first screenplate.

10. An apparatus according to claim 1, wherein a reduction gear is provided between said drive unit and said rotor unit.

11. An apparatus for breaking down and prescreening materials containing fiber pulp, comprising:

- a feeding chamber defined by a housing;

- a rotor unit located in said feeding chamber and rotatable by a drive unit, a first perforated screenplate in connection with said rotor unit in a bottom portion of the feeding chamber, a space defined by a housing on the opposite side of said first perforated screenplate for receiving the broken material;

- said space including a screening unit defined by:

- a first partial space which is in direct communication with said first screenplate and which is provided with a discharge connection unit for the portion of the broken material rejected by said screening unit;

- a second partial space for the accepted portion of the broken material, said second partial space being provided with a discharge connection unit for the accepted portion;

- a stationary partition wall provided between said first and second partial spaces and including, at least in part, a second perforated screenplate; and

- a cleaning device adapted to be rotated relative to said second screenplate by a drive unit and positioned inside said first partial space.

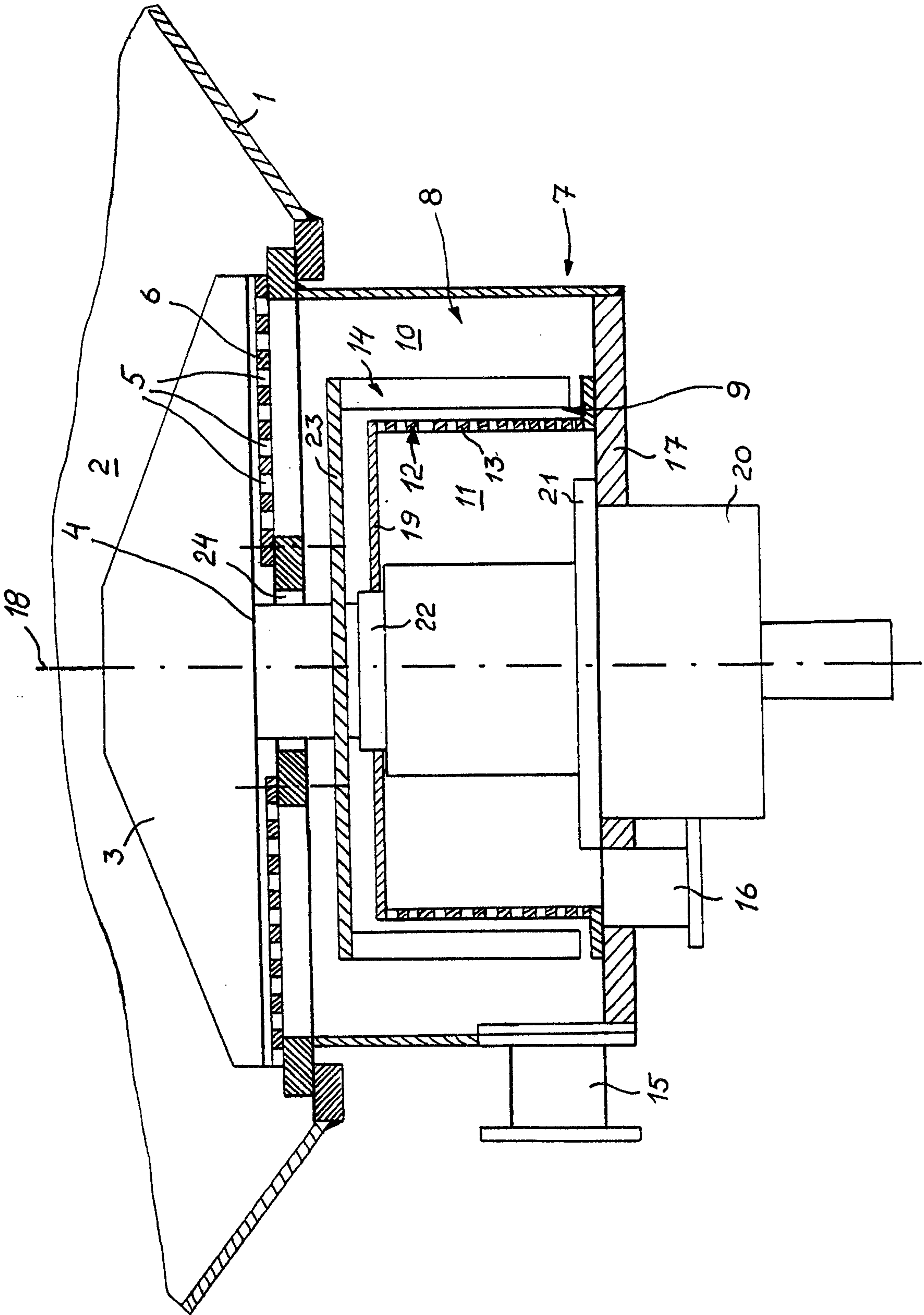
12. An apparatus according to claim 11, wherein a



shaft of said cleaning device, which is connected to a drive unit, is adapted to pass through the second partial space and wherein a supporting structure extending radially from said shaft is connected to said shaft, said supporting structure supporting, at its end part, elongated, blade-like members constituting said cleaning device.

13. An apparatus according to claim 11, wherein a reduction gear is provided between said drive unit and said rotor unit.

14. An apparatus according to claim 11, wherein a shaft is adapted to pass through said first perforated screenplate, and wherein an annular slot remains between the outer surface of said shaft and said first screenplate which functions as part of said first screenplate.



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