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

(11) EP 1 624 098 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.02.2006 Bulletin 2006/06

(51) Int Cl.:
D03D 47/36 *(2006.01)* ***B65H 51/22*** *(2006.01)*

(21) Application number: **05013200.0**

(22) Date of filing: **18.06.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

(30) Priority: **05.08.2004 IT TO20040105 U**

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(54) Weft feeder for looms provided with a self-governing braking device

(57) The feeder comprises a stationary drum (12) on which are wound loops of yam to be fed to a downstream textile machine, and a self-governing braking device comprising a hollow, frustoconical braking member (16) which is arranged in front of the drum (12) and is supported at the middle of a spider assembly of springs (18) hooked between the braking member (16) and an annular support (19). The springs (18) have a length at rest which is equal to, or higher than, the span between their hooking point on the frustoconical member (16) and their hooking point on the annular support (19). The annular support (19) is slidably supported with respect to the drum (12) along an axial direction, under control of driving means (22), for biasing the frustoconical member (16) against said edge (12r), thereby causing the frustoconical member to align to the drum, while approaching thereto, by geometrical engagement.

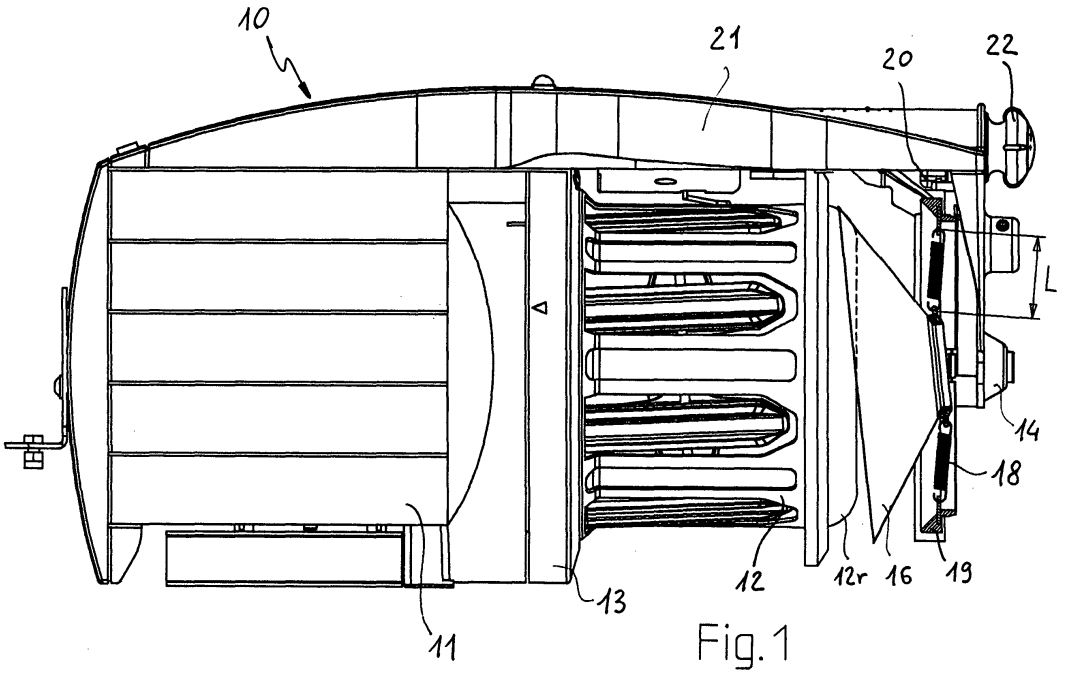


Fig.1

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Description

[0001] The present invention relates to a weft feeder for looms provided with a self-governing braking device.

[0002] A general weft feeder for looms comprises a stationary cylinder on which a motorized swivel arm winds a plurality of yarn loops forming a weft reserve. The yarn, while unwinding from the cylinder to feed the loom, is braked by a self-governing braking device of the type described in IT-U-1 251 209. This device comprises a frustoconical braking member that is coaxial to the drum and is elastically biased, with its inner surface, against a beveled delivery edge of the drum. The braking member is supported at the middle of a spider assembly of helical springs pulling on ring carried on a support that is axially movable for adjusting the static pressure applied by the frustoconical braking member upon the drum at rest. In the operation, the yarn flies between the drum and the braking member so that the axial component of its tension, which is proportional to the yarn speed, is applied upon the braking member. Accordingly, when the speed is increased, the braking member is axially drawn away from the drum, with automatic reduction of the braking action.

[0003] With the above braking device, it is difficult to obtain an accurate and regular unwinding of the yarn from the drum when weak braking actions are required, i.e., when low static pressures are applied upon the drum by the cone, because such conditions give rise to aligning problems, as well known to those persons skilled in the art.

[0004] Moreover, with modern looms, the yarn speed may reach very high values, with quick accelerations from 0 to 2500 m/min. With such operating conditions, the above described braking device is unsatisfactory from the standpoint of feedback at the peaks of speed of the yarn, because when the latter accelerates the cone is supposed to move away as quikly as possible in order to adapt the braking action to the new yarn speed.

[0005] Therefore, it is a main object of the present invention to provide a weft feeder for looms having an improved self-governing braking device by which the yarn unwinds from the drum with higher accuracy and regularity even with weak braking actions, with quicker reaction to the yarn accelerations.

[0006] The above object and other aims and advantages, as will better appear below, are achieved by a weft feeder having the features recited in claim 1, while the other claims state other advantageous, though secondary features.

[0007] The invention will be now described in more detail with reference to the attached drawings shown by way of non-limiting example, wherein:

Fig. 1 is a side elevation view of a weft feeder provided with a self-governing braking device according to this invention, in a first operating configuration;

Fig. 2 is a front view of the self-governing braking device according to the invention;

Fig. 3 is a side elevation view of the weft feeder of Fig. 1, in a second operating configuration;

Fig. 4 is a side elevation view of the weft feeder of Fig. 1, in a third operating configuration;

Fig. 5 is a view similar to Fig. 2, showing an alternative embodiment of the invention.

[0008] With reference to the above Figures, a weft feeder 10 comprises a motor housing 11 which coaxially supports a stationary drum 12 on which a motorized swivel arm 13 winds a plurality of yarn loops (not shown) forming a weft reserve. Upon request of the loom, the yarn is unwound from drum 12 via a yarn-guide eyelet 14 coaxial to the drum.

[0009] The tension of the yarn unwinding from the drum is modulated by a braking device comprising a frustoconical braking member 16 arranged with its larger perimeter in front of the end of drum 12, which is provided with a beveled delivery edge 12r.

[0010] Frustoconical braking member 16 is supported at the middle of a spider assembly of helical springs 18 which are hooked to braking member 16, at the smaller perimeter thereof, with one of their ends, and to an annular support 19 with the opposite end.

[0011] According to this invention, the length of springs 18, at rest, is equal to, or higher than, the span between their hooking point on frustoconical member 16 and their hooking point on annular support 19, i.e.:

$$L \geq \frac{D2 - D1}{2},$$

where L is the length of the spring at rest, D1 is the hooking diameter for the spring on braking member 16, and D2 is the hooking diameter for the spring on annular support 19.

[0012] Annular support 19 is carried on a slide 20 which is slidably supported along an axial direction on a stationary arm 21 integral with motor housing 11, under control of a screw gear (not shown) operable by a knob 22. Knob 22 is operable for adjusting the static pressure applied by the frustoconical braking member upon the drum.

[0013] As shown in Fig. 1, when frustoconical member 16 is at rest, it will lie aslant against stationary drum 16. By operating knob 22, frustoconical member 16 moves towards drum 12 and geometrically engages beveled delivery edge 12r without springs 18 being extended, thereby achieving an accurate alignement. In other words, with the improved braking device according to this invention, springs 18 only act as hooking means for braking 16, without affecting the alignement.

[0014] In the operative configuration of Fig. 3, the contact pressure between the drum and the frustoconical member is very low, because the springs are substantially released. Such neutral configuration of the springs during operation allows the frustoconical member to be accurately aligned to the drum even with very weak braking actions.

[0015] For stronger braking actions, the knob is further operated to pull the springs, as shown in Fig. 4.

[0016] An alternative embodiment of the invention is shown in Fig. 5, where the springs are substituted by elastic ropes of a synthetic material 118 whose length, when at rest, is equal to, or higher than, the span between their hooking point on frustoconical member 16 and their hooking point on annular support 19, similarly to the previous embodiment.

[0017] The braking device according to the invention has a high reactivity even when the yarn reaches its speed peaks, due to the transition of the elastic means from a released condition to an extended condition, while the formation of the ballon, which is liable to form when the yarn is unwound from the drum, is also controlled.

[0018] A preferred embodiment of the invention has been described herein, but of course many changes may be made by a person skilled in the art within the scope of the inventive concept.

Claims

1. A weft feeder for looms, comprising a stationary drum (12) having a delivery edge (12r), on which are wound loops of yarn to be fed to a downstream textile machine, and a self-governing braking device comprising a hollow, frustoconical braking member (16) which is arranged with its larger perimeter in front of the drum (12) and is supported at the middle of a spider assembly of elongated elastic elements (18) which are hooked to the braking member (16) with one of their ends and to an annular support (19) with their opposite end, **characterized in that** said elastic elements (18) have a length at rest which is equal to, or higher than, the span between their hooking point on the frustoconical member (16) and their hooking point on the annular support (19), i.e.:

$$L \geq \frac{D2 - D1}{2},$$

where L is the length of the elastic elements at rest, D1 is the hooking diameter for the elastic elements on the braking member (16), and D2 is the hooking diameter for the elastic elements on the annular support (19), and **in that** said annular support (19) is slidably supported with respect to the drum (12) along an axial direction, under control of driving means (22), for biasing the frustoconical member (16) against said edge (12r), thereby causing the frustoconical member to align to the drum, while approaching thereto, by geometrical engagement.

2. The feeder of claim 1, **characterized in that** said elastic means are helical springs (18).

3. The feeder of claim 1, **characterized in that** said elastic means are elastic ropes (118) of a synthetic material.

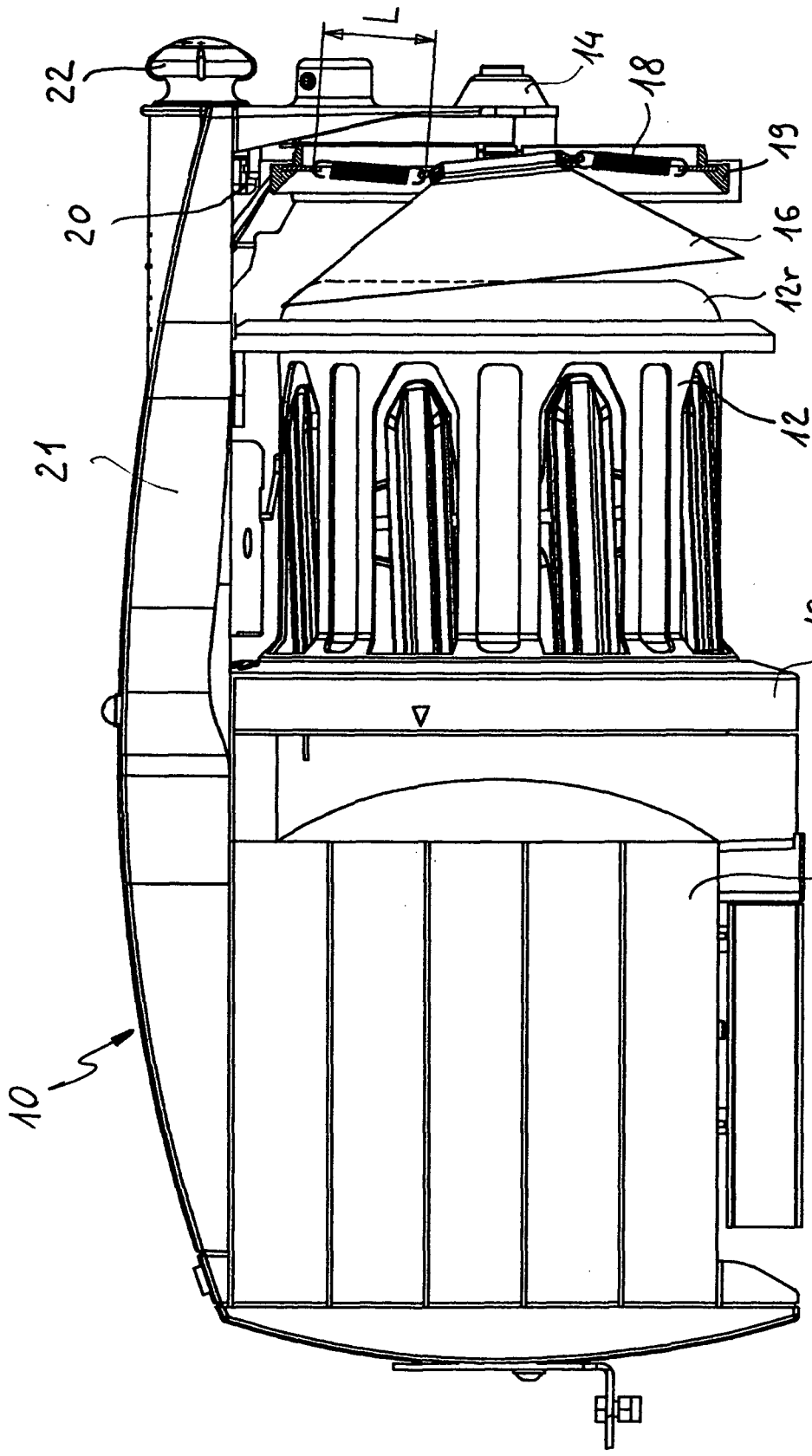


Fig.1

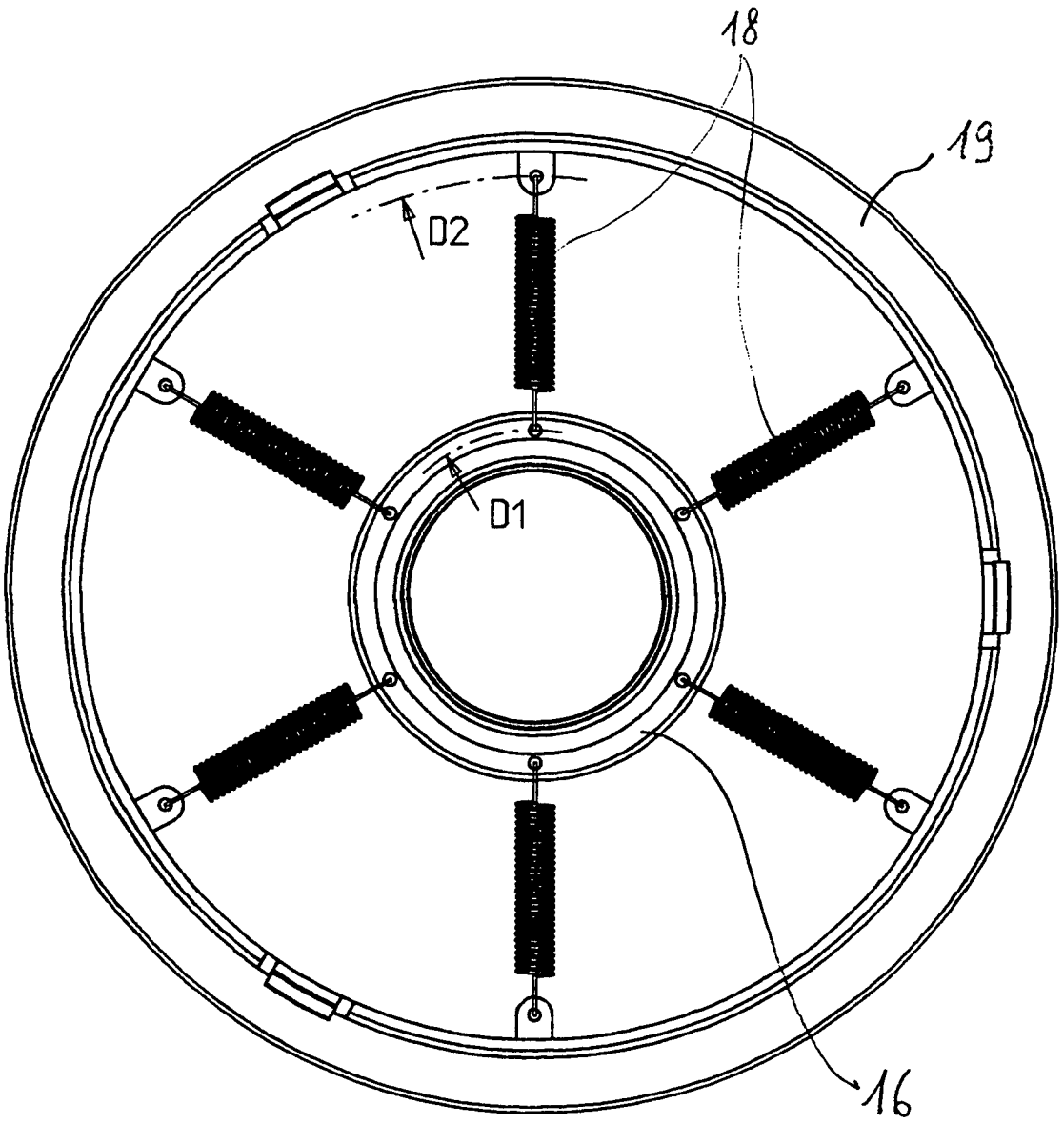


Fig. 2

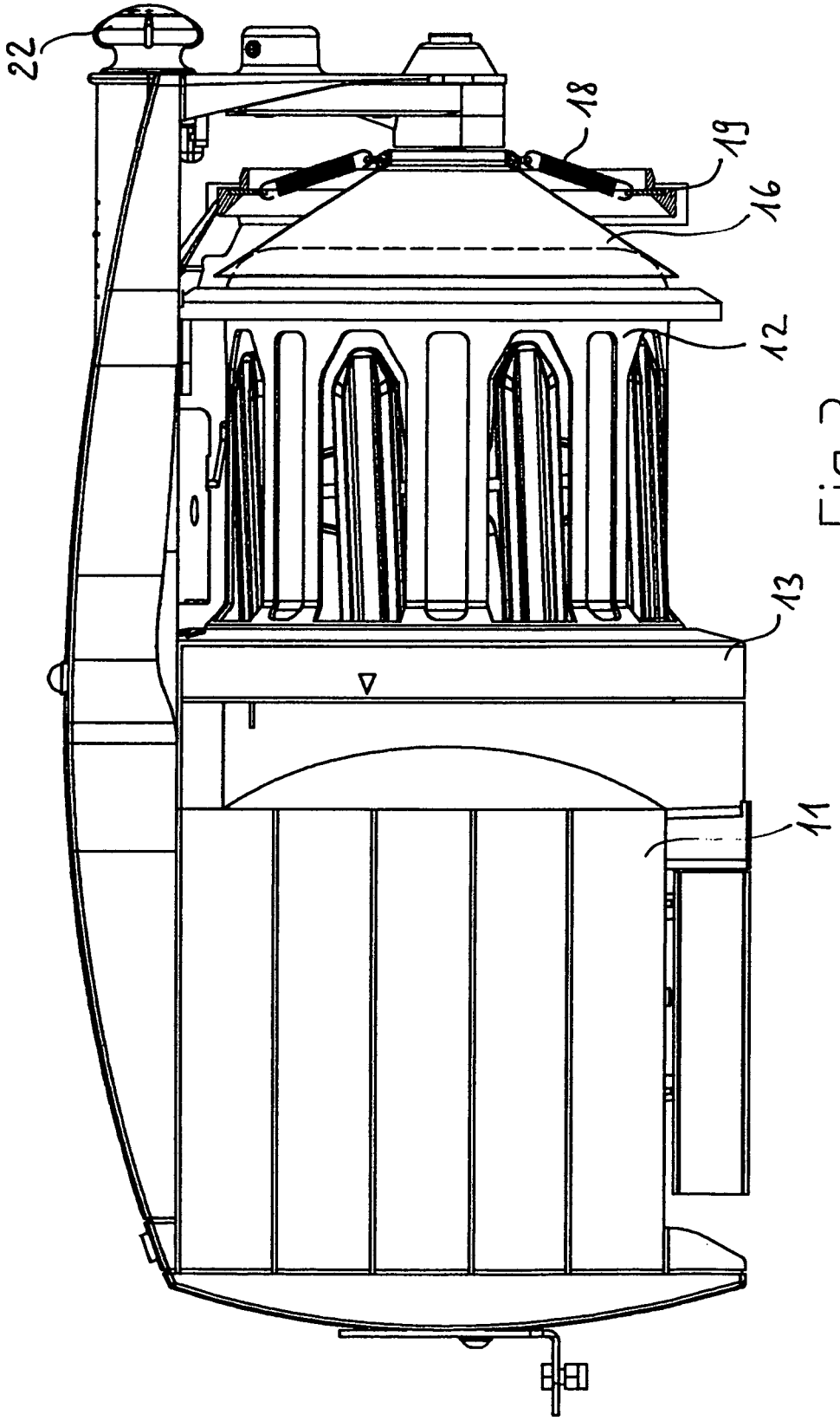


Fig.3

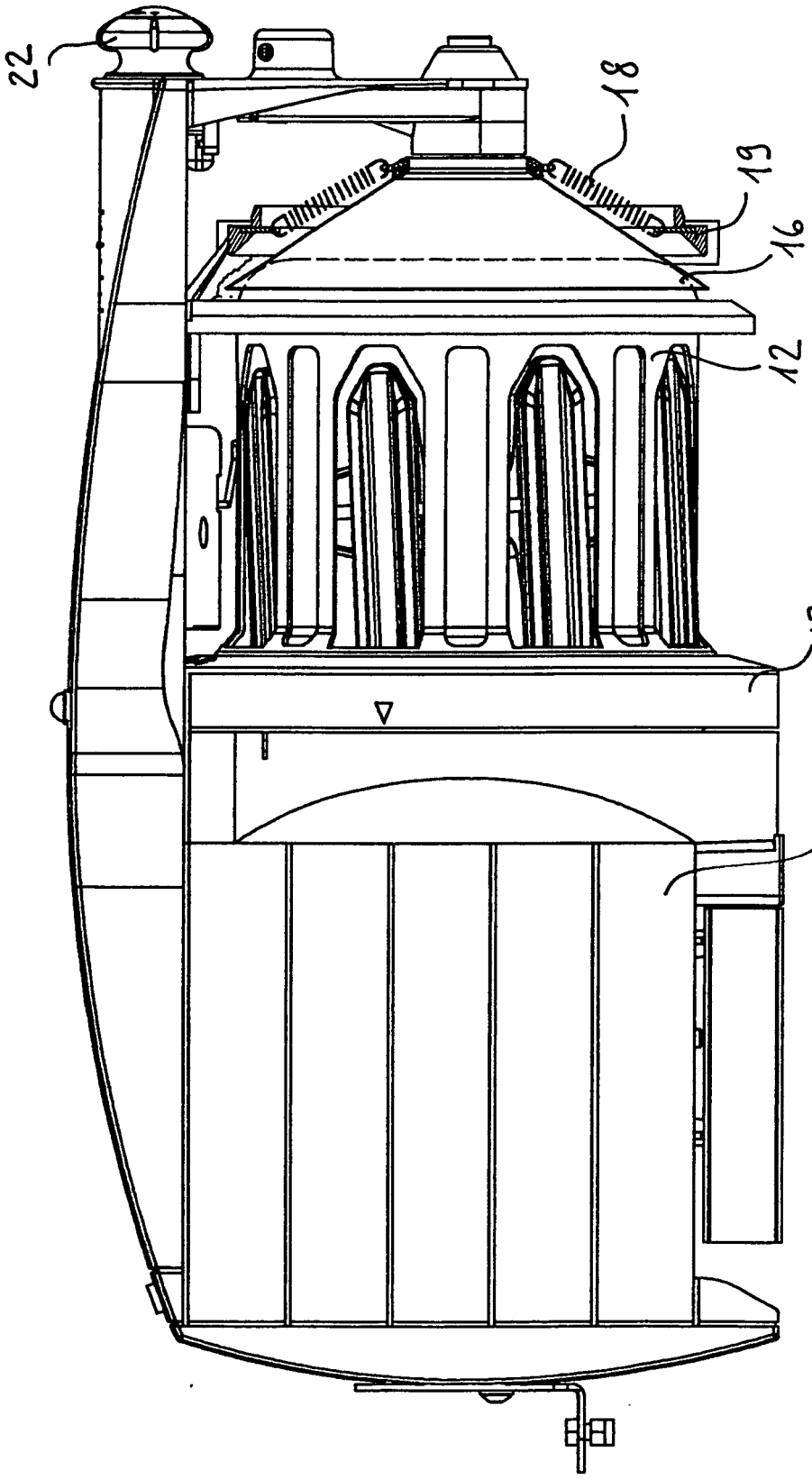


Fig. 4

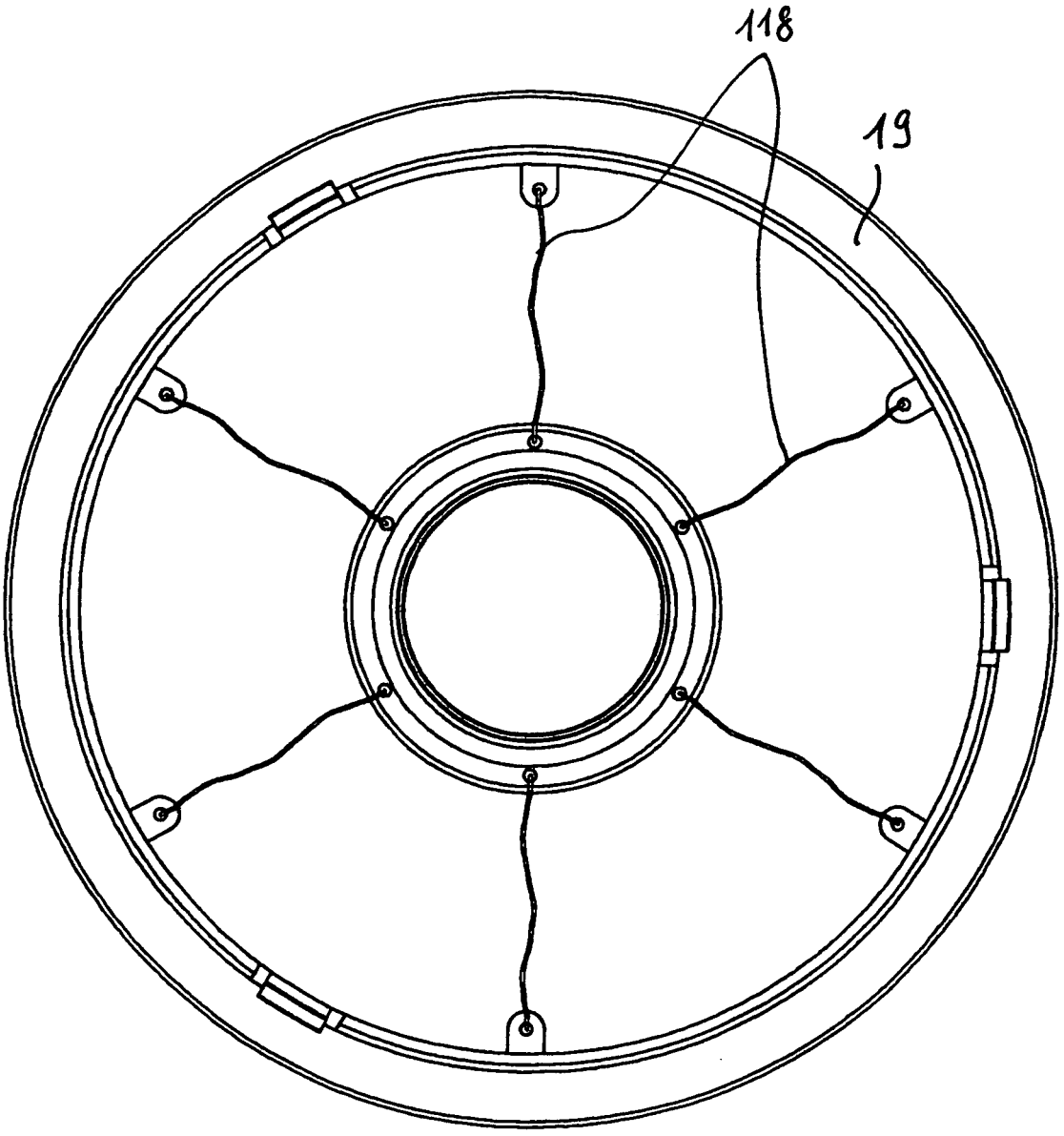


Fig.5