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(54) **SANDING PAD AND SANDING MACHINE COMPRISING SAID SANDING PAD**

(57) The present invention relates to a sanding pad (P) for a sanding unit (G), for sanding wood, plastic, metal and similar surfaces, comprising a rotating body (1) having a rotating driven shaft (11) and a main plate (12) coupled with said shaft (11), said main plate (12) having a first (121) and a second (122) face and a lateral surface (123), an abrasive disc (2) arranged on said first face (121) of said main plate (12), so as to carry out a sanding operation when said shaft (11) is operated in rotation,

and an annular element (3) for the perimeter blocking of said abrasive disc (2), characterized in that said annular element (3) is coupled with said main plate (12) so as to be movable between an unlocking position of said abrasive disc (2) and a blocking position of said abrasive disc (2).

The present invention also relates to a sanding machine (M) comprising at least one sanding unit (G).

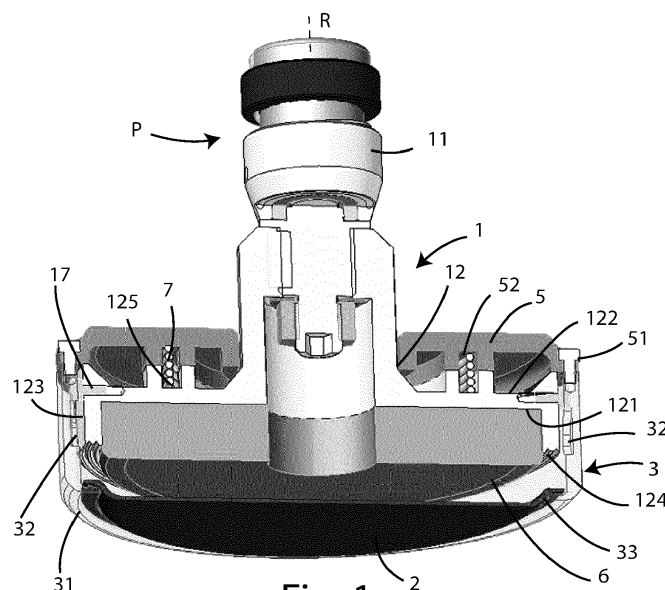


Fig. 1

Description

[0001] The present invention relates to a sanding pad and sanding machine comprising said sanding pad.

[0002] More specifically, the invention relates to a sanding pad, and in particular to a sanding disc, used on a sanding machine, comprising a rotating body, consisting of a cylindrical element and at the base a plate element, an abrasive disc, a layer of elastic material, interposed between the abrasive disc and the plate element and a locking system of the abrasive disc.

[0003] In the following the description will be addressed to a sanding pad used in sanding machines for working wood, plastic or metallic material and the like, but it is clear that the same should not be considered limited to this specific use.

[0004] As is well known, currently in sanding pads for sanding machines, the abrasive disc is fixed to the plate element by means of tear-off systems, generally consisting of two Velcro pieces, one placed on the abrasive and the other on the plate element. Although the Velcro connection allows easy replacement of the abrasive disc, it has sealing problems during processing, caused above all by the high dustiness of the sanding processes, especially in case of wood sanding.

[0005] Furthermore, the abrasive disc equipped with Velcro is more expensive.

[0006] The relevant prior art includes document DE202017103070U1, which describes a sanding pad for sanding machines, in which the abrasive is blocked to the plate element by means of a removable fixing ring, from which the abrasive disc protrudes. The plate element has some holes, thanks to which the ring is fixed by magnets.

[0007] In this solution, since the fixing ring is removable, the operator has to completely disassemble it to replace the abrasive disc. Therefore, in addition to slowing down the abrasive replacement operations, this solution turns out to be impractical.

[0008] In addition, a further technical problem of the aforementioned device is that of having poor sealing uniformity of the abrasive disc. In fact, since the magnets exert a punctual clamping force on the abrasive disc, the seal is not uniform in all points of the ring.

[0009] In light of the foregoing, it is therefore an object of the present invention to propose a locking system of the abrasive disc, which makes replacement operations of the abrasive disc simple and quick, even by an inexperienced operator.

[0010] Another object of the invention is to guarantee a perfect sealing of the abrasive disc during processing.

[0011] It is also an object of the invention to make abrasive discs cheaper.

[0012] It is specific object of the invention sanding pad for a sanding unit, for sanding wood, plastic, metal and similar surfaces, comprising a rotating body having a rotating driven shaft and a main plate coupled with said shaft, said main plate having a first and a second face

and a lateral surface, an abrasive disc arranged on said first face of said main plate, so as to carry out a sanding operation when said shaft is operated in rotation, and an annular element for the perimeter blocking of said abrasive disc, characterized in that said annular element is coupled with said main plate so as to be movable between an unlocking position of said abrasive disc and a blocking position of said abrasive disc.

[0013] Further according to the invention, said sanding pad may include elastic means for coupling between said annular element and said main plate to hold said annular element in said blocking position of said abrasive disc.

[0014] Still according to the invention, said sanding pad may comprise a counterplate, arranged facing said second face of said main plate, wherein said annular element is coupled by means of connecting and fixing devices to said counter-plate, and wherein said elastic means are interposed between said main plate and said counter-plate.

[0015] Further according to the invention, said elastic means may be compressed when said annular element is in said unlocking position and are extended when said annular element is in said blocking position.

[0016] Preferably according to the invention, said elastic means may include at least one spring.

[0017] Still according to the invention, said counterplate may comprise a first housing for said at least one spring, and said main plate may comprise a second housing for said at least one spring in correspondence of said second face.

[0018] Preferably according to the invention, said at least one spring may be coaxially arranged with respect to the rotation axis of said shaft.

[0019] Alternatively, according to the invention, said elastic means may comprise a plurality of springs alternately arranged:

- coaxial to each other in a coaxial manner with respect to the rotation axis of said shaft; or
- circumferentially on said second face of said main plate.

[0020] Further according to the invention, said sanding pad may comprise a holding system for holding said annular element in said unlocking position of said abrasive disc, and vice-versa.

[0021] Still according to the invention, said annular element may have an internal surface, facing said main plate, said restraint system comprises guiding means arranged on said inner surface, and at least one relief, such as a spine or the like, arranged on said lateral surface of said main plate, engaged with said guiding means, wherein the said guiding means have a first position of said relief, corresponding to the unlocking position of said abrasive disc, and a second position of said relief corresponding to the blocking position of said abrasive disc.

[0022] Preferably according to the invention, said guiding means may comprise a slotted hole obtained on said

internal surface of said annular element, having a first and a second portion, positioned at two different heights, corresponding respectively to said first position of said relief and to said second position of said relief.

[0023] Further according to the invention, said annular element may comprise at least one first toothed portion for blocking said abrasive disc, and/or said main plate may comprise at least one second toothed portion, preferably arranged facing said first toothed portion.

[0024] Still according to the invention, said sanding pad may comprise a elastic material layer interposed between said first face of said main plate and said abrasive disc.

[0025] It is further object of the invention a sanding machine comprising at least one sanding unit, which in its turn comprises at least one sanding pad according to any one of the preceding claims, each operated in rotation around a respective axis, said at least one sanding pad being intended for sanding surfaces made of wood, plastic, metal and the like.

[0026] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 is a sectional perspective view of a sanding pad according to the present invention, in which the annular element is in an unlocking position of the abrasive disc;

figure 2 is a sectional perspective view of a sanding pad according to the present invention, in which the annular element is in a locking position of the abrasive disc;

figure 3 shows a detailed perspective view in partial transparency of the pad according to the present invention;

figure 4 shows an exploded view of the sanding pad according to the present invention;

figure 5 shows a perspective view from the bottom of a sanding unit comprising a plurality of pads according to the present invention; and

figure 6 shows a perspective view of a sanding machine according to the present invention.

[0027] In the various figures, similar parts will be indicated by the same reference numbers.

[0028] With reference to figures 1-4, a sanding pad P according to the present invention can be observed, which can be used in sanding machines.

[0029] Said sanding pad P is used in a sanding unit G, mounted on a sanding machine M, as shown in figures 5-6.

[0030] In the particular embodiment shown, said sanding unit G comprises four planetary heads 4, each one of which is driven in rotation about a respective axis.

[0031] Each of said four planetary heads 4 comprises in turn four pads P, rotated around four respective axes of rotation.

[0032] Each sanding pad P essentially comprises a rotating body 1, an abrasive disc 2, and an annular element 3.

[0033] Said rotating body 1 comprises a shaft 11, which can be rotated about a rotation axis R, and a main plate 12 coupled to said shaft 11, having a first 121 and a second 122 face and a lateral surface 123.

[0034] Said abrasive disc 2 is arranged in correspondence with said first face 121 of said main plate 12, for carrying out a sanding operation when said shaft 11 is driven in rotation.

[0035] Said abrasive disc 2 protrudes beyond said annular element 3 and is blocked on the circumference between said annular element 3 and said main plate 12, in particular between a first toothed portion 33 of said annular element 3 and a second toothed portion 124, placed in the bottom end of said lateral surface 123, and intended for coupling with said first toothed portion 33.

[0036] Said annular element 3 is movable with respect to said main plate 12 between an unlocking position of said abrasive disc 2 and a locking position of said abrasive disc 2.

[0037] Said sanding pad P also comprises elastic means 7, for coupling between said annular element 3 and said main plate 12 to retain said annular element 3 in the locking position of said abrasive disc 2.

[0038] The sanding pad P also comprises a counterplate 5, arranged facing said second face 122 of said main plate 12 and coupled to said annular element 3 by means of connection and fixing elements 51, such as for example screws.

[0039] Said elastic means 7 are interposed between said main plate 12 and said counterplate 5.

[0040] Said elastic means 7 are compressed when said annular element 3 is in said unlocking position, and are stretched when said annular element 3 is in said locking position.

[0041] Said elastic means 7 further comprise, in a preferred embodiment, at least one spring arranged coaxially with respect to said rotation axis R of said shaft 11.

[0042] Said spring is arranged between a first housing 52, obtained in said counterplate 5, and a second housing 125, obtained in said main plate 12, placed in correspondence with said second face 122.

[0043] In another embodiment, said elastic means 7 comprise a plurality of springs arranged alternately:

- coaxial with respect to each other and coaxially with respect to the rotation axis R of said shaft 11; or
- circumferentially on said second face 122 of said main plate 12.

[0044] Said passage between said two positions of said abrasive disc 2 takes place due to a holding system, which includes guiding means 32 arranged on an internal surface 31 of said annular element 3, facing said main plate 12.

[0045] Said holding system further comprises a pin 17

engaged with said guiding means 32, which is arranged on said lateral surface 123 of said main plate 12.

[0046] Said guiding means 32 provide a first position of said pin 17 on the same, to hold said annular element 3 in said unlocking position of said abrasive disc 2, and a second position of said pin 17, to release said annular element 3 in the position wherein said abrasive disc 2 is clamped due to the action of said elastic means 7. More particularly, referring to figure 3, said guiding means 32 are made as a slot obtained on said internal surface 31 of said annular element 3, having a first 321 and a second 322 portion, positioned at different heights, so as to hold said annular element 3 in a different position when the pin 17 is housed in one of said portions of said slot.

[0047] Said annular element 3 can have different guiding means 32 on its internal surface 31.

[0048] With reference to figures 1 and 2, it can be observed that said sanding pad P comprises a layer of elastic material 18, interposed between said first face 121 of said main plate and said abrasive disc 2.

[0049] The operation of the sanding pad P, installed in the sanding unit G described above, is as follows.

[0050] As mentioned, in order to carry out a sanding process on a piece, the planetary heads 4, part of the sanding unit G, installed on the sanding machine M, are rotated. Four planetary pads P are installed on each planetary head 4, which in turn are rotated.

[0051] At the base of each sanding pad P is placed the abrasive disc 2, which, when in contact with the piece to be worked, achieves the desired finish, due to the optimal adhesion ensured by the elastic element 6.

[0052] Since the abrasive disc 2 is made of wearable material, it must be frequently replaced by the operator.

[0053] The replacement of the abrasive disc 2 is also necessary when obtaining a different degree of finish on the piece to be worked is desired.

[0054] To carry out the replacing operations of the abrasive disc 2 on each of the pads P of the relative planetary head 4, which is part of the sanding unit G, the operator manually exerts a slight traction, combined with an anticlockwise rotation, referring to figure 3, on two ends of the annular element 3. In this way, said relief 17, inside said guide means 32, passes from said first position, for locking the abrasive disc 2, to said second position, for releasing the abrasive disc 2. Said spring 7 passes from elongated to compressed.

[0055] At this point, without having to remove the annular element 3, the operator can remove the worn abrasive disc 2 and replace it with a new abrasive disc 2.

[0056] After replacing the abrasive disc 2, the operator can tighten said new abrasive disc 2 by exerting a slight compression on the annular element 3, combined with a clockwise rotation.

[0057] In this way, said relief 17, inside said guiding means 32, passes from said second unlocking position of the abrasive disc 2, to said second position, for locking the abrasive disc 2; while said spring 7 passes from compressed to elongated and the abrasive disc 2 remains so

tight, between the first toothed portion 33 of said annular element 3 and the second toothed portion 124 of said main plate 12, thanks to the action of the spring 7

[0058] An advantage of the present invention is that of guaranteeing a quick and practical replacement of the abrasive disc 2. In fact, the annular element 3, during the replacement operations of the abrasive disc 2 by the operator, remains coupled with the sanding pad P and must not therefore, in an impractical way, be removed and stored.

[0059] A further advantage of the present invention is that of providing a perfect sealing uniformity and a perfect fixing of the abrasive disc 2 during the working, thanks, in the preferred embodiment, to the uniform clamping force guaranteed by the spring 7.

[0060] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Sanding pad (P) for a sanding unit (G), for sanding wood, plastic, metal and similar surfaces, comprising a rotating body (1) having
 - a rotating driven shaft (11) and
 - a main plate (12) coupled with said shaft (11), said main plate (12) having a first (121) and a second (122) face and a lateral surface (123),
 - an abrasive disc (2) arranged on said first face (121) of said main plate (12), so as to carry out a sanding operation when said shaft (11) is operated in rotation, and
 - an annular element (3) for the perimeter blocking of said abrasive disc (2),
 - characterized in that** said annular element (3) is coupled with said main plate (12) so as to be movable between an unlocking position of said abrasive disc (2) and a blocking position of said abrasive disc (2).
2. Sanding pad (P) according to claim 1, **characterized in that** it includes elastic means (7) for coupling between said annular element (3) and said main plate (12) to hold said annular element (3) in said blocking position of said abrasive disc (2).
3. Sanding pad (P) according to the previous claim, **characterized in that** it comprises a counterplate (5), arranged facing said second face (122) of said main plate (12), wherein said annular element (3) is coupled by means of connecting and fixing devices (51) to said counter-plate (5), and

in that said elastic means (7) are interposed between said main plate (12) and said counterplate (5).

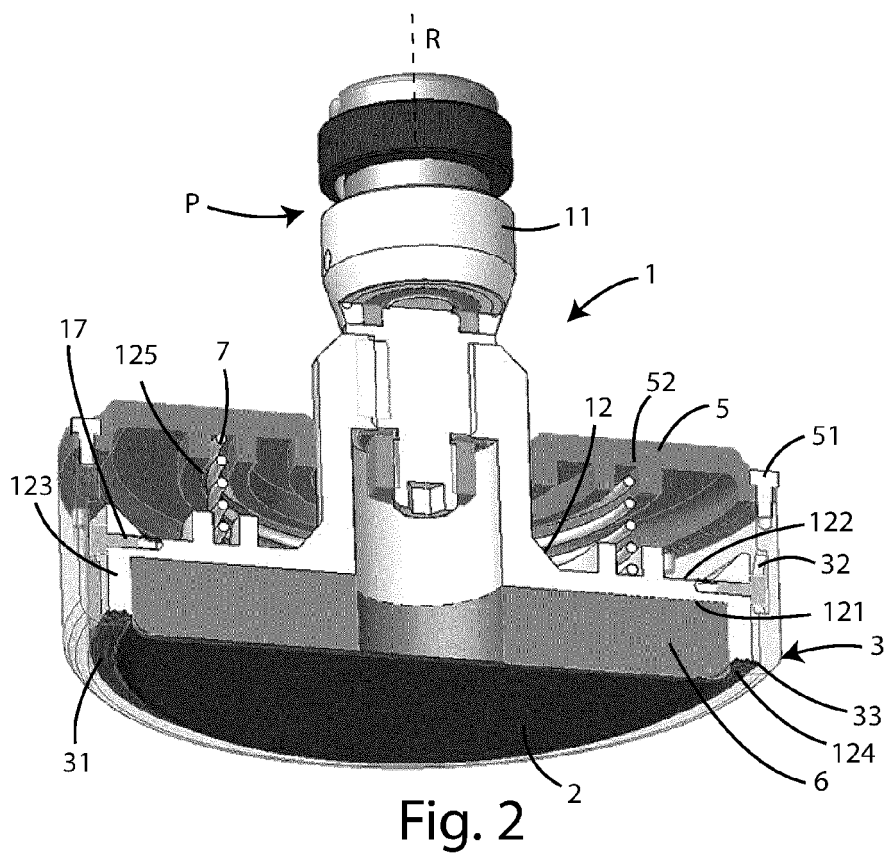
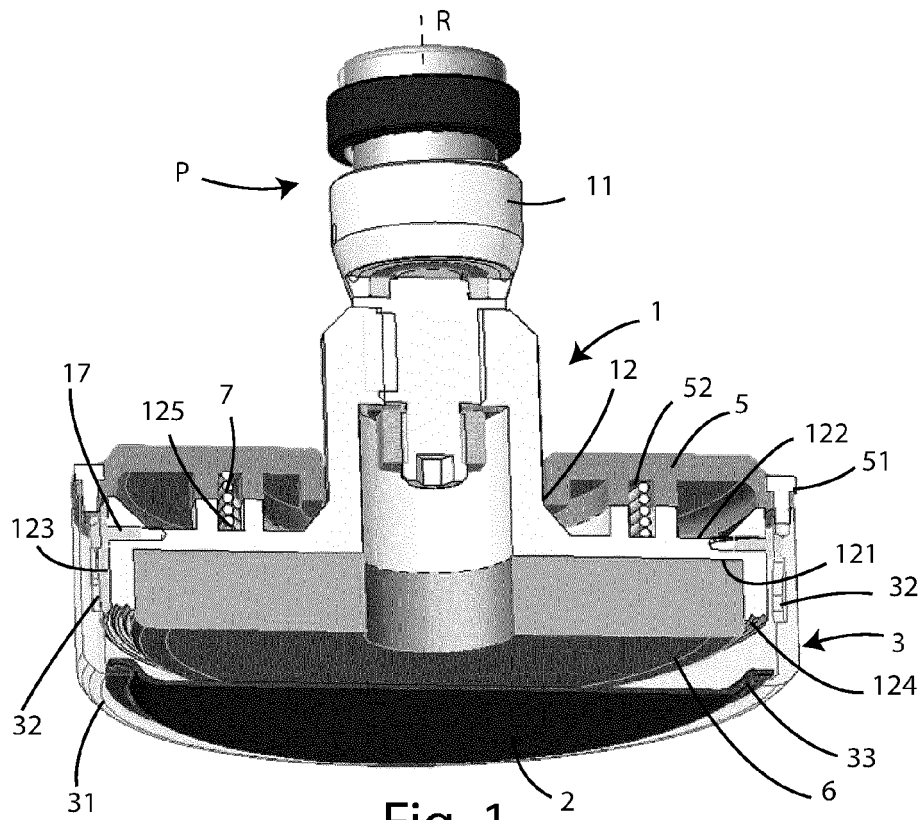
4. Sanding pad (P) according to any one of claims 2 or 3, **characterized in that** said elastic means (7) are compressed when said annular element (3) is in said unlocking position and are extended when said annular element (3) is in said blocking position. 5
5. Sanding pad (P) according to any one of claims 2 - 4, **characterized in that** said elastic means include at least one spring (7). 10
6. Sanding pad (P) according to claim 5, when dependent on claim 3, **characterized in that** said counterplate (5) comprises a first housing (51) for said at least one spring (7), and **in that** said main plate (12) comprises a second housing (125) for said at least one spring (7) in correspondence of said second face (122). 15
7. Sanding pad (P) according to claim 6, **characterized in that** said at least one spring (7) is coaxially arranged with respect to the rotation axis (R) of said shaft (11). 20
8. Sanding pad (P) according to claim 5 **characterized in that** said elastic means comprise a plurality of springs alternately arranged: 25
 - coaxial to each other in a coaxial manner with respect to the rotation axis (R) of said shaft (11);
 - or
 - circumferentially on said second face (122) of said main plate (12). 30
9. Sanding pad (P) according to any one of the preceding claims, **characterized in that** it comprises a holding system (32, 17) for holding said annular element (3) in said unlocking position of said abrasive disc (2), and vice-versa. 35
10. Sanding pad (P) according to claim 9, **characterized in that** said annular element (3) has an internal surface (31), facing said main plate (12), **in that** said restraint system (32, 17) comprises guiding means (32) arranged on said inner surface (31), and at least one relief (17), such as a spine or the like, arranged on said lateral surface (123) of said main plate (12), engaged with said guiding means (32), 40

wherein the said guiding means (32) have a first position of said relief (17), corresponding to the unlocking position of said abrasive disc (2), and a second position of said relief (17) corresponding to the blocking position of said abrasive disc (2). 45
11. Sanding pad (P) according to the preceding claim, 50

characterized

in that said guiding means (32) comprise a slotted hole obtained on said internal surface (31) of said annular element (3), having a first (321) and a second (322) portion, positioned at two different heights, corresponding respectively to said first position of said relief (17) and to said second position of said relief (17).

12. Sanding pad (P) according to any one of the preceding claims, **characterized in that** the annular element (3) comprises at least one first toothed portion (33) for blocking said abrasive disc (2), and/or **in that** said main plate (12) comprises at least one second toothed portion (124), preferably arranged facing said first toothed portion (33). 55
13. Sanding pad (P) according to any one of the preceding claims, **characterized in that** it comprises an elastic material layer (18) interposed between said first face (121) of said main plate and said abrasive disc (2). 60
14. Sanding machine (M) comprising at least one sanding unit (G), which in its turn comprises at least one sanding pad (P) according to any one of the preceding claims, each operated in rotation around a respective axis (R), said at least one sanding pad (P) being intended for sanding surfaces made of wood, plastic, metal and the like. 65



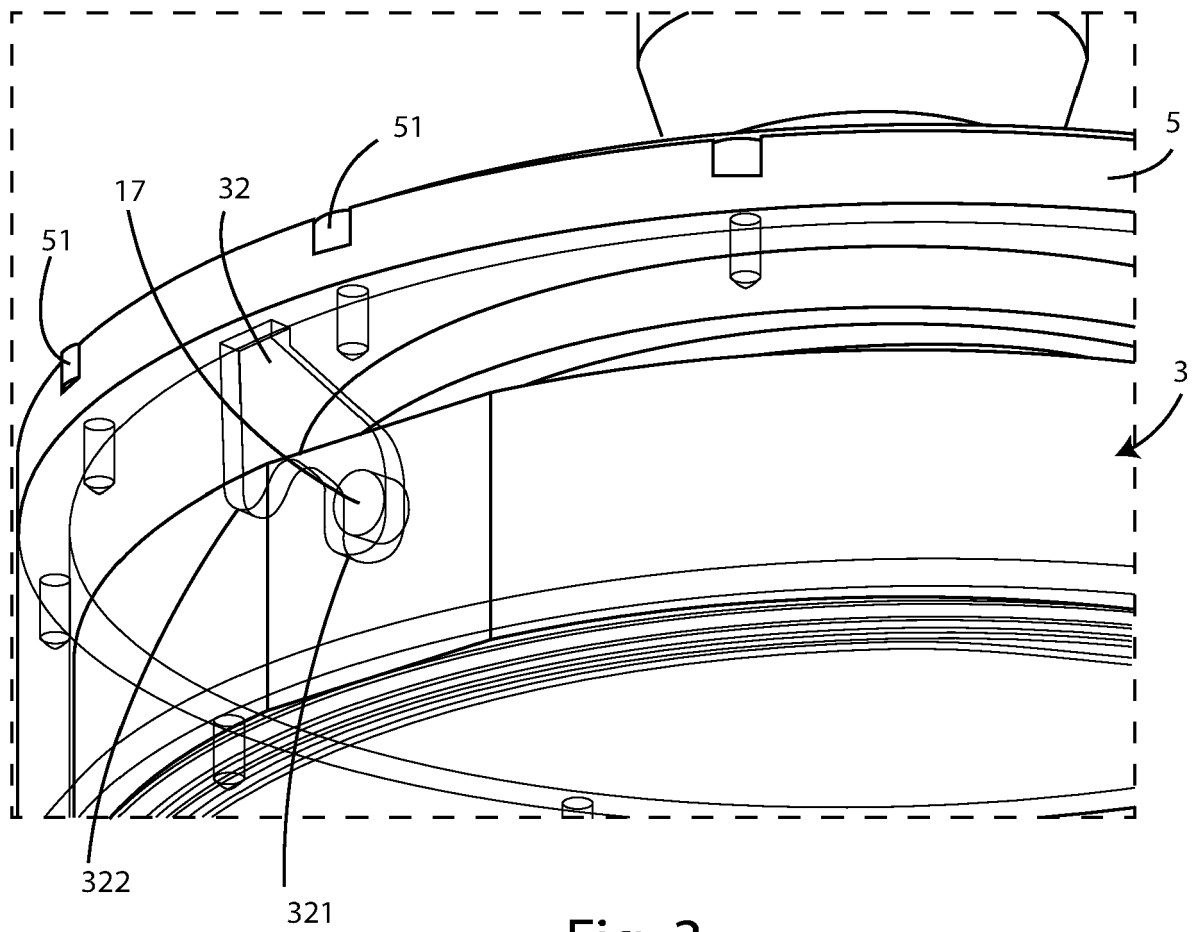


Fig. 3

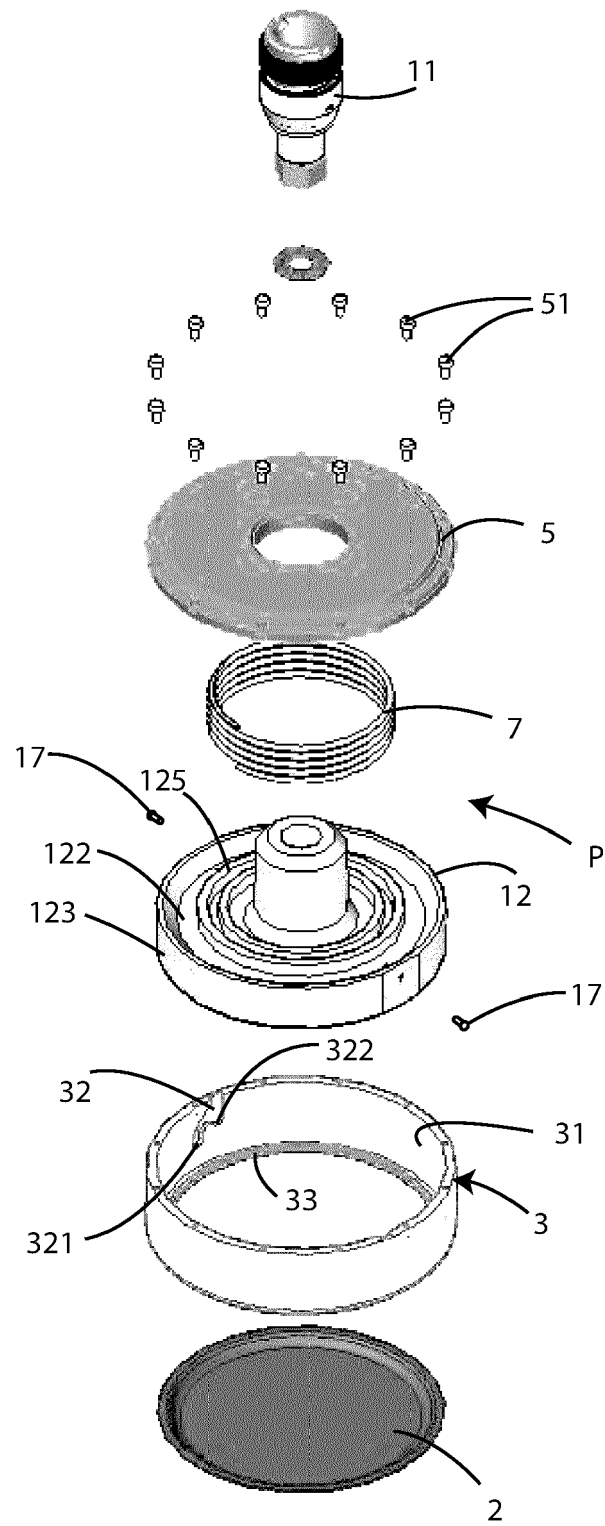


Fig. 4

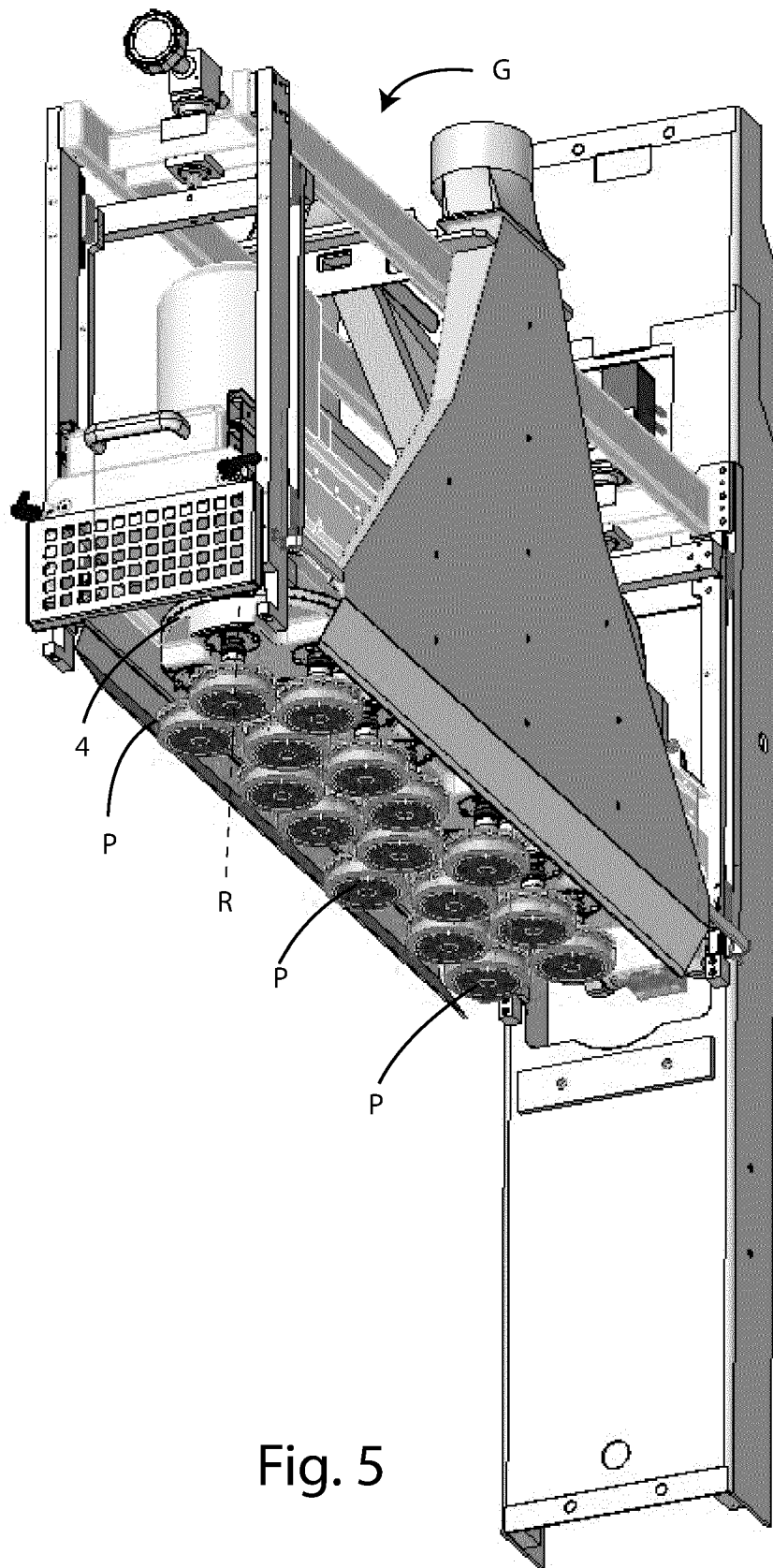


Fig. 5

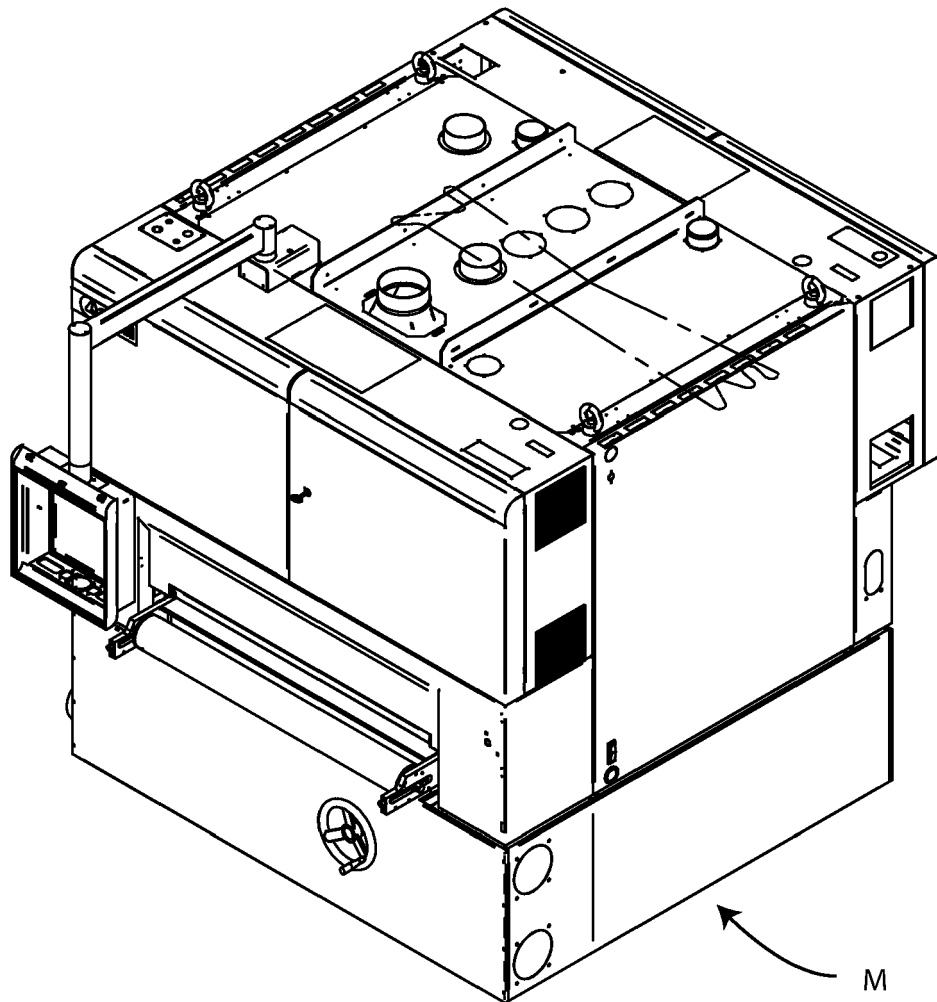


Fig. 6



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 16 0839

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 619 921 A (LEWIS T. ADAMS) 21 February 1899 (1899-02-21) * page 1, lines 45-49; figures 2-4 * * page 1, lines 58-91 *	1-14	INV. B24D9/08
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A	US 2015/251295 A1 (CHEN WEN-PIN [TW]) 10 September 2015 (2015-09-10) * figures 1-9 *	3,5-8, 10-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B24D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 July 2020	Examiner Koller, Stefan
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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