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(54) **Two-parts grinding wheel for machining**

(57) A grinding wheel for machining (1) pieces is provided, wherein the grinding wheel (1) essentially comprises two parts (2,3). One of the parts is fixed and the other part (3) is detachable, in such a way that the de-

tachable part (3) is universal and can be quickly replaced, being said detachable part (3) the one that comes into direct contact with the piece to be machined. On the other hand, the fixed part (2) is customised for the machine that is going to carry out the machining.

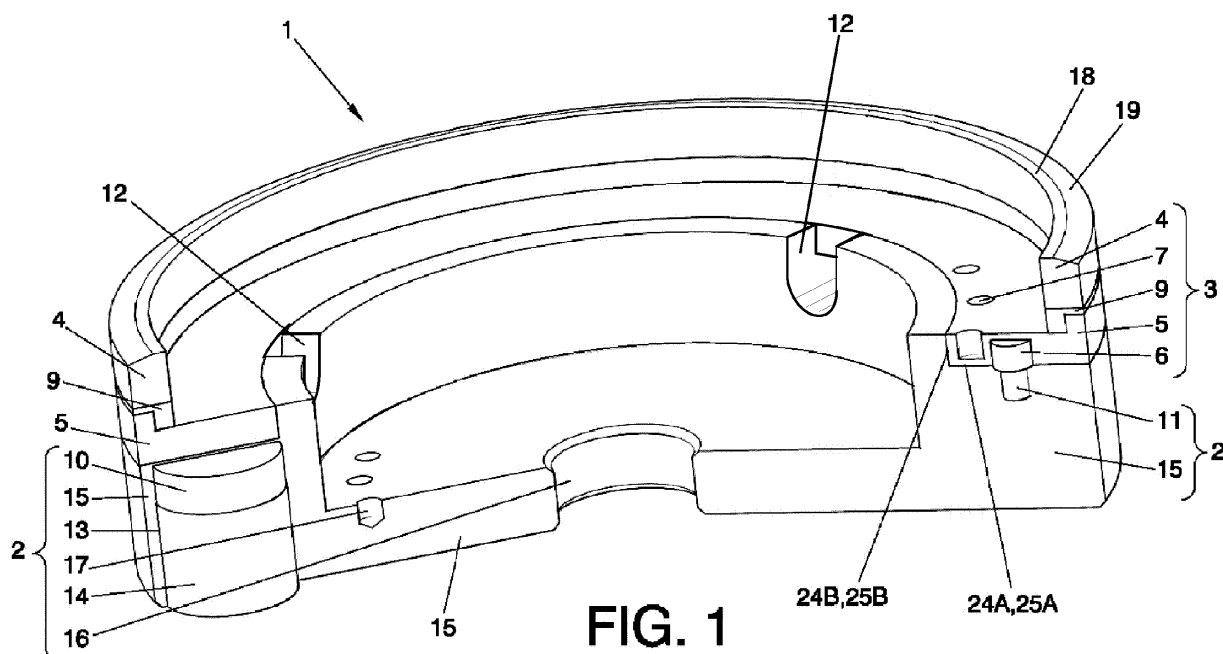


FIG. 1

Description**OBJECT OF THE INVENTION**

[0001] The present invention relates to a grinding wheel for machining pieces, where the grinding wheel comprises essentially two parts. One of the parts is fixed and the other part is detachable, whereby the detachable part is universal and can be quickly replaced, being the detachable part the one that comes into direct contact with the piece being machined. On the other hand, the fixed part is customised for the machine that is going to carry out the machining.

[0002] The technical field of the present invention is any field related with systems, devices, tools and machines for machining materials (pieces, elements, etc.), specially glass cutting and bevelling.

BACKGROUND OF THE INVENTION

[0003] Grinding wheels for machining pieces, which are made in one single piece, are known from the state of the art. Commonly, this piece has a circular shape and comprises several substrate layers depending on the material that is going to be machined. An example of this type of grinding wheel for machining is the machining grinding wheel disclosed in the document bearing the publication number US-A-4907376. This document discloses a grinding wheel with a bottom layer and a top layer for a strong abrasion and a weak abrasion, respectively.

[0004] The drawbacks that the machining grinding wheels present in the state of the art are diverse and are related to different aspects. One aspect is related to the universality of the grinding wheel for machining. That is to say, each machine, or device where these grinding wheels are housed, has its own system for fastening the grinding wheel. This involves manufacturing specific machining grinding wheels for each machine.

[0005] Another drawback linked to the machining grinding wheels in the state of the art (mono-piece) lies in the time it takes to replace the grinding wheel. This replacement time is long since the fastening systems of the grinding wheel to the machining machine are difficult to reach by the operator in charge of replacing the machining grinding wheel.

[0006] Another drawback linked to the machining grinding wheels in the state of the art (mono-piece) is that they require a larger storage, transport, and distribution logistics since they are heavy and cumbersome pieces. For this same reason, the machining grinding wheels of the state of the art (mono-piece) generate more waste and contamination.

[0007] There is no machining grinding wheel known in the state of the art, solving the aforementioned problems.

DESCRIPTION OF THE INVENTION

[0008] The grinding wheel of the present invention solves the aforementioned problems given that the machining grinding wheel of the present invention is divided into two parts, a fixed part (adapted to each machining machine) and another one having a universal wearing and being easily detachable.

[0009] In order to reach the objectives and to avoid the drawbacks indicated in previous paragraphs, the invention provides a machining grinding wheel comprising two detachable parts that make up two separated individual entities, but at the same time, complement each other. That is to say, they are interrelated products, as for instance an emitter and a receptor, or a male cap and a female cap. One of the parts, the grinding wheel support, is fixed to the machining machine or device and the other part, the abrasion element, is detachable, in such a way that the detachable part is universal and can be easily replaced. On the other hand, the fixed part is customised for the machine that is carrying out the machining process.

[0010] For the abrasion element to be not only interchangeable, but also universal, the abrasion element comprises predetermined surfaces in contact with the grinding wheel support, and the grinding wheel support also comprises predetermined surfaces in contact with the abrasion element, so the shape and size of both predetermined contacting surfaces (that is to say, those related to the abrasion element and the grinding wheel support) are in correspondence. In this way, if the shape and size of the contacting surfaces of the abrasion element are predetermined in an universal manner, the grinding wheel support will comprise, in the part making contact with the abrasion element, the surfaces contacting with the abrasion element, which are universal too, and on the part making contact with the machining machine or system, a specific shape and size adapted to each particular machining machine or system. The contacting surfaces, both the abrasion element surface and the grinding wheel support surface, ensure the correct reception of the abrasion element in the grinding wheel support, while providing the correct operation of the assembly (grinding wheel in two parts) constituted by the abrasion element and the grinding wheel support when the assembly rotates at the usual working speed.

[0011] In a first aspect of the invention, it is proposed a grinding wheel support designed for receiving and holding an abrasion element that is interchangeable.

[0012] In a preferred embodiment of the invention relating to the grinding wheel support, the grinding wheel support comprises a support body, which is shaped for receiving and holding an abrasion element such that the abrasion element is interchangeable. In this embodiment, the support body of the grinding wheel comprises at least one surface making contact with the abrasion element, complementing the contact surface comprised in the abrasion element. Therefore, the support body of

the grinding wheel comprises at least one of the predetermined surfaces (in shape and size) of the grinding wheel support making contact with the aforementioned abrasion element. The support body further comprises holding means to hold the abrasion element.

[0013] In another embodiment of the invention, the holding means comprise at least one magnet.

[0014] In another embodiment of the invention, the holding means comprise at least one drive pin.

[0015] In another embodiment of the invention, the holding means comprise at least one magnet and at least one drive pin.

[0016] In another embodiment of the invention, the holding means comprise at least one threaded hole made in the support body, and at least a threaded element, such that the threaded element goes through a hole provided in the abrasion element so it can be held in the threaded hole.

[0017] In another embodiment of the invention comprising any one of the preceding embodiments, the support body further comprises at least a balancing hole, which keeps the support body balanced when the support body rotates at a predetermined angular speed. The number, height, and thickness of the balancing holes are variable and depend on each particular case.

[0018] In another embodiment of the invention comprising any one of the preceding embodiments, the support body further comprises at least some machine/support fastening means to fasten the support body to a machining machine or, in general terms, to any machining system. That is to say, the machine/support fastening means in the grinding wheel support comprise fastening means, which complement the fastening means comprised in the machining machine.

[0019] In another embodiment of the invention comprising any one of the preceding embodiments, the support body further comprises at least a channelling/extraction slot, to channel outside the support body any waste produced during the machining process and, in addition, the channelling/extraction slot allows a fast extraction of the abrasion element.

[0020] In another embodiment of the invention, wherein the holding means comprise at least one magnet and optionally one drive pin, the magnet is comprised into the support body and, optionally it is covered by a cap.

[0021] In another embodiment of the invention comprising any one of the preceding embodiments, the grinding wheel support has a circular shape. Optionally, any one of the parts comprised in the grinding wheel support also has a circular shape.

[0022] In another embodiment of the invention comprising any one of the preceding embodiments, the support body is manufactured from any material. Among the preferred materials to manufacture the grinding wheel support, are: thermoplastic polyester (PET, PBT), bakelite, resins, aluminium, steel and plastic.

[0023] In a second aspect of the invention, it is proposed an abrasion element, which is designed for being

received and held by a grinding wheel support, so that the abrasion element is interchangeable. The abrasion element comprises a body of the abrasion element such that the abrasion element body is shaped to be received and held by the support body comprised in the grinding wheel support defined in any one of the invention embodiments previously described with regard to the first aspect of the invention.

[0024] As previously described and, so the abrasion element is correctly received by the grinding wheel support and vice versa, the body of the abrasion element comprises the predetermined contacting surfaces, which are in correspondence with the predetermined contacting surfaces comprised in the support body of the grinding wheel. Therefore, the body of the abrasion element comprises the predetermined surfaces of the abrasion element making contact with the grinding wheel support.

[0025] In the preferred embodiment of the invention relating to the abrasion element, the body of the abrasion element comprises a paramagnetic section, such that the paramagnetic section is configured to be received and held by the support body comprised in the grinding wheel support defined in any one of the previously described embodiments of the invention. The paramagnetic zone shapes, at least partially, the body of the abrasion element, such that the abrasion element is held by means of the magnet or magnets comprised in the grinding wheel support defined in the first aspect of the invention. If the body of the abrasion element is totally shaped by the paramagnetic zone, both terms designate the same technical feature (element).

[0026] In another embodiment of the invention, the abrasion element further comprises a drive hole, which complements the pin drive defined in the previously described embodiments.

[0027] In another embodiment of the invention, the abrasion element further comprises an abrasion section manufactured from a predetermined compound having abrasive properties, wherein the abrasion section is located on the body of the abrasion element or on the paramagnetic section, constituting partially or totally, the body of the abrasion element (in the case of the preferred embodiment).

[0028] In another embodiment of the invention, the body of the abrasion element (the paramagnetic section of the preferred embodiment of the invention) further comprises at least one balancing hole, which keeps balanced the abrasion element when the abrasion element rotates at a predetermined angular speed. The number, height, and thickness of the balancing holes are variable and depend on each particular case.

[0029] In another embodiment of the invention, the abrasion element further comprises an intermediate section located between the abrasion section and the body of the abrasion element or between the abrasion section and the paramagnetic section, constituting totally or partially the body of the abrasion element (in the case of the preferred embodiment of the invention).

[0030] In another embodiment of the invention, the body of the abrasion element comprises at least a through hole in correspondence with the threaded hole provided in the grinding wheel support, in such a way that the abrasion element is held by the grinding wheel support by means of a threaded element. The threaded element can be a screw or similar.

[0031] The body of the abrasion element is manufactured from a material whose physical properties are selected from non-paramagnetic and paramagnetic (preferred embodiment of the invention). The choice of one material or another is related to the specific mode of carrying out the invention, and more particularly, to the holding means, which hold the abrasion element in the grinding wheel support. Among the paramagnetic materials, the body of the abrasion element can be a weak paramagnetic or a strong paramagnetic material (also known as ferromagnetic). Among the weak paramagnetic materials, the most used elements are Aluminium, Magnesium, Titanium, and Wolfram. Among the strong paramagnetic materials (ferromagnetic), the most used elements are Iron and Steel. Among the non-paramagnetic materials, the most used are thermoplastic polyester (PET, PBT), bakelite, resins, and plastic.

[0032] In another embodiment of the invention comprising any one of the preceding embodiments, the abrasion element is circular. Optionally, any one of the parts comprised in the abrasion element has also a circular shape.

[0033] In a third aspect of the invention, it is proposed a grinding wheel in two parts for machining. The grinding wheel in two parts for machining of the present invention comprises a grinding wheel support, according to any one of the embodiments of the invention relating to the grinding wheel support, and an abrasion element, according to any one of the embodiments of the invention relating to the abrasion element. In this way, different embodiments of the invention for the grinding wheel in two parts for machining, are obtained. Optionally and in order to avoid waste formation between the grinding wheel support and the abrasion element, waterproof lubricant grease can be applied between the grinding wheel support and the abrasion element contacting surfaces.

[0034] For all the embodiments of the invention, and with the object of optimizing the reception and holding of the abrasion element by the grinding wheel support, in the construction as well as in the operating processes, both pieces comprise a tolerance H7/h7 (defined according to the ISO system of tolerances and fits EN 20286-2: 1993) or less in their contacting surfaces.

[0035] In the preferred embodiment of the invention, the grinding wheel support and the abrasion element comprise flat contacting surfaces between both elements that maximize the contact area between both elements, so that the reception and holding of the abrasion element by the grinding wheel support is optimized. In this way, the abrasion element comprises a horizontal flat surface

and a vertical flat surface making contact with the grinding wheel support, where both flat surfaces complement respectively a horizontal flat surface and a vertical flat surface comprised in the grinding wheel support. In order to optimise the reception and the holding of the abrasion element by the grinding wheel support, in the construction as well as in the operation processes, both pieces comprise a tolerance H7/h7 (defined according to the ISO system of tolerances and fits EN 20286-2: 1993) or less in their vertical flat surfaces.

[0036] Next, for a better understanding of this specification and forming an integral part thereof, are enclosed figures in which by way of illustration only and by no way of limitation, the object of the invention has been represented.

BRIEF DESCRIPTION OF THE FIGURES

[0037]

Figure 1.- It shows a perspective view of the grinding wheel in two separable parts for machining, according to the present invention.

Figures 2A and 2B.- They show, respectively, an elevation view taken along the line A-B and a plan view of the grinding wheel in two parts of the present invention as shown in figure 1.

Figures 3A and 3B.- They show, respectively, an elevation view taken along the line C-D and a plan view of the grinding wheel support of the present invention as shown in figure 1.

Figures 4A and 4B.- They show, respectively, an elevation view and a plan view of the abrasion element of the present invention as shown in figure 1.

Figures 5A and 5B.- They show, respectively, an elevation view and a plan view of an abrasion element whose abrasion profile is biased internally and externally.

Figures 6A and 6B.- They show, respectively, an elevation view and a plan view of an abrasion element whose abrasion profile further comprises radially distributed grooves.

Figures 7A and 7B.- They show, respectively, an elevation view and a plan view of an abrasion element whose abrasion profile further comprises radially distributed and biased grooves.

Figures 8A and 8B.- They show, respectively, an elevation view and a plan view of an abrasion element whose abrasion profile is half-round and further comprises radially distributed partial grooves.

Figures 9A and 9B.- They show, respectively, an elevation view and a plan view of an abrasion element whose abrasion profile is rounded and further comprises biased and radially distributed grooves.

Figures 10A and 10B.- They show, respectively, an elevation view taken along the line E-F and a plan view of the grinding wheel support optimized for resin-type abrasion elements.

Figures 11A and 11B.— They show, respectively, an elevation view and a plan view of a resin-type abrasion element and a straight profile of the abrasion section.

Figures 12A and 12B.— They show, respectively, an elevation view and a plan view of a resin-type abrasion element and a straight profile of the abrasion section with radially biased internal grooves.

Figures 13A and 13B.— They show, respectively, an elevation view, taken along the line A-B-C, and a plan view of the grinding wheel in two parts of the present invention exhibiting a holding system by means of screws between the abrasion element and the grinding wheel support.

Figures 14A and 14B.— They show, respectively, an elevation view, taken along the line A-B-C, and a plan view of the grinding wheel support of the present invention as shown in figures 13A and 13B.

Figures 15A and 15B.— They show, respectively, an elevation view and a plan view of the abrasion element of the present invention, as shown in figures 13A and 13B.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0038] Below is provided a description of an example of the invention, in which reference is made to the symbols employed in the figures.

[0039] First, a list with the references and the elements they refer to, is provided.

- 1: two-parts grinding wheel for machining;
- 2: grinding wheel support (fixed part);
- 3: abrasion element (detachable part);
- 4: abrasion section;
- 5: body of the abrasion element (paramagnetic section);
- 6: drive hole of the abrasion element;
- 7: balancing hole of the abrasion element;
- 8: round internal channelling slot;
- 9: intermediate section;
- 10: magnet;
- 11: drive pins;
- 12: channelling/extraction slot comprised in the grinding wheel support;
- 13: hole for holding the magnet and magnet cap;
- 14: magnet cap;
- 15: grinding wheel support body;
- 16: machine/support fastening means;
- 17: balancing hole of the fixed part;
- 18: internal section of the contact profile of the abrasion element;
- 19: external section of the contact profile of the abrasion element;
- 20: radially distributed grooves of the abrasion element;
- 21: biased and radially distributed grooves of the

abrasion element;

22: partial grooves of the abrasion element;

23: radially biased internal grooves of the resin-type abrasion element;

24A: horizontal flat surface of contact of the grinding wheel support (with the abrasion element);

24B: vertical flat surface of contact of the grinding wheel support (with the abrasion element);

25A: horizontal flat surface of contact of the abrasion element (with the grinding wheel support);

25B: vertical flat surface of contact of the abrasion element (with the grinding wheel support);

26: through hole of the abrasion element;

27: threaded hole of the support body of the grinding wheel;

28: threaded element.

[0040] In figure 1, is shown a perspective view of the grinding wheel in two separable parts for machining according to the present invention. The grinding wheel 1 comprises a grinding wheel support 2 (which corresponds to the fixed part which is fixed to the machining machine), and an abrasion element 3 (which corresponds to the detachable part). In the embodiment exhibited in figure 1, only the grinding wheel support 2 is customised for a specific model of machining machine known as Bovone. The grinding wheel support 2, according to the view provided in figure 1, comprises: a magnet 10; a drive pin 11; two channelling slots 12; a hole 13 for receiving the magnet; a magnet cap 14; a support body 15 of the grinding wheel; three balancing holes 17 of the grinding wheel support and; machine/support fastening means comprised by a fastening hole 16 complementing the machine/support fastening means comprised in the machine (not shown). The machine/support fastening means comprised in the machine can include a threaded rod, which goes through the hole 16, and a nut threaded internally. On the other hand, the abrasion element 3 is universal and independent from the machining machine. The abrasion element 3, according to the view provided in figure 1, has a circular shape and in addition, it comprises the following elements: an abrasion section 4; a body of the abrasion element 5 manufactured in its entirety with a paramagnetic material (paramagnetic section); an intermediate section 9; a drive hole 6 of the abrasion element; three balancing holes 7 of the abrasion element and an adhesive bonding (not shown) which binds the abrasion section 4 to the intermediate section 9, as well as the intermediate section 9 to the paramagnetic section 5.

[0041] In figure 1, it is further shown that both the grinding wheel support 2 and the abrasion element 3 comprise flat contacting surfaces between both elements, which maximize the contact area between both elements, in such a way that the reception and holding of the abrasion element by the grinding wheel support are optimized. In this way, the abrasion element 3 comprises a horizontal flat surface 25A and a vertical flat surface 25B contacting

the grinding wheel support 2, where both flat surfaces complement respectively a horizontal flat surface 24A and a vertical flat surface 24B comprised in the grinding wheel support 2. In order to optimize the reception and holding of the abrasion element 3 by the grinding wheel support 2, in the construction as well as in the operation processes, both pieces comprise a tolerance H7/h7 (defined according to the ISO system of tolerances and fits EN 20286-2:1993) or less in their vertical flat surfaces.

[0042] On the other hand, the magnets shown in figure 1 and that in addition are preferably used in all the embodiments of the invention, are neodymium magnets, which are permanent magnets based on the alloy Ne.Fe.B. They are very powerful magnets almost 6 more times than the ferrite magnets. Furthermore, it should be noted that the paramagnetic section shown in figure 1 is manufactured in steel, that is to say, a strong paramagnetic material (ferromagnetic) so it is able to stand the typical angular speed of this type of grinding wheels (between 2,500 and 3,500 r.p.m for a circular grinding wheel having a 150 mm diameter). With the embodiment shown in figure 1, the grinding wheel is able to stand a speed up to 109 m/s (13,878 r.p.m. for a 150 mm diameter; $r.p.m. = (V * 60000)/(\pi * D)$) without the abrasion element getting detached from the grinding wheel support.

[0043] The abrasion section 4 is arranged along the perimeter of the abrasion element 3 and represents the area making contact with the piece being machined. The profile of the contact area of the abrasion section 4 comprises a flat internal area 18 followed by a chamfer-type external area 19. The abrasion section 4 of figure 1 is a metallic-type, that is to say, the abrasion section 4 is made up of a mixture of diamond powder and metal. Since the machining implies different forms of treatment of the piece to be machined, for instance: edging, bevelling, smooth finishing, etc., the abrasion section 4 presents different embodiments, regarding its shape and composition, which are adapted to said forms of treatment. Some of the embodiments of the abrasion section are presented later on as embodiments of the invention.

[0044] In figures 2A and 2B are respectively shown, an elevation view and a plan view of the grinding wheel 1 in two parts of the present invention shown in figure 1. To represent the elevation view, a cut has been practiced along the line A-B shown in the plan view. In the specific case of figures 2A and 2B, the abrasion section 4 of the grinding wheel 1 in two parts for machining is configured specifically to machine sheet glass. The two parts of the grinding wheel 1 shown in figures 2A and 2B are joined together in a working configuration to carry out the machining (edging and bevelling) of sheet glass. The embodiment shown in figures 2A and 2B comprises the grinding wheel support 2, which is customised for the machining machine model known as Bovone. The grinding wheel support 2, according to the view exhibited in figures 2A and 2B, comprises: six magnets 10; three drive pins 11; three channelling/extraction slots 12; six holes 13 for receiving the magnets; six magnets caps 14; a

support body 15 of the grinding wheel; a hole 16 for fastening the grinding wheel support body as a machine/support fastening mean and; three balancing holes of the grinding wheel support 17.

[0045] On the other hand, the abrasion element 3, which is universal and independent from the machining machine, has a circular shape and besides it comprises the following elements: an abrasion section 4; a paramagnetic section 5 (body of the abrasion element); an intermediate section 9; three drive holes 6 of the abrasion element; three balancing holes 7 of the abrasion element and a adhesive bonding (not shown), which binds the abrasion section 4 to the intermediate section 9, as well as the intermediate section 9 to the paramagnetic section 5. The abrasion section 4 is arranged along the perimeter of the abrasion element 3 and represents the area making contact with the piece being machined. The profile of the contact area of the abrasion section 4 comprises a flat internal area 18 followed by a chamfer-type external area 19.

[0046] In figures 3A and 3B are respectively shown, an elevation view taken along the line C-D and a plan view of the grinding wheel support of the present invention, as shown in figure 1. The grinding wheel support 2, according to the view exhibited in figures 3A and 3B, comprises: six magnets 10 distributed equidistantly along the circular perimeter of the grinding wheel support 2; three drive pins 11 distributed equidistantly along the circular perimeter of the grinding wheel supports 2; six holes 13 for receiving the magnets; six magnet caps 14; a support body 15 of the grinding wheel; three channelling/extraction slots 12 distributed equidistantly along the circular perimeter of the grinding wheel support 2 connecting the internal and external parts of the grinding wheel body 15; a hole 16 for fastening the grinding wheel support body 16 and; three balancing holes 17 of the grinding wheel support.

[0047] In Figures 4A and 4B are respectively shown, an elevation view and a plan view of the abrasion element of the present invention, as shown in figure 1. The abrasion element 3 has a circular shape and in addition, it comprises the following elements: an abrasion section 4; a paramagnetic section 5 (the body of the abrasion element); an intermediate section 9; three drive holes 6 of the abrasion element distributed equidistantly along the circular perimeter of the abrasion element; three balancing holes 7 of the abrasion element and; an adhesive bonding (not-shown), which binds the abrasion section 4 to the intermediate section 9, as well as the intermediate section 9 to the paramagnetic section 5. The abrasion section 4 is arranged along the perimeter of the abrasion element 3 and represents the area making contact with the piece being machined. The profile of the contact area of the abrasion section 4 comprises a flat internal area 18 followed by a chamfer-type biased external area 19.

[0048] Both, the material with which the abrasion section 4 is materialized and the profile shape of the abrasion section 4 are defined by the type of piece that is going

to be machined and by the kind of machining procedure that is going to be carried out on that piece. In this way, the abrasion section shown in figures 1, 2A-2B, 4A-4B to 9A-9B is of a metallic-type, that is to say, is made with a composition of diamond powder and metal, even though the shapes of the profiles shown in said figures, are different.

[0049] In figures 5A and 5B are respectively shown" an elevation view and a plan view of an abrasion element 3, wherein the abrasion section 4 comprises a chamfer-type biased internal area 18 followed by a chamfer-type biased external area 19.

[0050] In figures 6A and 6B are respectively shown, an elevation view and a plan view of an abrasion element 3, wherein the abrasion section 4 comprises a flat internal area 18 followed by a chamfer-type biased external area 19. The abrasion element 3 shown in figures 6A y 6B, is different from those shown in the preceding figures in that the balancing holes are carried out from the lower part of the abrasion element 3 instead of from the upper part thereof. The abrasion element 3 is also different from those shown in the preceding figures in that its does not comprise an intermediate section 9 and in that it comprises radially arranged grooves 20.

[0051] In figures 7A and 7B are respectively shown, an elevation view and a plan view of an abrasion element 3, wherein the abrasion section 4 comprises a flat internal area 18 followed by a chamfer-type biased external area 19 and biased and radially distributed grooves 20.

[0052] In figures 8A and 8B are respectively shown, an elevation view and a plan view of an abrasion element 3, presenting a semi-round abrasion profile of the abrasion area 4, where the abrasion element 3 further comprises partial grooves 22 radially distributed along the perimeter of the abrasion element 3.

[0053] In figures 9A and 9B are respectively shown, an elevation view and a plan view of an abrasion element 3, presenting a rounded profile of the abrasion section 4. The abrasion element 3 further comprises six grooves 21 radially distributed, biased and equidistant along the perimeter of the abrasion section 4.

[0054] Another type of material with which the abrasion section 4 is materialised is the resin-type. The resin-type is a compound based on mixing diamond powder with polymeric resins. The machining process of pieces with this type of abrasion element 3 is optimised with the type of grinding wheel support 2 disclosed in figures 10A and 10B. This grinding wheel support 2 further comprises on the grinding wheel support 2 shown in figures 3A and 3B, a channelling internal circular slot 8 in communication with the three channelling/extraction slots 12 comprised in the grinding wheel support. This channelling internal circular slot 8 improves the disposal of wastes generated during the machining process.

[0055] In figures 11A and 11B are respectively shown, an elevation view and a plan view of a resin-type abrasion element 3, presenting a straight profile of the abrasion section. On the other hand, in figures 12A and 12B are

respectively shown, an elevation view and a plan view of a resin-type abrasion element 3, as shown in figures 11A and 11B, wherein radially biased internal grooves 23 have been practised.

[0056] In figures 13A and 13B are respectively shown, an elevation view, taken along the line A-B-C, and a plan view of the grinding wheel in two parts of the present invention, for a holding system through screws between the abrasion element and the grinding wheel support. That is to say, this embodiment is different from the one shown in figures 2A and 2B, in that the six magnets assembly is replaced by three threaded elements (screws) assembly 28. This way, each threaded element 28 goes through the through holes 26 of the abrasion element to be finally introduced in the threaded holes 27. Given that there are no magnets, the material used to manufacture the body of the abrasion element does not need to be necessarily a paramagnetic material. In figures 14A and 14B, are respectively shown" an elevation view, taken along the line A-B-C, and a plan view of the grinding wheel support of the present invention, as shown in figures 13A and 13B, where the threaded holes 27 and the threaded elements 28 can be observed. In figures 15A and 15B are respectively shown, an elevation view and a plan view of the abrasion element of the present invention, as shown in figures 13A and 13B, where the through holes 26 can be observed.

30 Claims

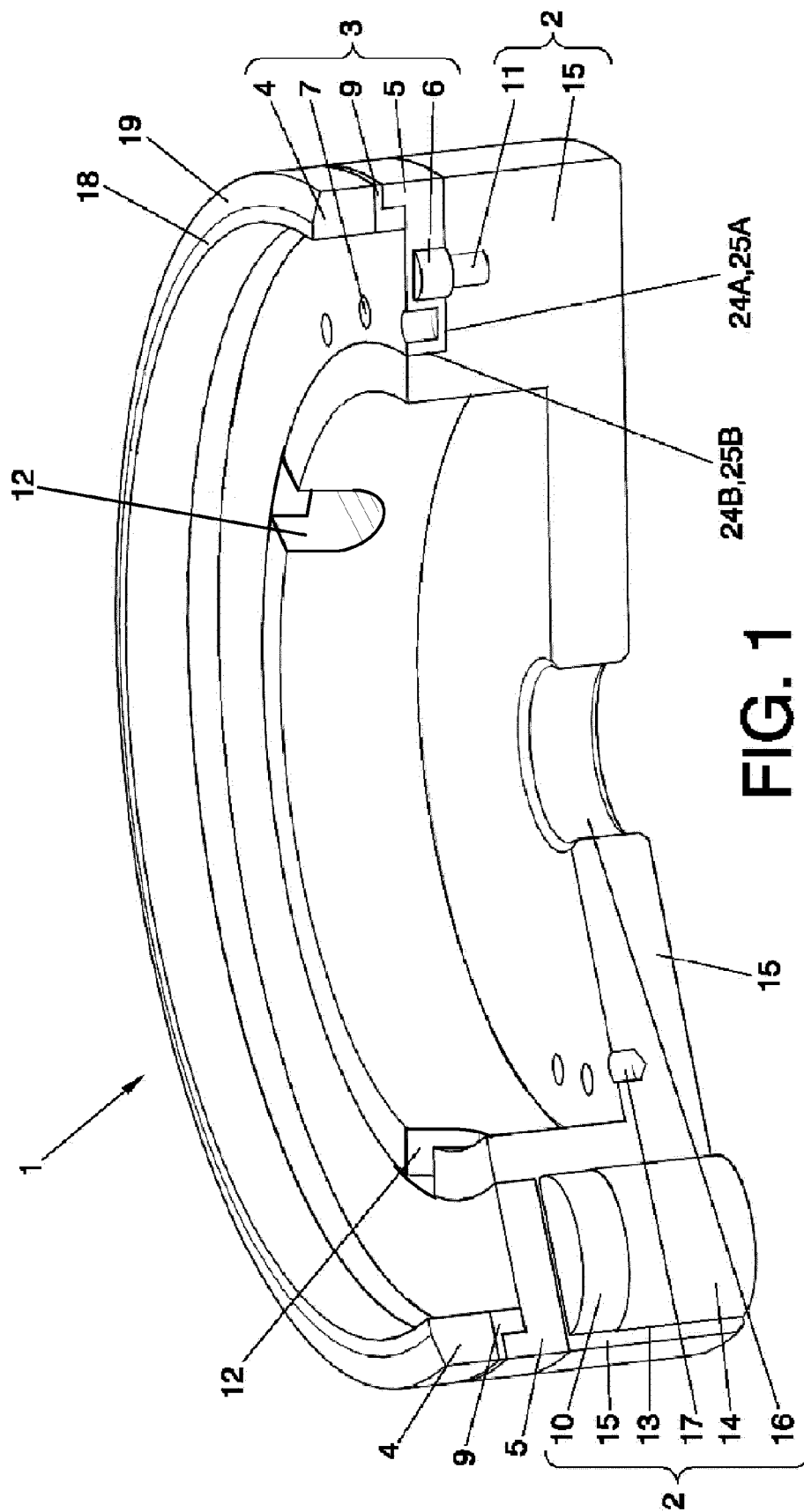
1. Grinding wheel support (2) **characterised in that** it comprises a support body (15), which is shaped to receive and hold an abrasion element (3) such that said abrasion element (3) is interchangeable.
2. Grinding wheel support (2), according to claim 1, wherein the support body (15) further comprises holding means (10, 11, 26, 27, 28) to hold the abrasion element (3).
3. Grinding wheel support (2), according to claim 2, wherein the holding means are selected among at least one magnet (10), at least one drive pin (11) and a combination thereof.
4. Grinding wheel support (2), according to claim 2, wherein the holding means comprise at least a threaded hole (27) realised in the support body of the grinding wheel (5) and at least a threaded element (28), such that said threaded element goes through a hole (26) provided in the abrasion element for being held in the threaded hole.
5. Grinding wheel support (2), according to any one of the preceding claims, wherein the support body (15) further comprises at least a balancing hole (17) which keeps balanced said support body (15) when

said support body (15) rotates at a predetermined angular speed.

6. Grinding wheel support (2), according to any one of the preceding claims, wherein the support body (15) further comprises at least one surface making contact with the abrasion element, having a predetermined shape and size, so that said contact surface complements a contact surface comprised in the abrasion element. 5
7. Grinding wheel support (2), according to any one of the preceding claims, wherein the support body (15) further comprises at least a channelling/extraction slot (12) to channel outside the support body (15) any waste produced during a machining process and, in addition, said channelling/extraction slot (12) allows a fast extraction of the abrasion element (3). 10
8. Abrasion element (3) **characterised in that** it comprises a body of the abrasion element (5) such that said body of the abrasion element (5) is shaped to be received and held by the support body (15) comprised in the grinding wheel support (2), as defined in any one of the claims 1 to 7. 15
9. Abrasion element (3) according to claim 8, wherein the abrasion element comprises a paramagnetic zone that shapes, at least partially, the body of the abrasion element, such that the abrasion element (5) is held by the at least one magnet comprised in the grinding wheel support (2) as defined in any one of the claims 1 to 7. 20
10. Abrasion element (3) according to claim 8 or 9, wherein the abrasion element (3) further comprises at least one surface making contact with the grinding wheel support having a predetermined shape and size. 25
11. Abrasion element (3), according to any one of the claims 8 to 10, wherein the abrasion element (3) further comprises a drive hole (6), which complements the drive pin (11) defined in claim 4. 30
12. Abrasion element (3), according to any one of the claims 8 to 11, wherein the abrasion element (3) further comprises an abrasion section (4) manufactured in a predetermined compound having abrasive properties, where said abrasion section (4) is located on the body of the abrasion element (5). 35
13. Abrasion element (3), according to any one of the claims 8 to 12, wherein the abrasion element (3) further comprises at least a through hole (26) in correspondence with the threaded hole (27) defined in claim 4. 40

14. Abrasion element (3), according to any one of the claims 8 to 13, wherein the body of the abrasion element (5) further comprises at least a balancing hole (7) which keeps balanced the abrasion element (3) when said abrasion element (3) rotates at a predetermined angular speed. 45

15. Two-parts grinding wheel for machining (1) **characterised in that** it comprises a grinding wheel support (2) as claimed in any one of the claims 1 to 7, and an abrasion element (3) as claimed in any one of claims 8 to 14. 50



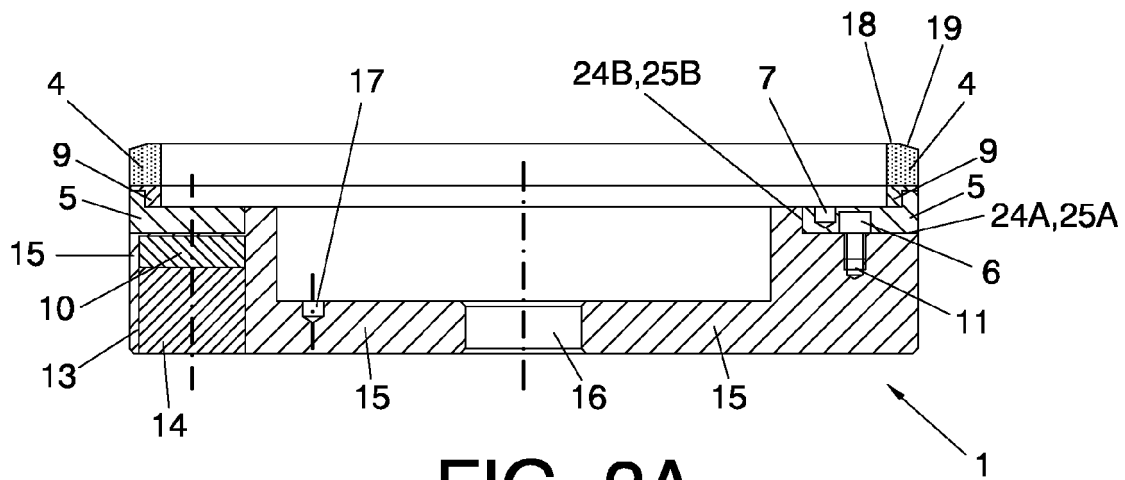


FIG. 2A
A-B

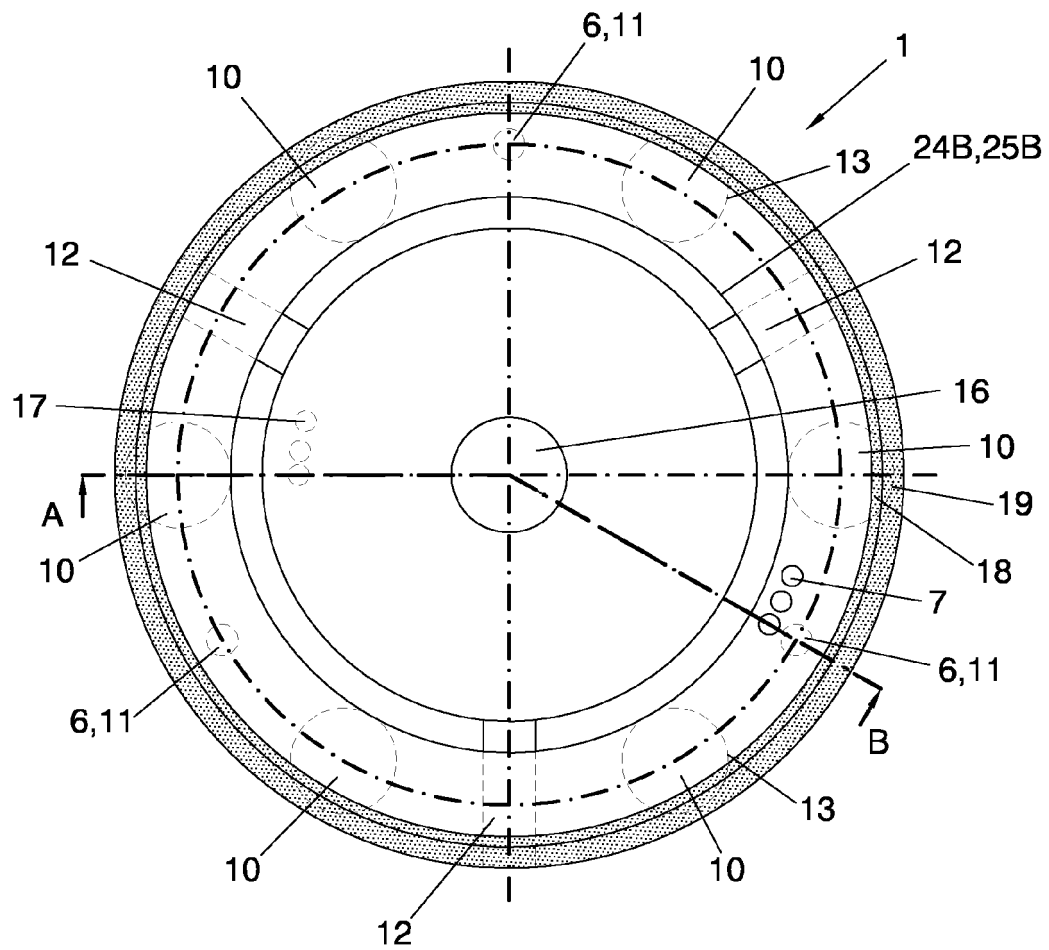


FIG. 2B

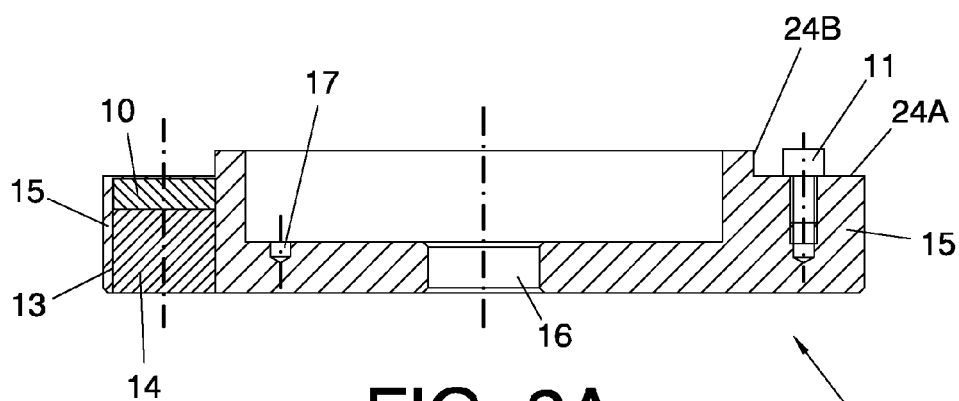


FIG. 3A

C-D

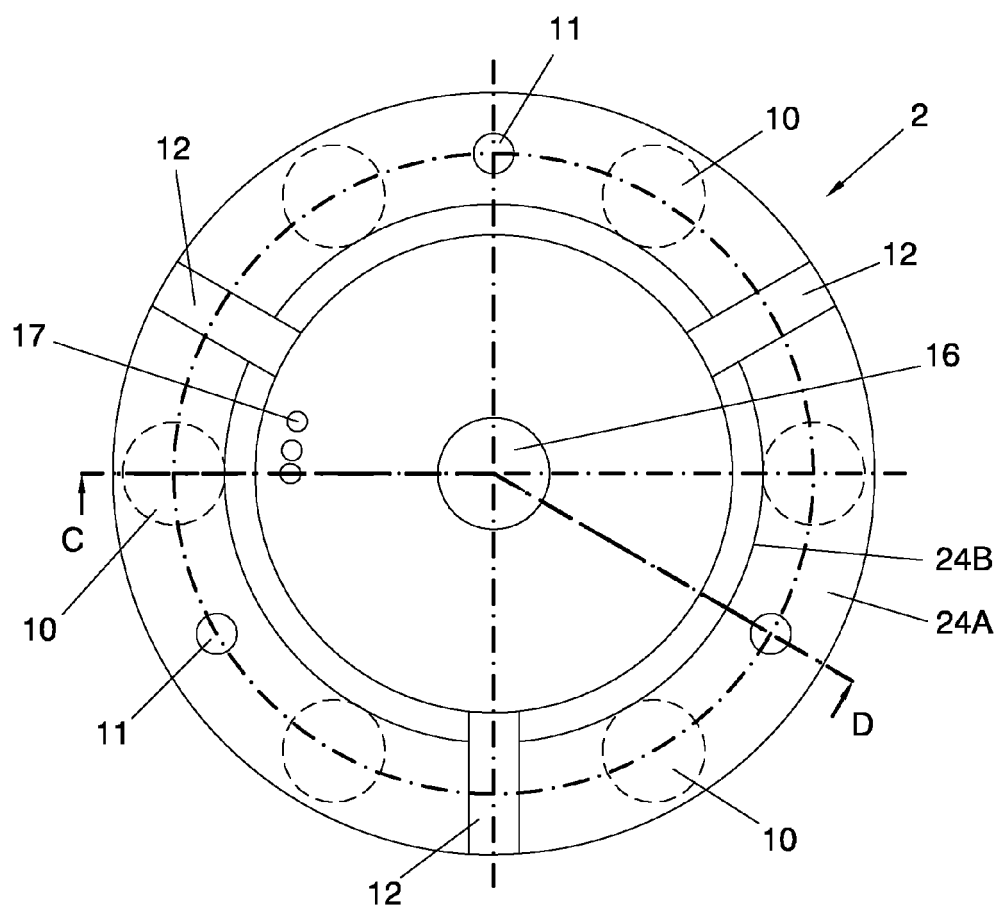


FIG. 3B

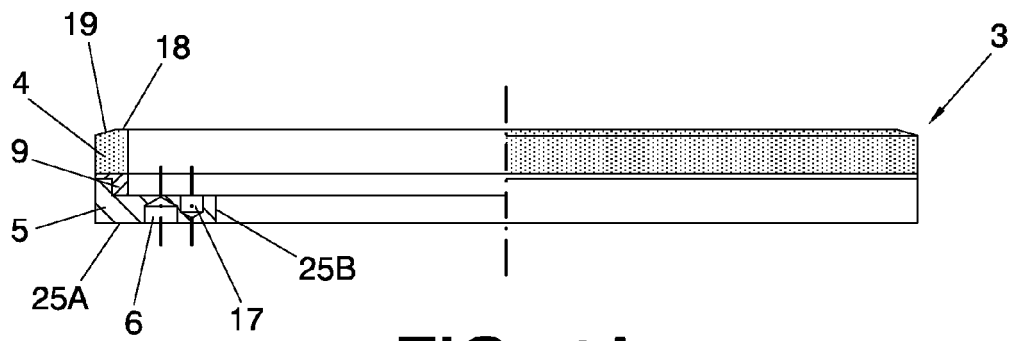


FIG. 4A

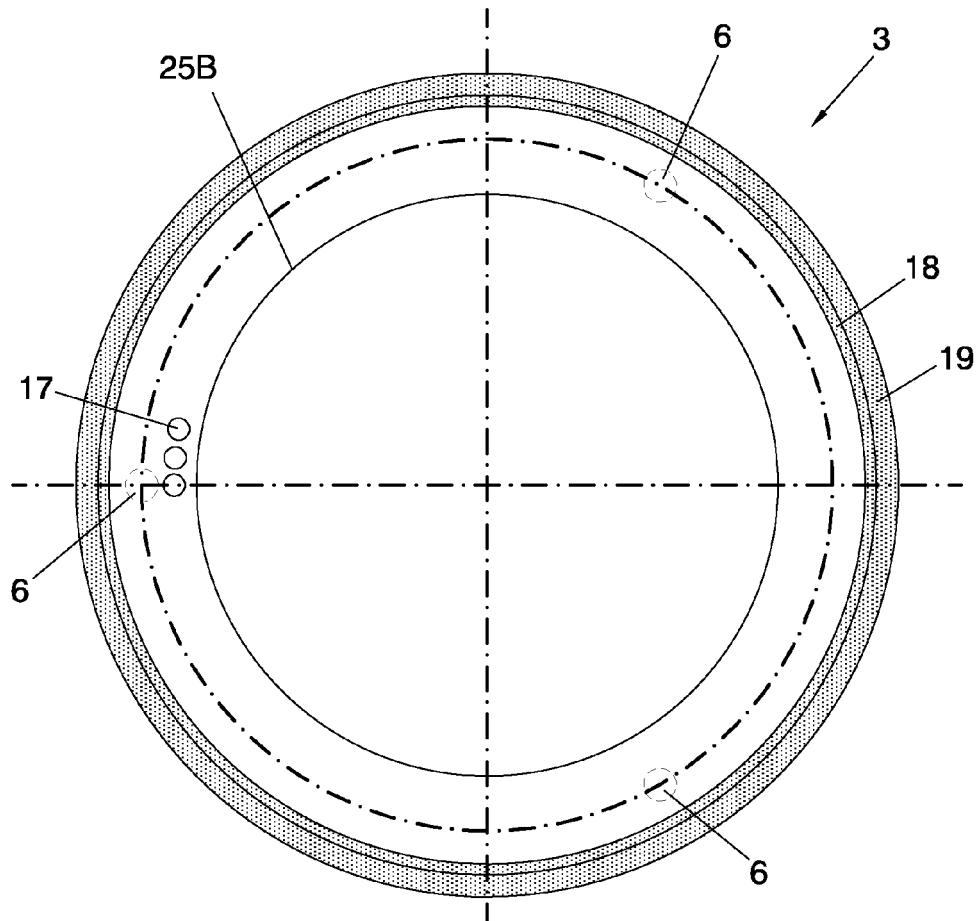


FIG. 4B

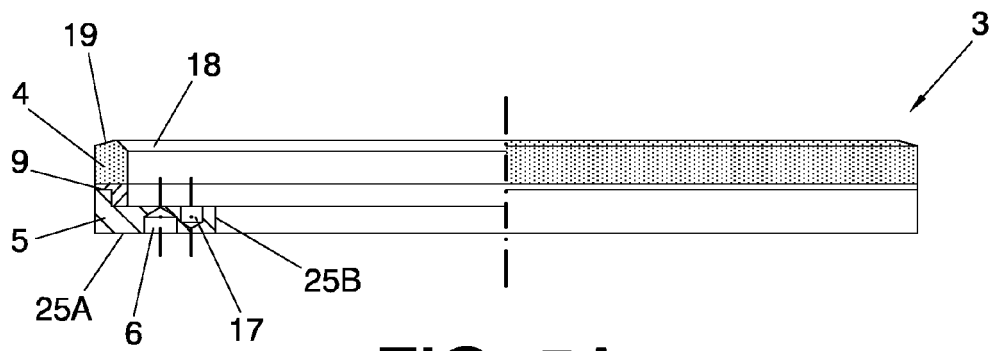


FIG. 5A

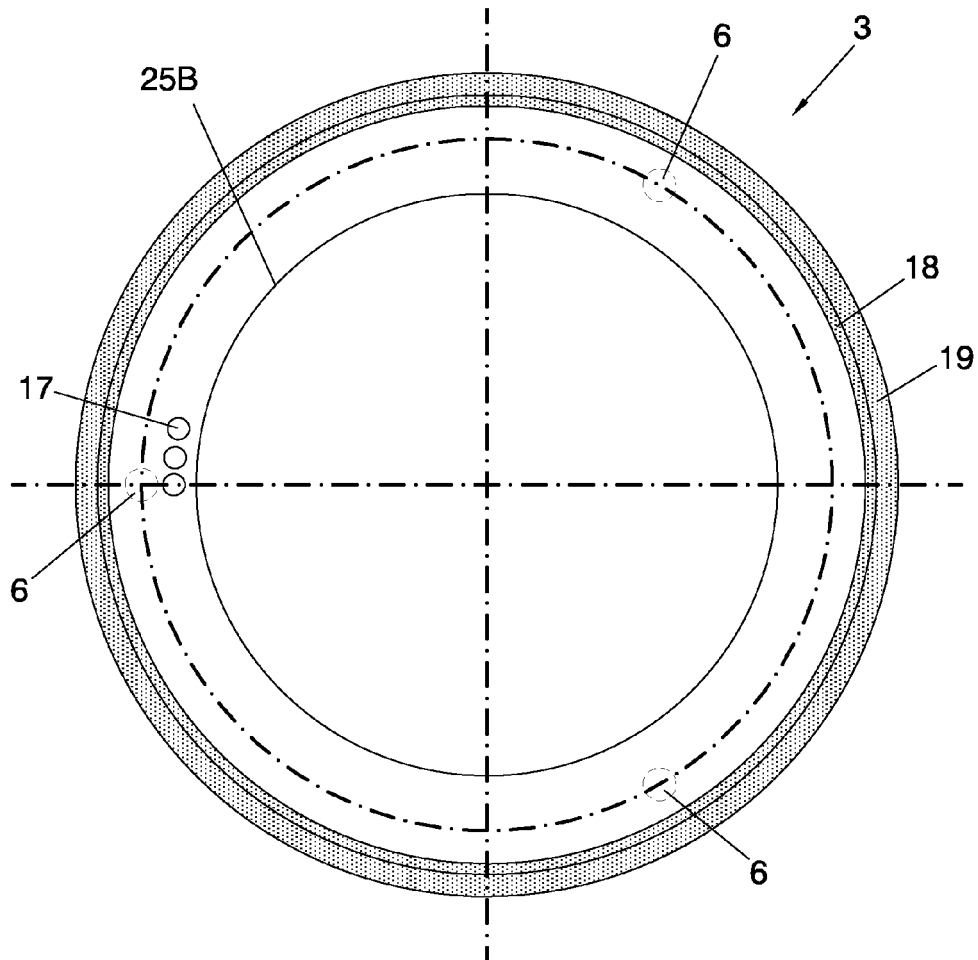


FIG. 5B

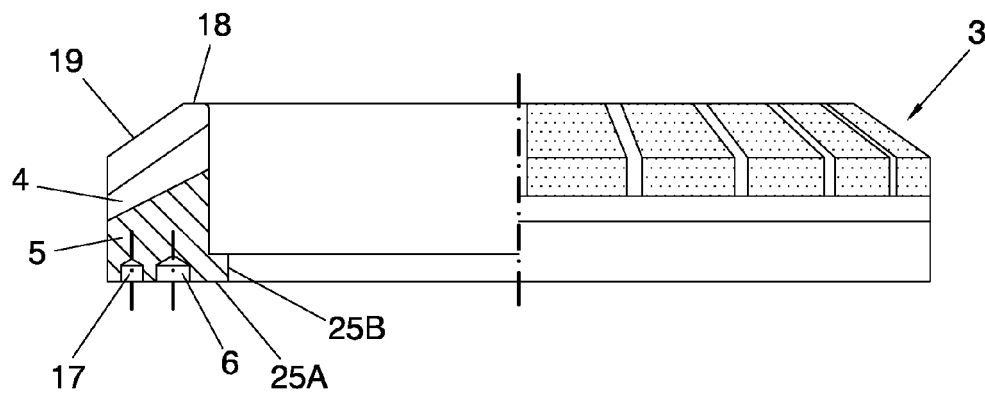


FIG. 6A

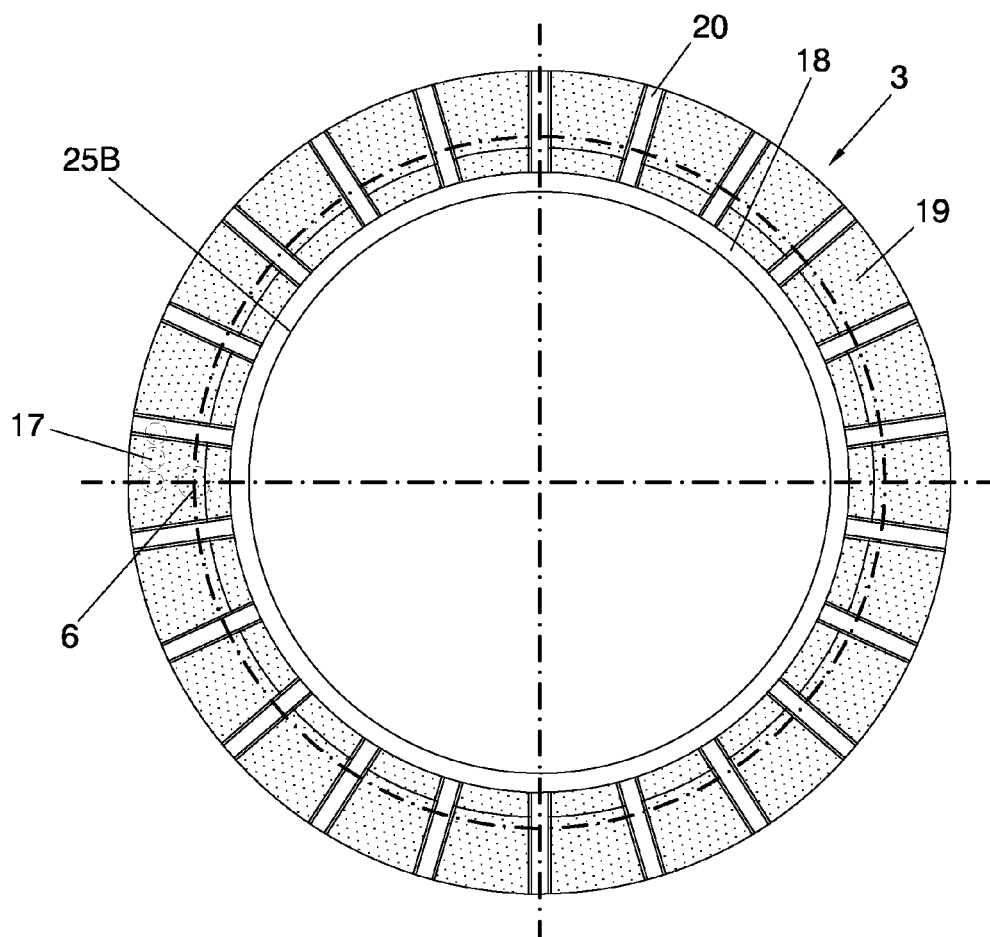


FIG. 6B

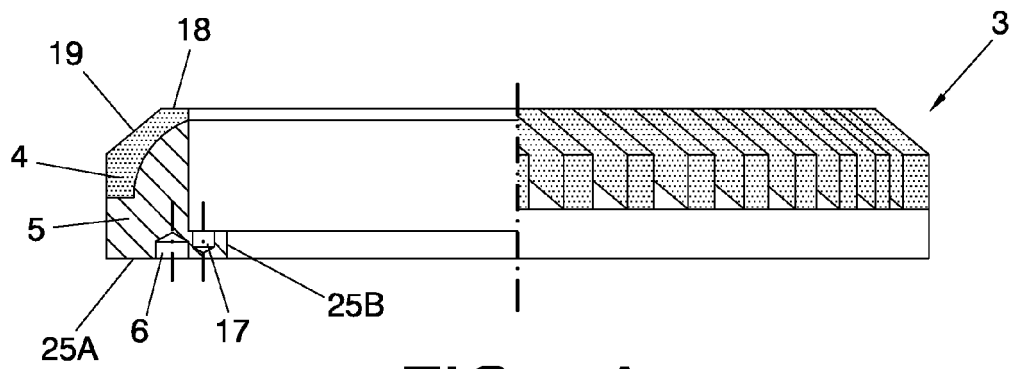


FIG. 7A

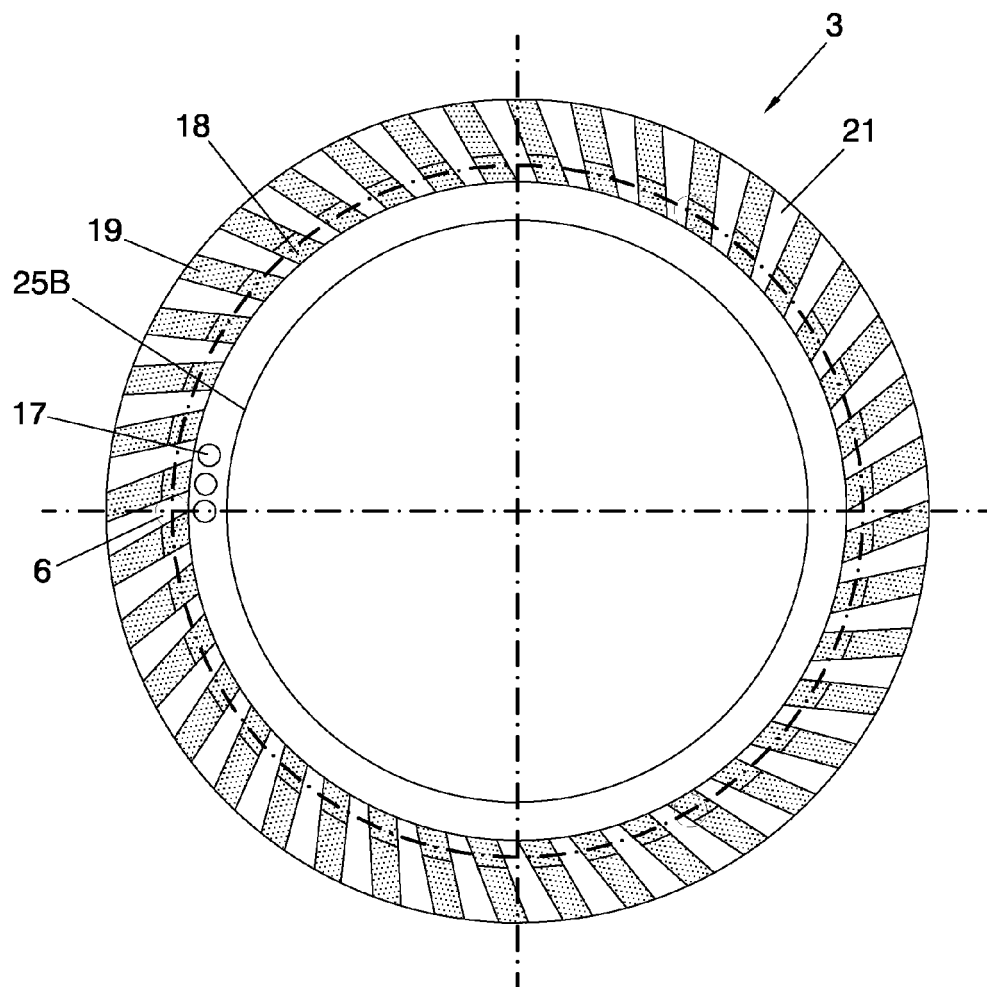


FIG. 7B

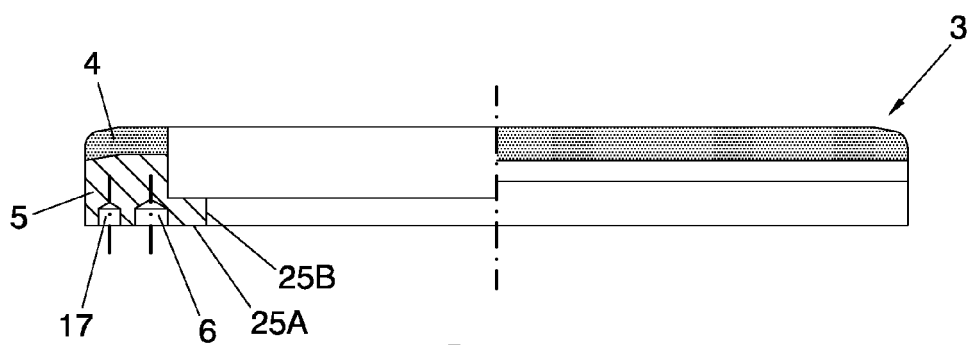


FIG. 8A

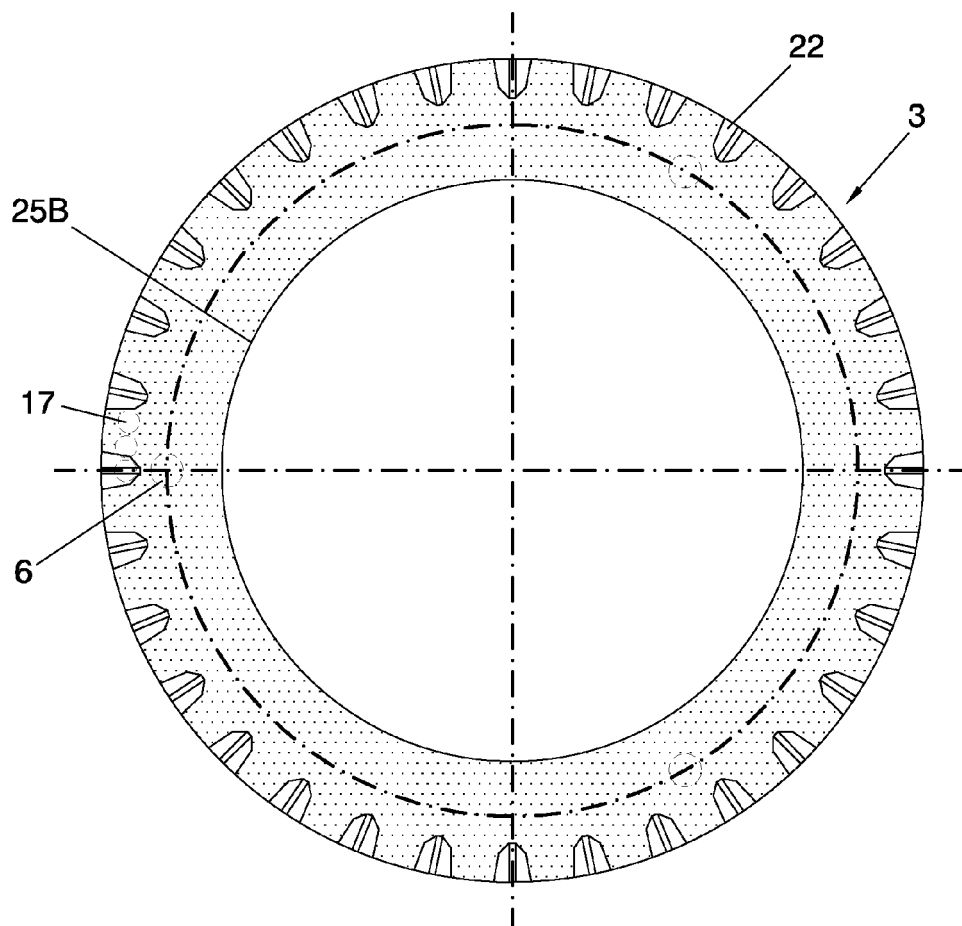


FIG. 8B

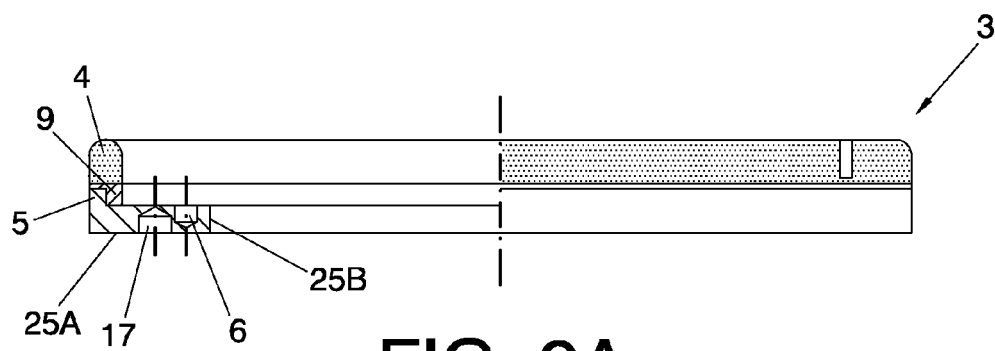


FIG. 9A

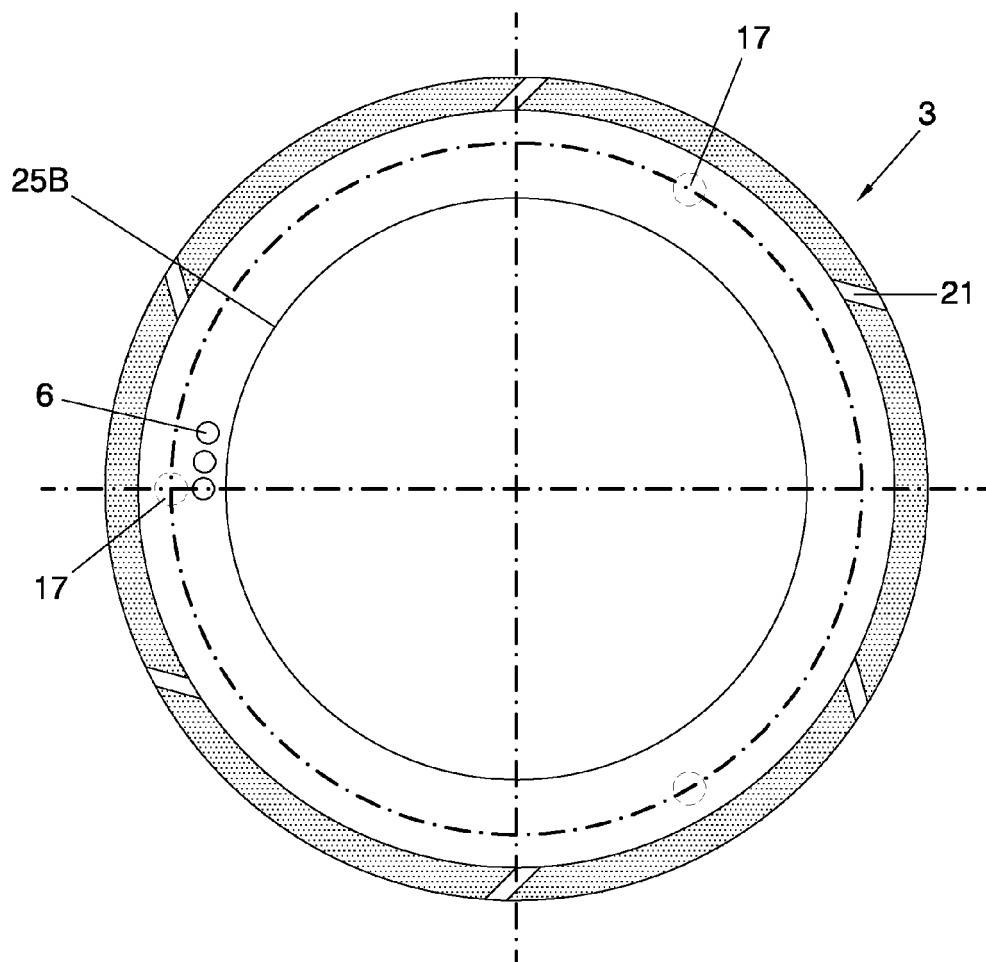


FIG. 9B

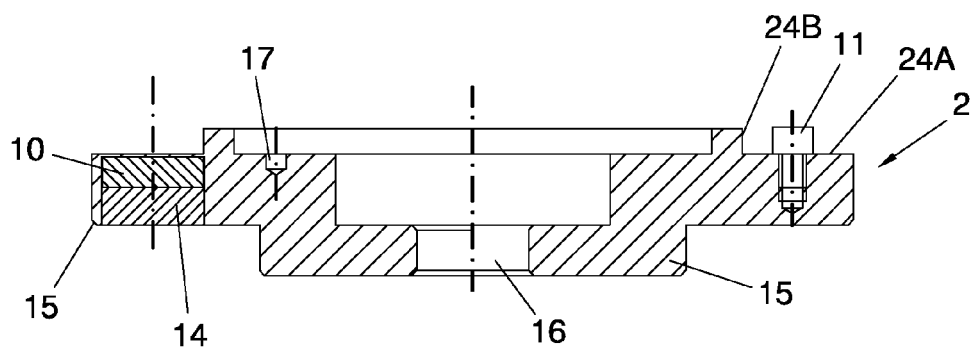


FIG. 10A

E-F

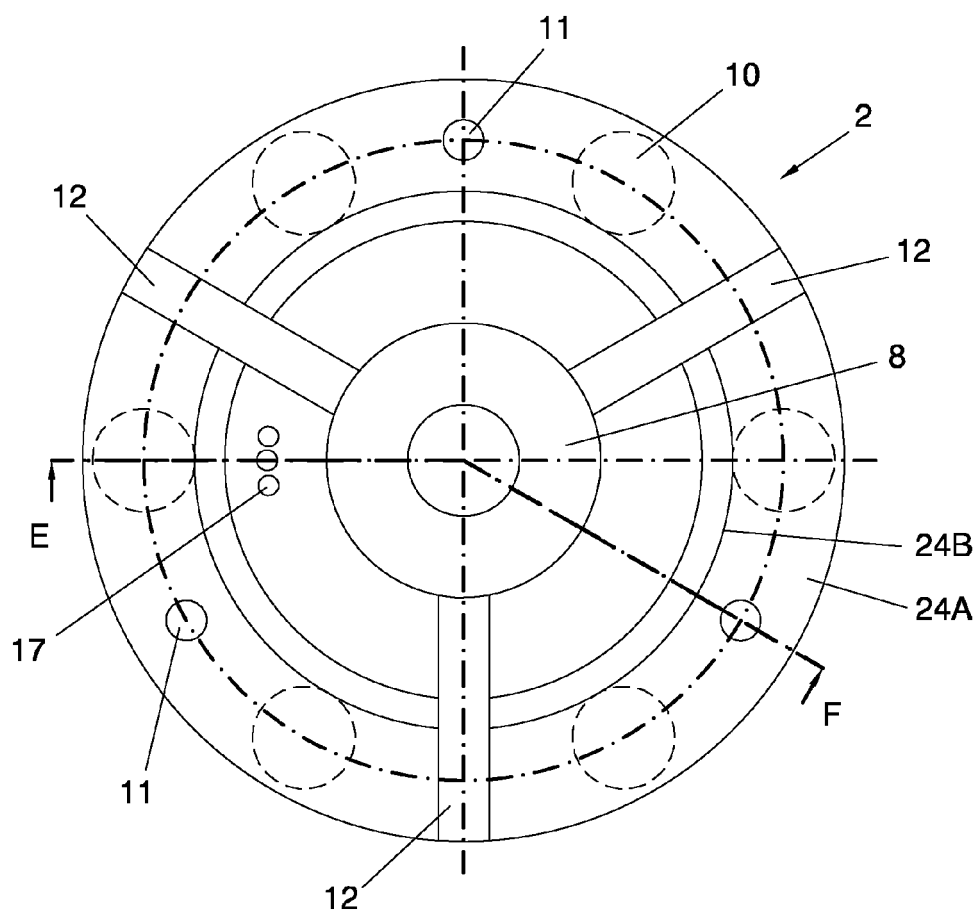


FIG. 10B

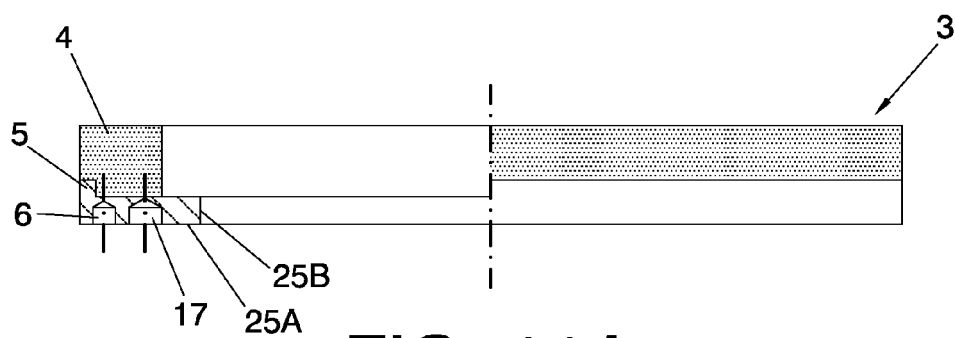


FIG. 11A

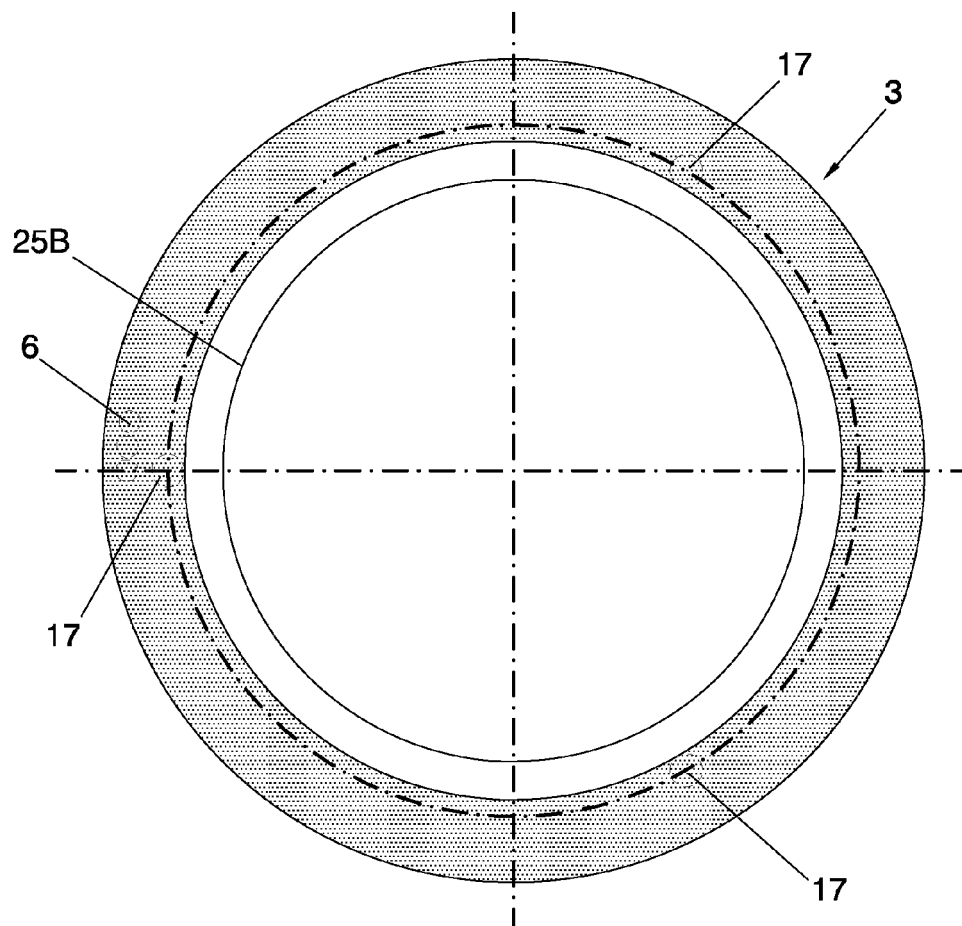
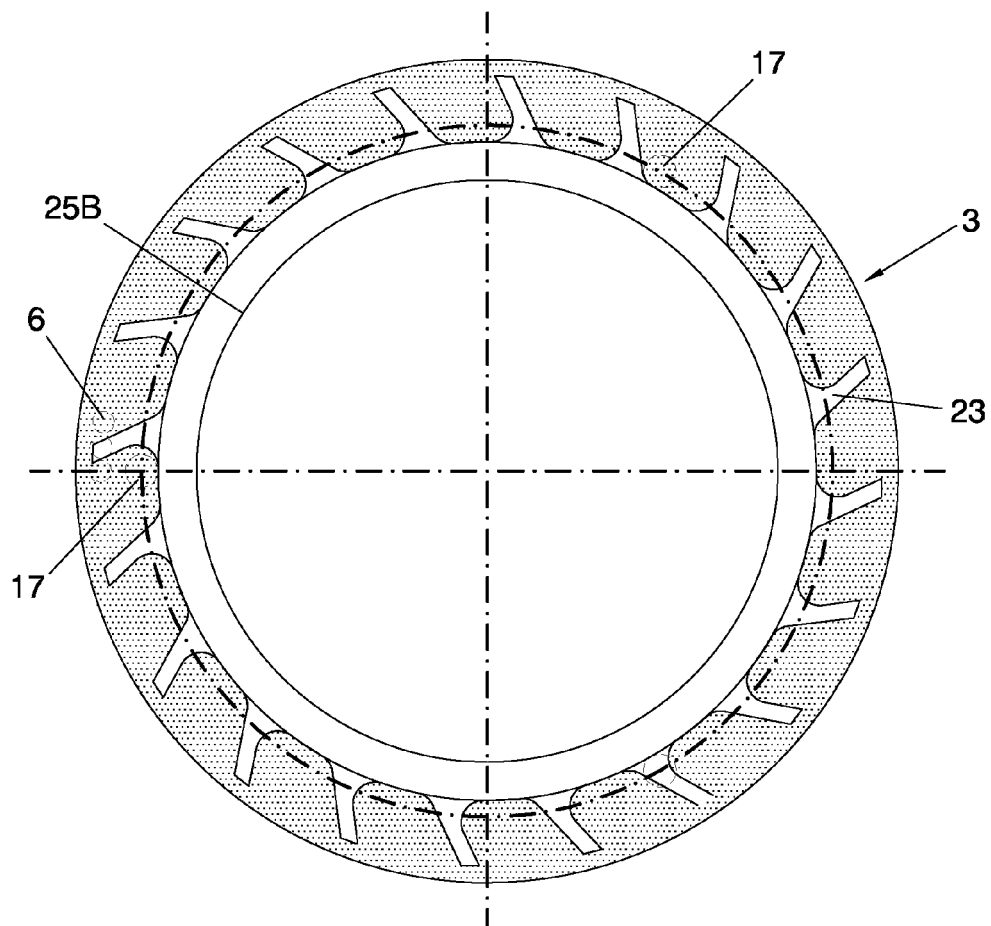
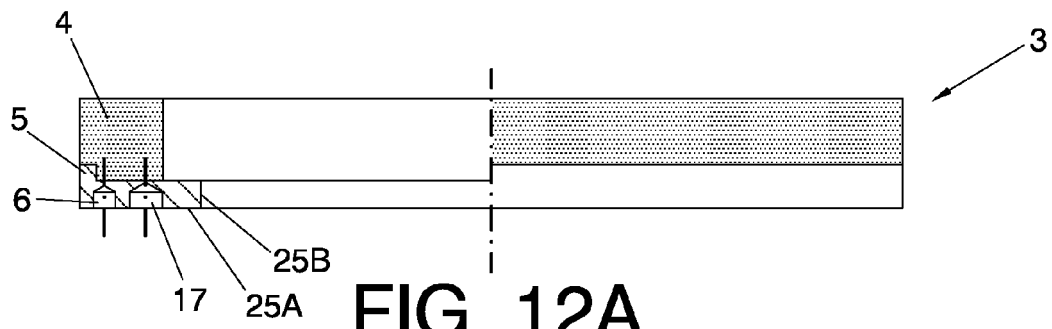


FIG. 11B



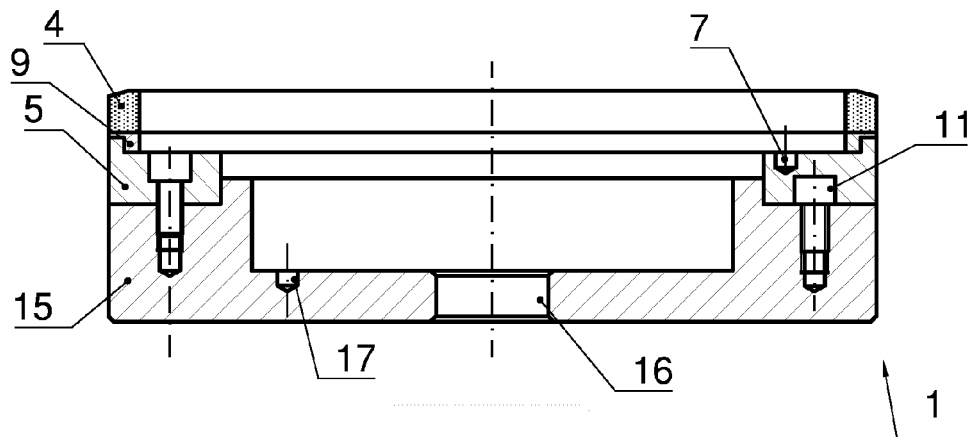


FIG. 13A

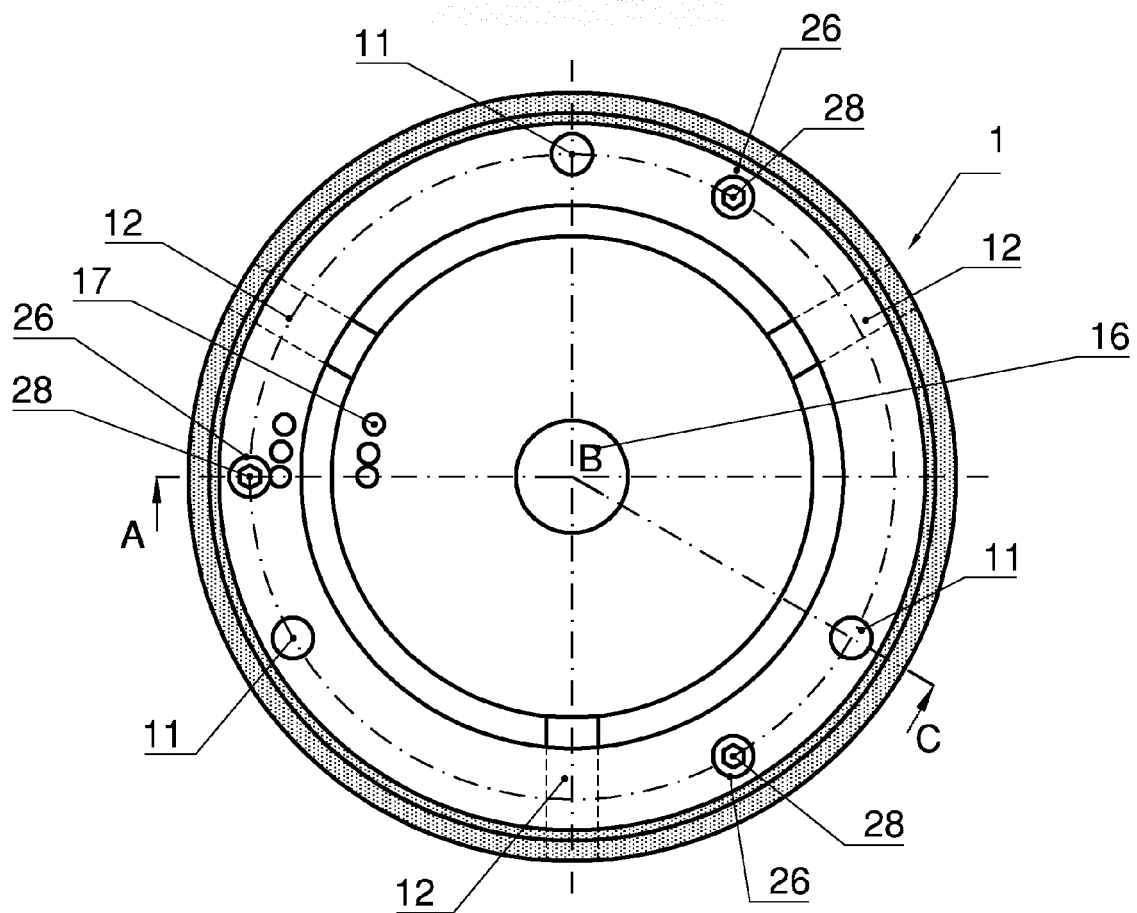


FIG. 13B

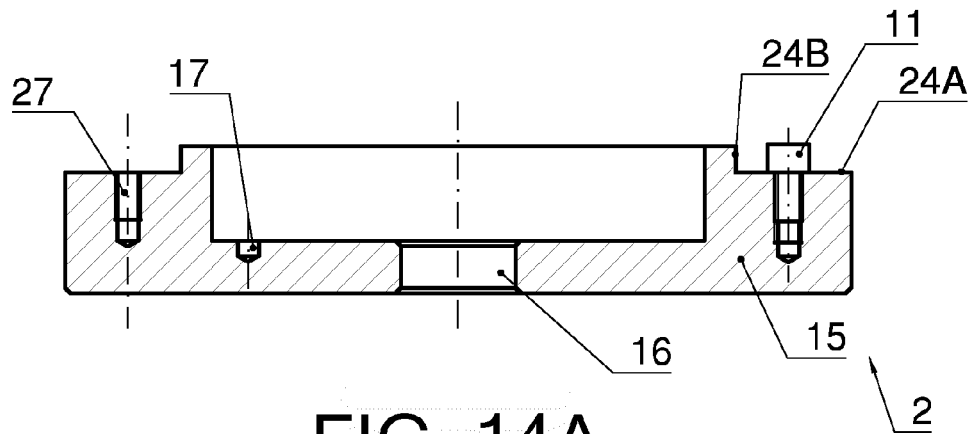


FIG. 14A

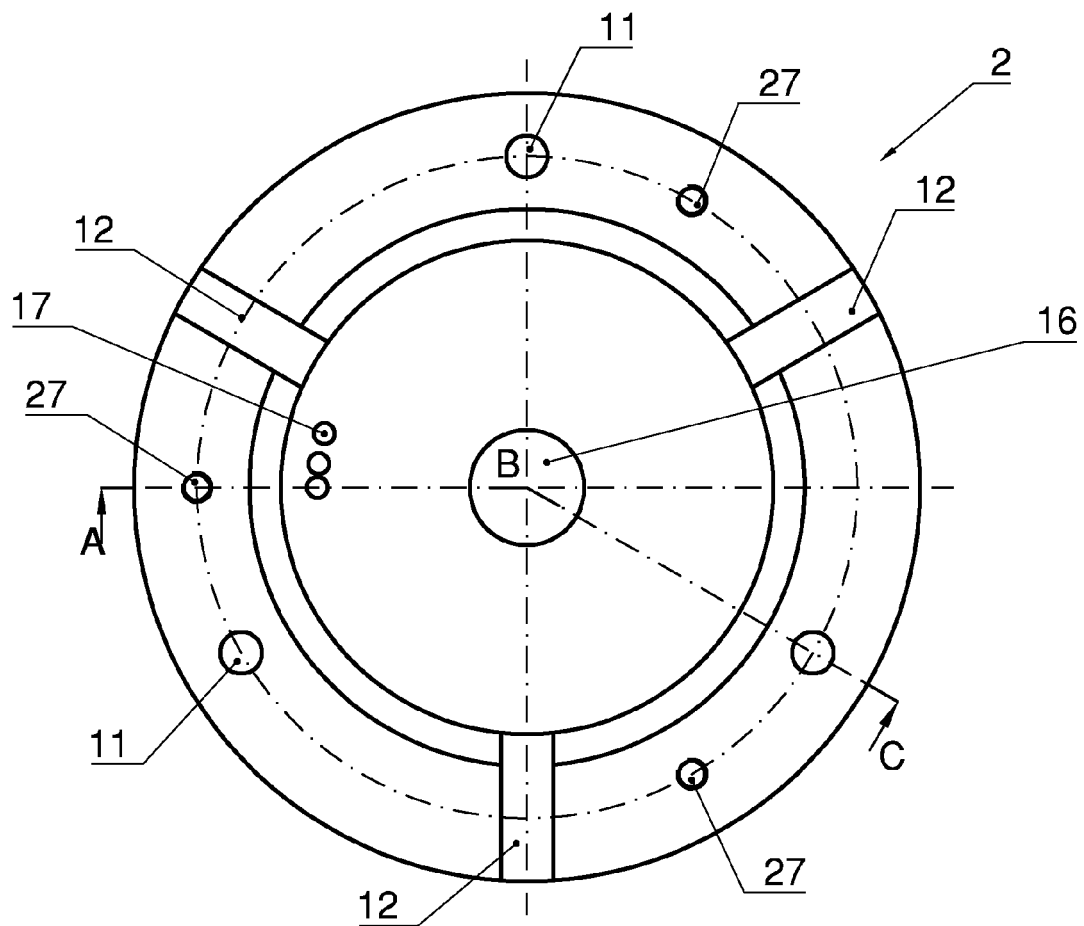


FIG. 14B

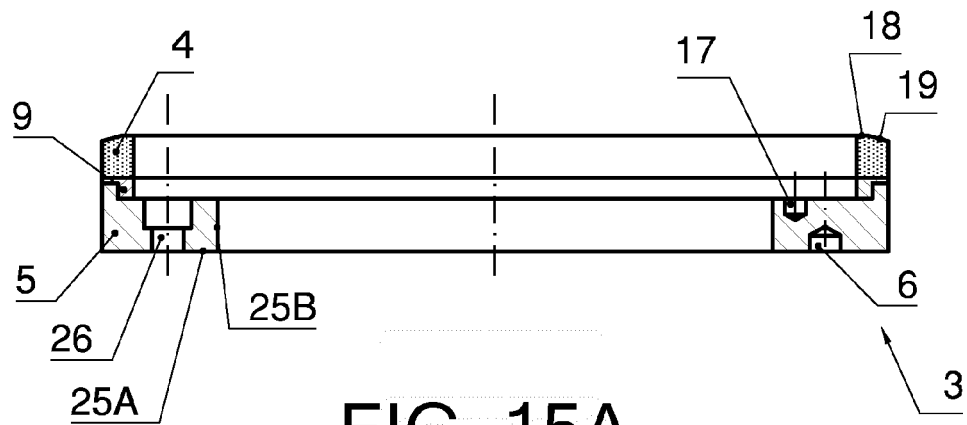


FIG. 15A

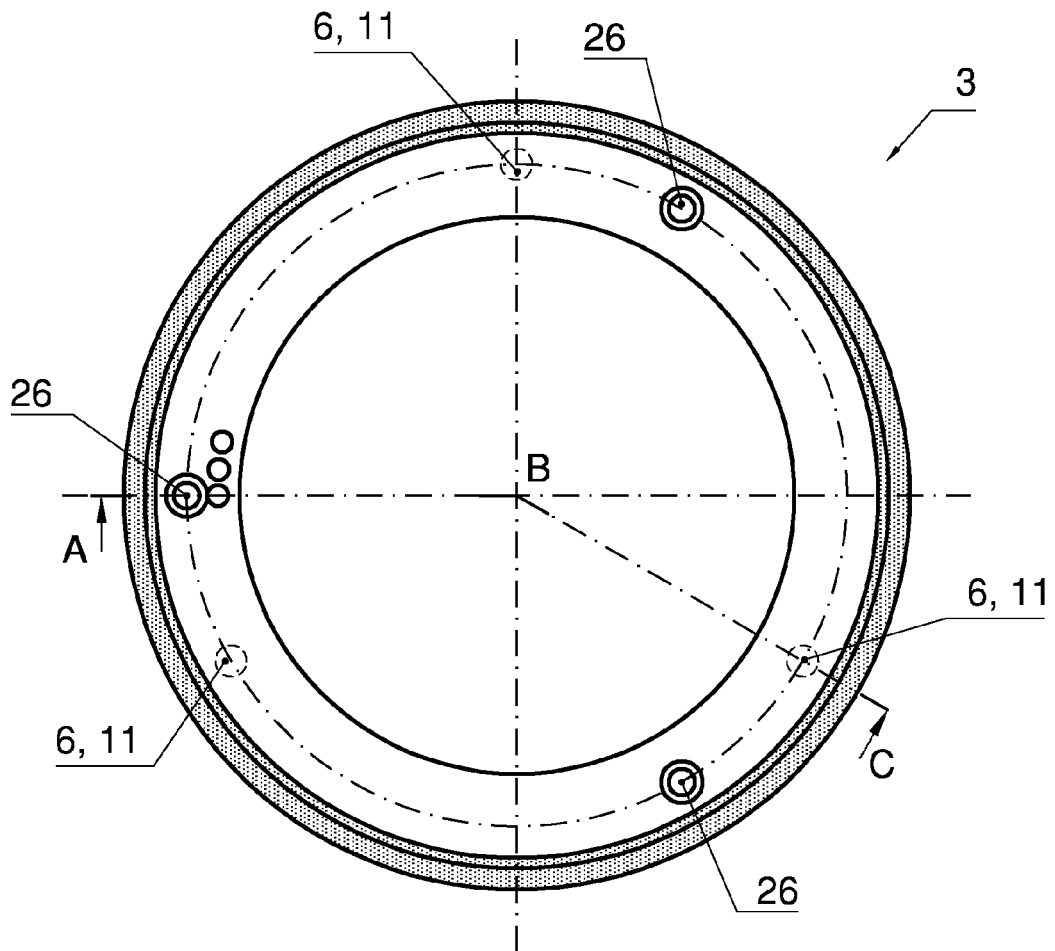


FIG. 15B

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4907376 A [0003]