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(54) A SEALING ASSEMBLY FOR A VANE SET OF A GAS TURBINE ENGINE AND GAS TURBINE ENGINE COMPRISING SUCH A SEALING ASSEMBLY

DICHTUNGSANORDNUNG FÜR EINEN SCHAUFELSATZ EINES GASTURBINENMOTORS UND GASTURBINENMOTOR MIT EINER SOLCHEN DICHTUNGSANORDNUNG

ENSEMBLE D'ÉTANCHÉITÉ POUR UN JEU D'AUBES D'UN MOTEUR À TURBINE À GAZ ET MOTEUR À TURBINE À GAZ COMPRENANT UN TEL ENSEMBLE D'ÉTANCHÉITÉ

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Description

TECHNICAL FIELD

[0001] The present invention relates to a sealing assembly for a vane set of a gas turbine engine.

BACKGROUND

[0002] As it is known, a gas turbine engine comprises a stator and a rotor, which is configured to rotate about a longitudinal axis inside the stator. The rotor comprises a shaft; and a plurality of blade sets distributed along the longitudinal axis and supported by the shaft that in some embodiment is made of a set of clamped discs. The stator comprises a casing; and a plurality of vane sets, each of which is interposed between two blade sets and is supported by the casing.

[0003] A hot gas stream under high pressure flows and expands through the vanes and the blades and determines the rotation of the rotor with respect to the stator.

[0004] The inner ends of the vanes of some sets of vanes engage a respective U-shaped sealing ring, which is located in a corresponding annular cavity of the shaft. The U-shaped sealing ring is made of a plurality of U-ring sectors joined one another and together with the vanes of the respective set defines a closed spaced called "plenum". An airstream flows inside the vanes, through the plenum and in the cavity through holes in order to avoid the ingestion of the hot gas stream into the cavity. For this reason, the airstream is called "sealing air".

[0005] Many solutions have been devised in order to properly direct flow of sealing air in the most efficient way such as in US 6 082 961 A or in EP 3,663,522 A1, the latter belonging to the same applicant. The solution proposed in the above-referenced patent application has proved to be rather efficient in preventing the ingestion of the hot gas stream. However, this solution is not always applicable in the existing gas turbine engine.

SUMMARY OF THE INVENTION

[0006] It is an aim of the present invention to provide a sealing assembly for engaging a vane of a gas turbine engine, which is efficient in mitigating the ingestion of hot gas stream into a cavity surrounding the easing assembly.

[0007] According to the present invention as defined by independent claim 1 there there is provided a sealing assembly for engaging a number of vanes of a gas turbine engine, the sealing assembly comprising:

- a U-shaped sector, which is configured for engaging at least one vane so that the U-shaped sector and the vane enclose a plenum, which communicates to the outside trough at least one through hole for conveying an airstream outside the plenum; and
- at least one cover plate configured for being coupled to the U-shaped sector for guiding the airstream in a given direction.

[0008] In this way, it is possible to change the geometry of the sealing assembly in order to vary the direction of the airstream also in existing gas turbine engine with a minimal modification of the design. In addition to that, the cover plate reduces the axial gap in a cavity designed to house the sealing assembly. Both effects mitigate the ingestion of hot gas.

[0009] Still according to independent claim 1, the U-shaped sector is provided with said at least one through hole.

[0010] In this way, the airstream is channeled by the cover plate in the most convenient position for mitigating the ingestion of hot gases.

[0011] In particular, the U-shaped sector has a typical configuration comprising an upstream wall; and a downstream wall, which are provided with respective main faces and respective circumferential faces and conveniently the at least one cover plate is configured for being coupled to the upstream wall and/or to the downstream wall.

[0012] Conveniently, the cover plate is L-shaped and in contact with the U-ring sector along the main face and the circumferential face.

[0013] In particular, the cover plate comprises a main wall in contact with the main face and a circumferential wall facing the circumferential face.

[0014] In this way, the cover plate increases the thickness in axial direction of the U-shaped sector.

[0015] The cover plate further comprises a circumferential baffle that further reduces the axial gap. In particular, the circumferential baffle protrudes from the main wall in the opposite direction to the circumferential wall and is coplanar with the circumferential wall.

[0016] In particular, the cover plate comprises a radial baffle for directing the airstream. The radial baffle protrudes from the circumferential wall and is coplanar with the main wall.

[0017] In order to conveniently coupling the cover plate to the U-shaped sector, the U-shaped sector has at least one retaining groove and the cover plate has at least one retaining profile for engaging the retaining groove. In particular, the retaining groove and the retaining profile have matching shapes and preferably are L-shaped.

[0018] In particular, the cover plate comprises ad least one channel in fluidic communication with the through hole, preferably the channel is cut into the cover plate.

[0019] In this way, the cover plate can direct the airstream in a given direction.

[0020] In particular, the channel is open at one free end along the edge of the cover plate. This allows conveying the airstream in just one direction.

[0021] In alternative, the channel is open at the opposite ends of the channel along the edges of the cover plate so that the airstream can be directed in two directions.

[0022] In particular, the cover plate comprises at least one through opening in fluidic communication with said channel. This configuration allows flowing the airstream at any point along the channel.

[0023] In particular, the sealing assembly comprising a plurality of adjacent cover plates and shaped so as to be partially superimposed at their respective ends for the benefit of the tightness of the sealing assembly.

[0024] The present invention further concerns providing a gas turbine engine, which is free from the drawbacks of the prior art.

[0025] According to the present invention there is provided a gas turbine engine comprising a stator and a rotor, which is configured to rotate about a longitudinal axis; the stator comprising a plurality of vane sets distributed along the longitudinal axis and the rotor comprising a plurality of blade sets distributed along the longitudinal axis and alternated to the vane sets, wherein each vane set engage a respective sealing ring comprising a plurality of sealing assemblies as previously disclosed and joined one another.

[0026] The implementation of a sealing ring made of the previously disclosed sealing assemblies mitigate the ingestion of hot gases and improves the performances of the gas turbine engine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] The present invention will now be described with reference to the accompanying drawings, which show a number of non-limitative embodiments thereof, in which:

- Figure 1 is a schematic section view, with parts removed for clarity, of a gas turbine engine according to the present invention;
- Figure 2 is a perspective view, with parts removed for clarity and parts in section, of a vane and a sealing assembly according to the present invention;
- Figures 3 and 4 are perspective view of a cover plate, with parts removed for clarity and parts in section, of the sealing assembly of Figure 2;
- Figure 5 is a variation of the cover plate of Figures 3 and 4;
- Figure 6 is a perspective view, with parts removed for clarity and parts in section, of a second embodiment of a sealing assembly according to the present invention;
- Figure 7 is a perspective view, with parts removed for clarity and parts in section, of a variation of a cover plate for the sealing assembly disclosed in Figure 2;
- Figure 8 is perspective view, with parts removed for clarity and parts in section, of a further variation of a cover plate for the sealing assembly of Figure 2;
- Figure 9 is a perspective view, with parts removed for clarity and parts in section, of a sealing assembly according to a third embodiment of the present invention;
- Figure 10 is a section view, with part removed for clarity, of a sealing assembly according to a further embodiment of the present invention; and

[0028] Figure 11 is a section view, with part removed for clarity, of the sealing assembly of Figure 1.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0029] In Figure 1, with numeral 1 is indicated a gas turbine engine comprising a stator 2 and a rotor 3 rotating about a longitudinal axis A1 with respect to the stator 2. The rotor 3 comprises a shaft 4 made of a number of axially clamped discs not shown the Figures; and a plurality of blade sets 5 (just two of them are shown in Figure 1) distributed along the longitudinal axis A1 and supported by the shaft 4. The stator 2 comprises a casing 6; and a plurality of vane sets 7 (just one shown in Figure 1). Each vane set 7 is interposed between two blade sets 5 and is supported by the casing 6. The inner ends of the vane 7 engage a respective U-shaped sealing ring 8, which is located in a corresponding annular cavity 9 of the shaft 4. The U-shaped sealing ring 8 together with the vanes 7 or the corresponding set defines a plenum 10.

[0030] A dynamic seal 11 such as for example a labyrinth seal is arranged between the U-shaped sealing ring 8 and the shaft in the bottom of the cavity 8.

[0031] In use, a hot gas stream under high-pressure flows in direction D1 through the vanes 7 and the blades 5 and determines the rotation of the rotor 3 with respect to the stator 2. At the same time, an airstream flows inside the vanes 7 to the plenum 10 and from the plenum 10 through the cavity 9.

[0032] With reference to Figure 2, the U-shaped sealing ring 8 comprises a plurality of sealing assembly 12, which, in turn, comprises a U-shaped sector 13 and two adjacent cover plates 14 and is connected to a number of vanes 7 (just one them is shown in Figure 2).

[0033] Each U-shaped sector 13 comprises a bottom wall 15; an upstream wall 16; and a downstream wall 17 with reference to a direction D1 of the hot gases in the gas turbine engine 1 (Figure 1). The upstream and downstream walls 16 and 17 comprises respective outer main faces 18 and 19 and respective circumferential faces 20 and 21.

[0034] Each U-shaped sector 13 is shaped so as to engage the bottom of the vanes 7 so that the U-shaped sector 13 and the vanes 7 enclose the plenum 10.

[0035] Each vane 7 comprises an airfoil 22, an outer shroud 23 and an inner shroud 24 coupled to the U-shaped sector 13. The airfoil 22 is provided with a cooling air duct 25 fed by a dedicated opening on the outer shroud 23. The inner shroud 24 comprises a platform 26, a leading edge flange 27 and a trailing edge flange 28 extending radially inward from the platform 26. The leading edge flange 27 is upstream the trailing edge flange 28 along

the hot gas flow direction D1 and is coupled to the upstream wall 16 in a respective annular seat, while the trailing edge flange 28 is coupled to the downstream wall 17 in a respective annular seat.

[0036] The upstream wall 16 is provided with at least one through hole 29 for conveying an airstream outside the plenum and, preferably, with a plurality of through holes 29 circumferentially distributed.

[0037] Each cover plate 14 is configured for being coupled to the upstream wall 16 for channeling the airstream toward the platform 26.

[0038] According to an embodiment not shown in the attached Figures also the downstream wall is provided with a plurality of through holes circumferentially distributed and an additional cover plate is configured for being coupled to the upstream wall for channeling the airstream toward the platform.

[0039] Each cover plate 14 is shaped as a sector and is arranged in contact with the main face 18 and the circumferential 20 face of the U-shaped sector 13.

[0040] Each cover plate 14 comprises a main wall 30 facing the main face 18 and a circumferential wall 31 facing the circumferential face 20.

[0041] As better shown in Figure 3, each cover plate 14 comprises a circumferential baffle 32 protruding from the main wall 30 of the opposite side of the circumferential wall 31. In particular, the circumferential baffle 32 is coplanar with the circumferential wall 31.

[0042] The upstream wall 16 has a retaining groove 33 extending from the main face 18 for housing a retaining profile 34 extending from the main wall 30 of the cover plate 14. The retaining groove 33 and the retaining profile 34 have a matching shape and preferably are L-shaped.

[0043] With reference to Figure 4, each cover plate 14 comprises channels 35, which are configured to be, in use, in fluidic communication with the through holes 29. Each channel 35 extends along the main face 18 and the circumferential face 20 and is cut into the main wall 30 and circumferential wall 31 of the cover plate 14. In particular, each channel 35 comprises a blind groove cut into the main wall 30 and by an open groove, which is cut into the circumferential wall 31 and is in communication with the blind groove. In other words, the channel is open just at the end along the circumferential wall 31.

[0044] According to a variation shown in Figure 5, each channel 35 is open at both ends.

[0045] With reference to the embodiment disclosed in Figure 6 reference numeral 36 indicates a sealing assembly, which comprises a U-shaped sector 37 and a cover plate 38. The U-shaped sector 37 differentiates from the U-shaped sector 13 for the fact that hole 29 (Figure 2) are replaced by through holes 39. For this reason, the other parts of the U-shaped sector 37 will be indicated with the same reference numerals for indicating corresponding parts of the U-shaped sector 13 (Figure 2).

[0046] The through holes 39 end in proximity of the bottom wall 15 and, for this reason, the cover plate 38 covers a greater portion of the main face 18. The cover plate 38 differentiates from the cover plate 14 for the fact that is provided with a main wall 40 larger than the main wall 30 shown in Figure 2. The other parts of cover wall 38 are indicated with the same reference numerals indicating the corresponding parts of cover plate 14 (Figure 2).

[0047] According to the variation of Figure 7, the cover plate 14 comprises through openings 41 in fluidic communication with respective channels 35 (Figure 4). The through openings 41 are located along the main wall 30 and/or the circumferential wall 31.

[0048] According to the further variation of figure 8, cover plate 14 comprises a radial baffle 42 protruding from the circumferential wall 31. The radial baffle 42 is substantially coplanar with the main wall 30.

[0049] With reference to the embodiment disclosed in Figure 9 with reference numeral 43 is indicated a sealing assembly, which comprises a U-shaped sector 44 and a cover plate 45. The U-shaped sector 44 differentiates from the U-shaped sector 13 (Figure 2) for the fact that it comprises one additional retaining groove 46 parallel to retaining groove 33.

[0050] Similarly, the cover plate 45 differentiates from the cover plate 14 for the fact that it comprises an additional retaining profile 47 parallel to retaining profile 34.

[0051] According to the embodiment of Figure 10, the sealing assembly differentiates from the previous embodiments in the through holes 48 made in the leading flange 27. Through holes 48 made in the leading flange 27 could be either in addition to the through holes in the U-shaped sector or just the sole through holes for evacuating the air from plenum 10. According to the second option, the cover plate 49 has the function of guiding, in particular deflecting, the airstream flowing from plenum 10.

[0052] According to a further variation not shown in the attached Figures, the through holes are made in the trailing flange.

[0053] With reference to Figure 11, cover plates 14 and shaped so as to be partially superimposed at their respective ends.

[0054] Finally, it is clear that modifications and variants can be made to the stator assembly and to the gas turbine described herein without departing from the scope of the present invention, as defined in the appended claims.

Claims

1. A sealing assembly for engaging a number of vanes of a gas turbine engine, the sealing assembly comprising a U-shaped sector (13; 37; 44), which is configured for engaging at least one vane (7) so that the U-shaped sector (13; 37; 44) and the vane (7) enclose a plenum (10), which communicates to the outside trough at least one through hole (29; 39; 48) for conveying an airstream outside the plenum (10); wherein the sealing assembly further comprises at

least one cover plate (14; 38; 45; 49) configured for being coupled to the U-shaped sector (13; 37; 44) for guiding said airstream in a given direction, the sealing assembly being **characterised in that** the U-shaped sector (13; 37; 44) is provided with said at least one through hole (29; 39).

2. The sealing assembling as claimed in Claim 1, wherein the U-shaped sector (13; 37; 44) comprises an upstream wall (16); and a downstream wall (17), which are provided with respective main faces (18, 19) and respective circumferential faces (20, 21).

3. The sealing assembly as claimed in Claim 2, wherein the at least one cover plate (14; 38; 45) is configured for being coupled to the upstream wall (16) and/or to the downstream wall (17).

4. The sealing assembly as claimed in Claim 2 or 3, wherein the cover plate (14; 38; 45) is in contact with the U-ring sector along the main face (18; 19) and the circumferential face (20; 21).

5. The sealing assembly as claimed in any one of the Claims from 2 to 4, wherein the cover plate (14; 38; 45) comprises a main wall (30; 40) in contact with the main face (18; 19) and a circumferential wall (31) facing the circumferential face (20; 21).

6. The sealing assembly as claimed in Claim 5, wherein the cover plate (14; 38; 45) comprises a circumferential baffle (32), in particular the circumferential baffle (32) protrudes from the main wall (30; 40) in the opposite direction to the circumferential wall (31), in particular the circumferential baffle (32) being coplanar with the circumferential wall (31).

7. The sealing assembly as claimed in Claim 3 or 4, wherein the cover plate (14) comprises a radial baffle (42), in particular the radial baffle (42) protrudes from the circumferential wall (31) and is coplanar with the main wall.

8. The sealing assembly as claimed in anyone of the foregoing Claims, wherein the U-shaped sector (13; 37; 44) has a at least one retaining groove (33) and the cover plate (14; 38; 45) has at least one retaining profile (34) for engaging the retaining groove (33), in particular the retaining groove (33) and the retaining profile (34) have matching shapes and preferably are L-shaped.

9. The sealing assembly as claimed in Claim 8, wherein the U-shaped sector (44) has a further retaining groove (46) parallel to said retaining groove (33) and the cover plate (45) has further retaining profile (47) parallel to said retaining profile (34), in particular the further retaining groove (46) and the further retaining profile (47) have matching shapes and preferably are L-shaped.

10. The sealing assembly as claimed in anyone of the Claims from 1 to 9, wherein the cover plate (14; 38; 45) comprises ad least one channel (35) in fluidic communication with the through hole (29; 39), preferably the channel (35) is cut into the cover plate (14; 38; 45).

11. The sealing assembly as claimed in Claim 10, wherein said channel (35) is open at one free end along an edge of the cover plate (14; 38; 45).

12. The sealing assembly as claimed in Claim 10 or 11, wherein said channel (35) is open at two free ends along the edges of the cover plate (14).

13. The sealing assembly as claimed in Claim 10 or 11 or 12, wherein the cover plate (14) comprises at least one through opening (41) in fluidic communication with said channel (35).

14. The sealing assembly as claimed in anyone of the foregoing Claims, and comprising a plurality of adjacent cover plates and shaped so as to be partially superimposed at their respective ends.

15. A gas turbine engine comprising a stator (2) and a rotor (3), which is configured to rotate about a longitudinal axis (A); the stator (2) comprising a plurality of vane sets (7) distributed along the longitudinal axis (A) and the rotor (3) comprising a plurality of blade sets (5) distributed along the longitudinal axis (A) and alternated to the vane sets (7), wherein at least one vane set engage a respective sealing ring comprising a plurality of sealing assembly (12; 36; 43) as claimed in any one of the foregoing Claims and joined one another.

Patentansprüche

1. Dichtungsanordnung für den Eingriff mit einer Anzahl von Schaufeln einer Gasturbinenmaschine, wobei die Dichtungsanordnung einen U-förmigen Sektor (13; 37; 44) umfasst, der für den Eingriff mit wenigstens einer Leitschaufel (7) konfiguriert ist, so dass der U-förmige Sektor (13; 37; 44) und die Leitschaufel (7) eine Luftkammer (10) umschließen, die mit dem Äußeren über wenigstens ein Durchgangsloch (29; 39; 48) in Verbindung steht, um einen Luftstrom nach außerhalb der Luftkammer (10) zu befördern; wobei die Dichtungsanordnung ferner wenigstens eine Abdeckplatte (14; 38; 45; 49) umfasst, die dazu konfiguriert ist, mit dem U-förmigen Sektor (13; 37; 44) gekoppelt zu werden, um den Luftstrom in eine vorgegebene Richtung zu führen, wobei die

Dichtungsanordnung **dadurch gekennzeichnet ist, dass** der U-förmige Sektor (13; 37; 44) mit dem wenigstens einen Durchgangsloch (29; 39) versehen ist.

2. Dichtungsanordnung nach Anspruch 1, wobei der U-förmige Sektor (13; 37; 44) eine stromaufwärts gelegene Wand (16) und eine stromabwärts gelegene Wand (17) umfasst, die mit jeweiligen Hauptflächen (18, 19) und jeweiligen Umfangsflächen (20, 21) versehen sind.

3. Dichtungsanordnung nach Anspruch 2, wobei die wenigstens eine Abdeckplatte (14; 38; 45) dazu konfiguriert ist, mit der stromaufwärts gelegenen Wand (16) und/oder der stromabwärts gelegenen Wand (17) gekoppelt zu werden.

4. Dichtungsanordnung nach Anspruch 2 oder 3, wobei die Abdeckplatte (14; 38; 45) entlang der Hauptfläche (18; 19) und der Umfangsfläche (20; 21) in Kontakt mit dem U-förmigen Sektor steht.

5. Dichtungsanordnung nach einem der Ansprüche 2 bis 4, wobei die Abdeckplatte (14; 38; 45) eine Hauptwand (30; 40) in Kontakt mit der Hauptfläche (18; 19) und eine Umfangswand (31), die der Umfangsfläche (20; 21) gegenüberliegt, umfasst.

6. Dichtungsanordnung nach Anspruch 5, wobei die Abdeckplatte (14; 38; 45) eine umlaufende Ablenkplatte (32) umfasst, wobei insbesondere die umlaufende Ablenkplatte (32) in entgegengesetzter Richtung zur umlaufenden Wand (31) von der Hauptwand (30; 40) hervorsteht, wobei insbesondere die umlaufende Ablenkplatte (32) koplanar mit der umlaufenden Wand (31) ist.

7. Dichtungsanordnung nach Anspruch 3 oder 4, wobei die Abdeckplatte (14) eine radiale Ablenkplatte (42) umfasst, wobei insbesondere die radiale Ablenkplatte (42) von der Umfangswand (31) hervorsteht und koplanar mit der Hauptwand ist.

8. Dichtungsanordnung nach einem der vorangehenden Ansprüche, wobei der U-förmige Sektor (13; 37; 44) wenigstens eine Haltenut (33) aufweist und die Abdeckplatte (14; 38; 45) wenigstens ein Halteprofil (34) zum Eingriff in die Haltenut (33) aufweist, wobei insbesondere die Haltenut (33) und das Halteprofil (34) zueinander passende Formen aufweisen und vorzugsweise L-förmig sind.

9. Dichtungsanordnung nach Anspruch 8, wobei der U-förmige Sektor (44) eine weitere Haltenut (46) parallel zu der Haltenut (33) aufweist und die Abdeckplatte (45) ein weiteres Halteprofil (47) parallel zu dem Halteprofil (34) aufweist, wobei insbesondere die weitere Haltenut (46) und das weitere Halteprofil (47) zueinander passende Formen aufweisen und vorzugsweise L-förmig sind.

10. Dichtungsanordnung nach einem der Ansprüche 1 bis 9, wobei die Abdeckplatte (14; 38; 45) wenigstens einen Kanal (35) umfasst, der mit dem Durchgangsloch (29; 39) in Fluidverbindung steht, wobei der Kanal (35) vorzugsweise in die Abdeckplatte (14; 38; 45) geschnitten ist.

11. Dichtungsanordnung nach Anspruch 10, wobei der Kanal (35) an einem freien Ende entlang eines Randes der Abdeckplatte (14; 38; 45) offen ist.

12. Dichtungsanordnung nach Anspruch 10 oder 11, wobei der Kanal (35) an zwei freien Enden entlang der Ränder der Abdeckplatte (14) offen ist.

13. Dichtungsanordnung nach Anspruch 10 oder 11, wobei die Abdeckplatte (14) wenigstens eine Durchgangsöffnung (41) umfasst, die in Fluidverbindung mit dem Kanal (35) steht.

14. Dichtungsanordnung nach einem der vorangehenden Ansprüche, die mehrere benachbarte Abdeckplatten umfasst und so geformt ist, dass diese an ihren jeweiligen Enden teilweise übereinander liegen.

15. Gasturbinenmaschine, umfassend einen Stator (2) und einen Rotor (3), der dazu konfiguriert ist, um eine Längsachse (A) zu rotieren; wobei der Stator (2) mehrere Leitschaufelsätze (7) umfasst, die entlang der Längsachse (A) verteilt sind, und der Rotor (3) mehrere Schaufelsätze (5) umfasst, die entlang der Längsachse (A) verteilt sind und mit den Leitschaufelsätzen (7) alternieren, wobei wenigstens ein Leitschaufelsatz mit einem jeweiligen Dichtungsring in Eingriff steht, der mehrere Dichtungsanordnungen (12; 36; 43) nach einem der vorangehenden Ansprüche umfasst, die miteinander verbunden sind.

Revendications

1. Ensemble d'étanchéité pour coopérer avec un certain nombre d'aubes d'un moteur à turbine à gaz, l'ensemble d'étanchéité comprenant un secteur en forme de U (13; 37; 44), qui est configuré pour coopérer avec au moins une aube (7) de sorte que le secteur en forme de U (13; 37; 44) et l'aube (7) entourent une chambre (10) qui communique avec l'extérieur par au moins un trou traversant (29; 39; 48) pour transporter un courant d'air à l'extérieur de la chambre (10); dans lequel l'ensemble d'étanchéité comprend en outre au moins une plaque de recouvrement (14; 38; 45; 49) configurée pour être cou-

plée au secteur en forme de U (13; 37; 44) pour guider ledit courant d'air dans une direction donnée, l'ensemble d'étanchéité étant **caractérisé en ce que** le secteur en forme de U (13; 37; 44) est muni dudit au moins un trou traversant (29; 39).

2. Ensemble d'étanchéité selon la revendication 1, dans lequel le secteur en forme de U (13; 37; 44) comprend une paroi amont (16); et une paroi aval (17), qui sont munies de faces principales respectives (18, 19) et de faces circonférentielles respectives (20, 21).

3. Ensemble d'étanchéité selon la revendication 2, dans lequel la au moins une plaque de recouvrement (14; 38; 45) est configurée pour être couplée à la paroi amont (16) et/ou à la paroi aval (17).

4. Ensemble d'étanchéité selon la revendication 2 ou 3, dans lequel
la plaque de recouvrement (14; 38; 45) est en contact avec le secteur en forme de U le long de la face principale (18; 19) et de la face circonférentielle (20; 21).

5. Ensemble d'étanchéité selon l'une quelconque des revendications de 2 à 4, dans lequel la plaque de recouvrement (14; 38; 45) comprend une paroi principale (30; 40) en contact avec la face principale (18; 19) et une paroi circonférentielle (31) faisant face à la face circonférentielle (20; 21).

6. Ensemble d'étanchéité selon la revendication 5, dans lequel la plaque de recouvrement (14; 38; 45) comprend un déflecteur circonférentiel (32), en particulier le déflecteur circonférentiel (32) dépasse de la paroi principale (30; 40) dans la direction opposée à la paroi circonférentielle (31), en particulier le déflecteur circonférentiel (32) étant coplanaire avec la paroi circonférentielle (31).

7. Ensemble d'étanchéité selon la revendication 3 ou 4, dans lequel la plaque de recouvrement (14) comprend un déflecteur radial (42), en particulier le déflecteur radial (42) dépasse de la paroi circonférentielle (31) et est coplanaire avec la paroi principale.

8. Ensemble d'étanchéité selon l'une quelconque des revendications précédentes, dans lequel le secteur en forme de U (13; 37; 44) a au moins une rainure de retenue (33) et la plaque de recouvrement (14; 38; 45) a au moins un profil de retenue (34) pour coopérer avec la rainure de retenue (33), en particulier la rainure de retenue (33) et le profil de retenue (34) ont des formes adaptées et sont de préférence en forme de L.

9. Ensemble d'étanchéité selon la revendication 8, dans lequel le secteur en forme de U (44) a une autre rainure de retenue (46) parallèle à ladite rainure de retenue (33) et la plaque de recouvrement (45) a un autre profil de retenue (47) parallèle audit profil de retenue (34), en particulier l'autre rainure de retenue (46) et l'autre profil de retenue (47) ont des formes adaptées et sont de préférence en forme de L.

10. Ensemble d'étanchéité selon l'une quelconque des revendications 1 à 9, dans lequel la plaque de recouvrement (14; 38; 45) comprend au moins un canal (35) en communication fluidique avec le trou traversant (29; 39), de préférence le canal (35) est découpé dans la plaque de recouvrement (14; 38; 45).

11. Ensemble d'étanchéité selon la revendication 10, dans lequel ledit canal (35) est ouvert à une extrémité libre le long d'un bord de la plaque de recouvrement (14; 38; 45).

12. Ensemble d'étanchéité selon la revendication 10 ou 11, dans lequel ledit canal (35) est ouvert à deux extrémités libres le long des bords de la plaque de recouvrement (14).

13. Ensemble d'étanchéité selon la revendication 10 ou 11 ou 12, dans lequel la plaque de recouvrement (14) comprend au moins une ouverture traversante (41) en communication fluidique avec ledit canal (35).

14. Ensemble d'étanchéité selon l'une quelconque des revendications précédentes, et comprenant une pluralité de plaques de recouvrement adjacentes et conformées de manière à être partiellement superposées à leurs extrémités respectives.

15. Moteur à turbine à gaz comprenant un stator (2) et un rotor (3), qui est configuré pour tourner autour d'un axe longitudinal (A); le stator (2) comprenant une pluralité de jeux d'aubes (7) distribués le long de l'axe longitudinal (A) et le rotor (3) comprenant une pluralité de jeux de pales (5) distribués le long de l'axe longitudinal (A) et alternés par rapport aux jeux d'aubes (7), dans lequel au moins un jeu d'aubes coopère avec un anneau d'étanchéité respectif comprenant une pluralité d'ensembles d'étanchéité (12; 36; 43) selon l'une quelconque des revendications précédentes et reliés les uns aux autres.

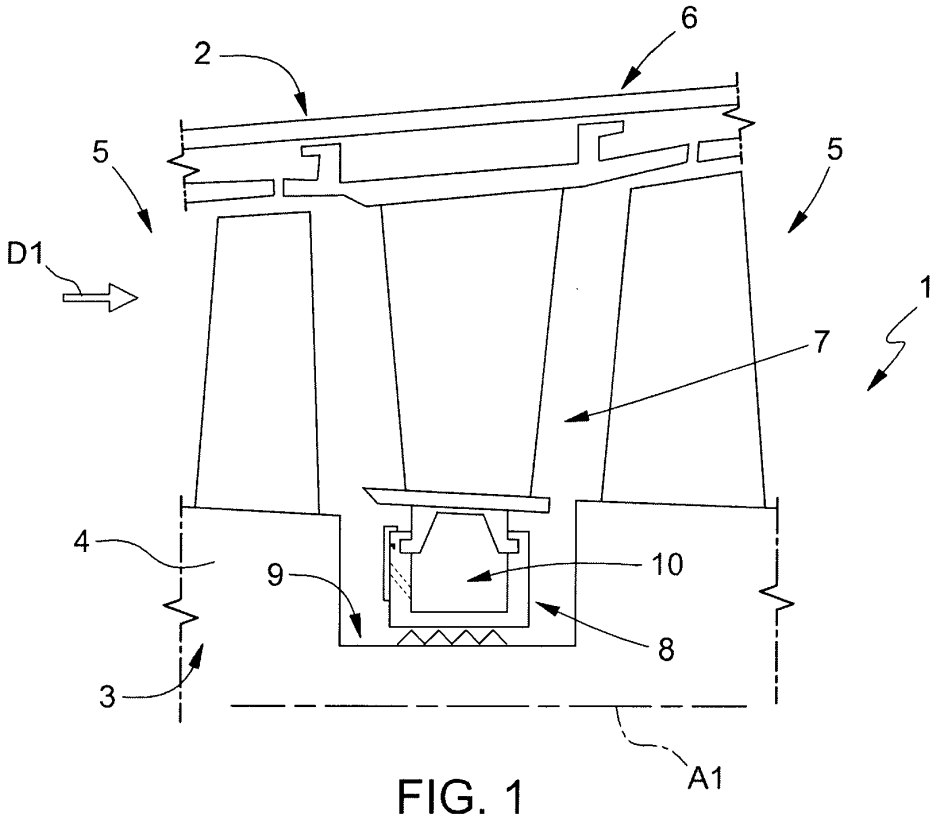
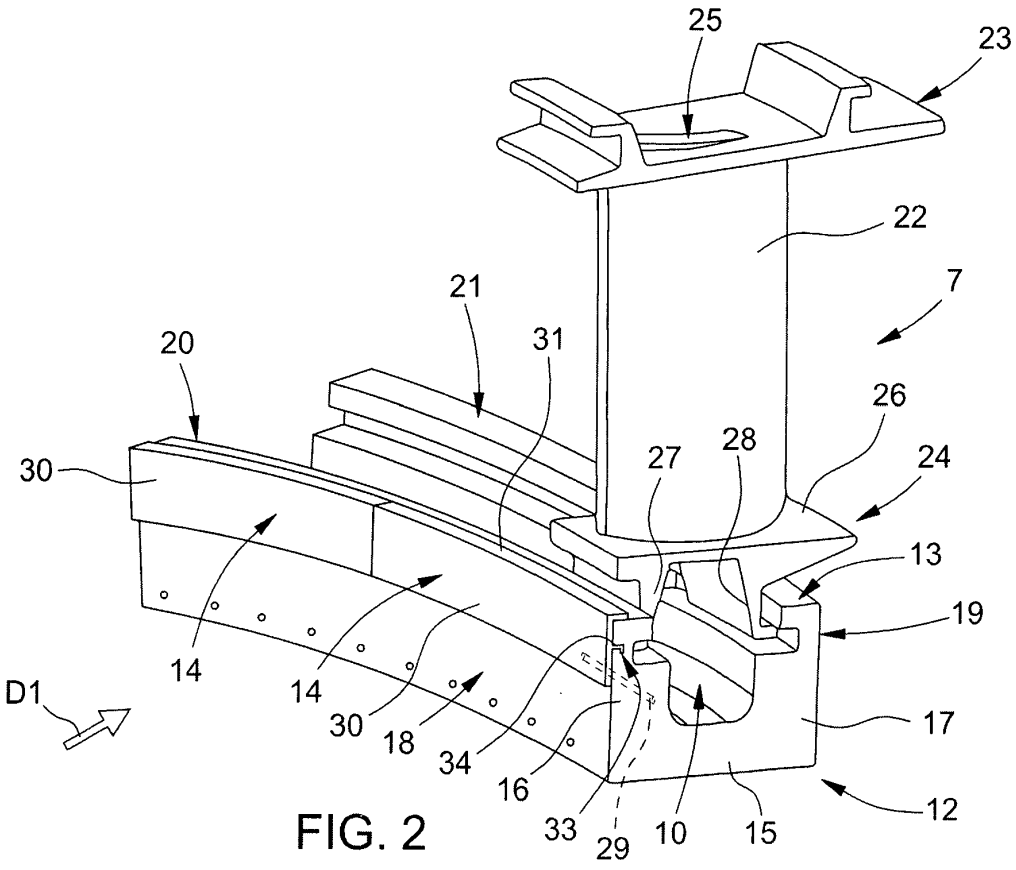

6
2
5
5
D1
1
7
4
9
10
8
3
A1

FIG. 1


25
23
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D1
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15
17
12

FIG. 2

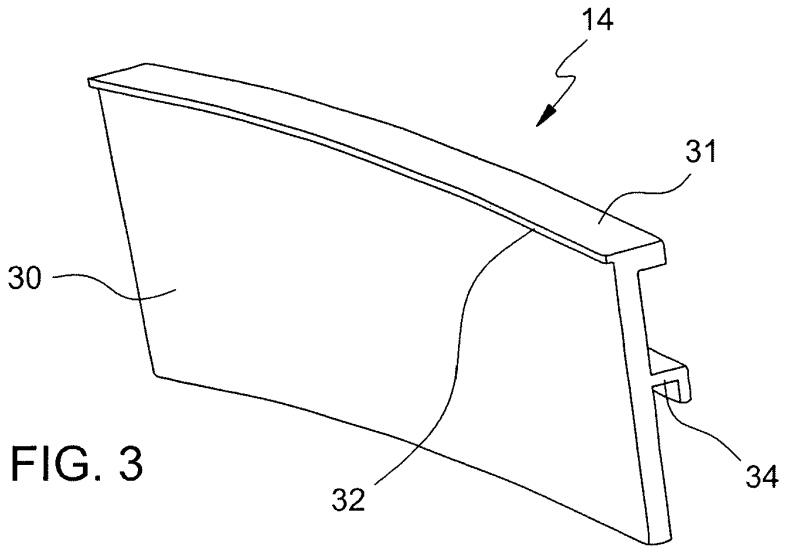

FIG. 3

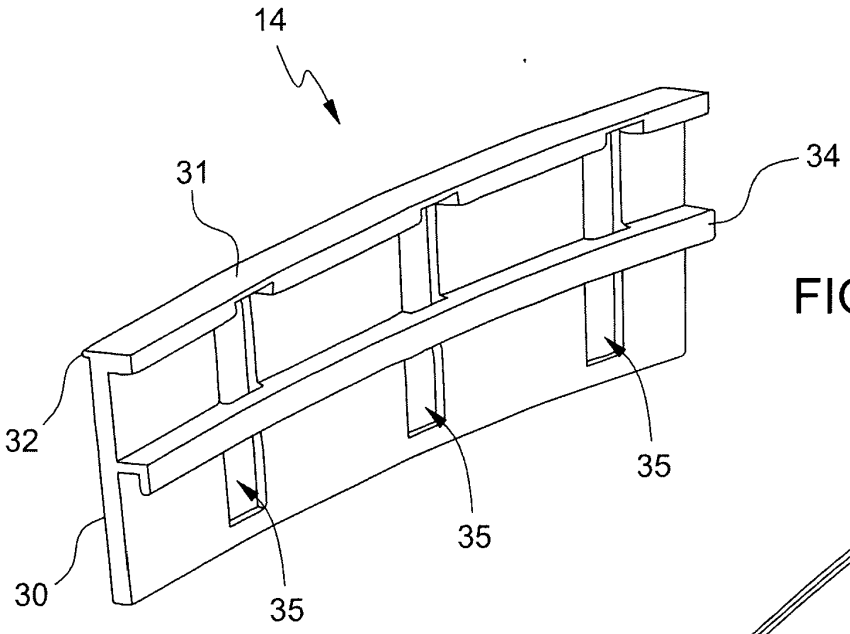

FIG. 4

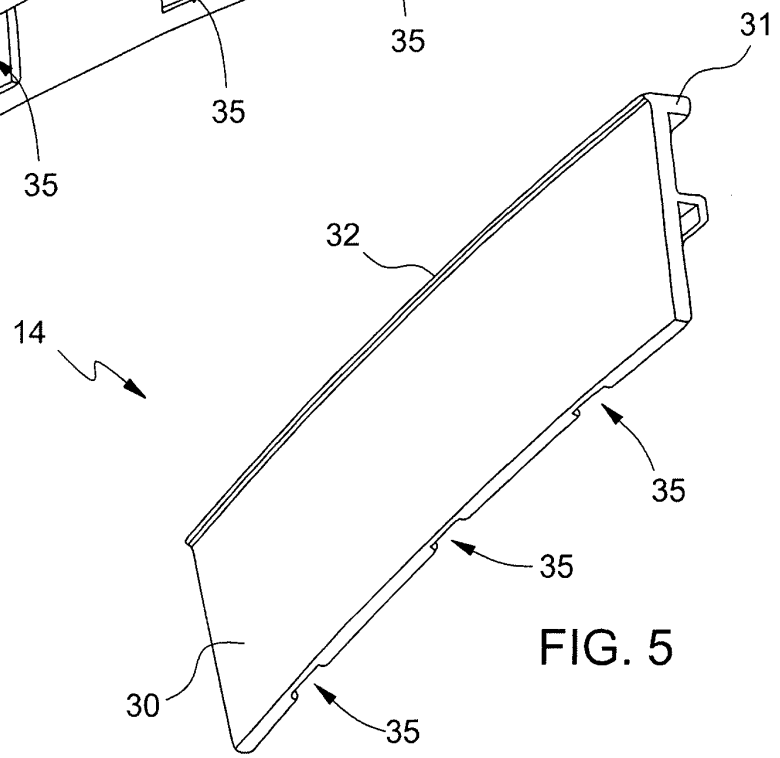

FIG. 5

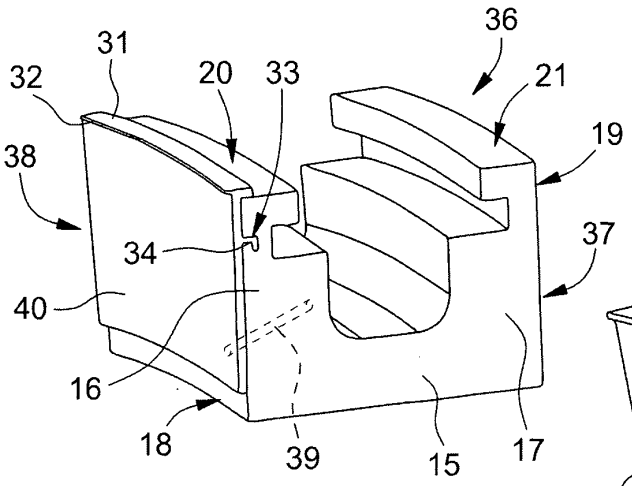

FIG. 6

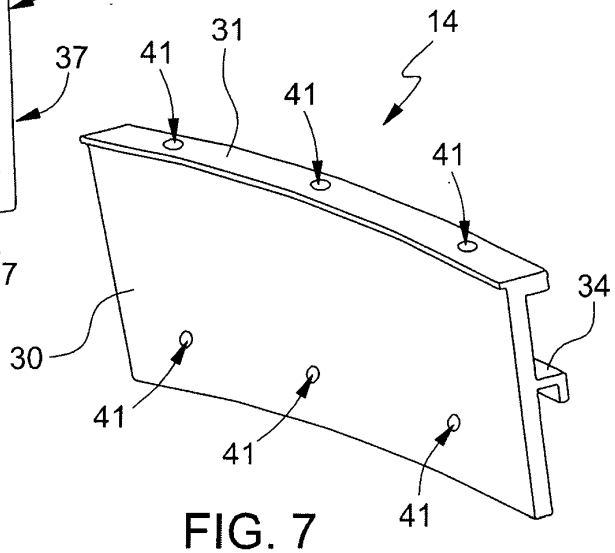

FIG. 7

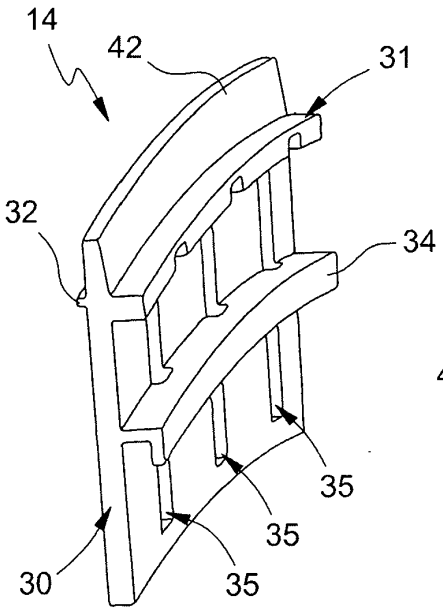

FIG. 8

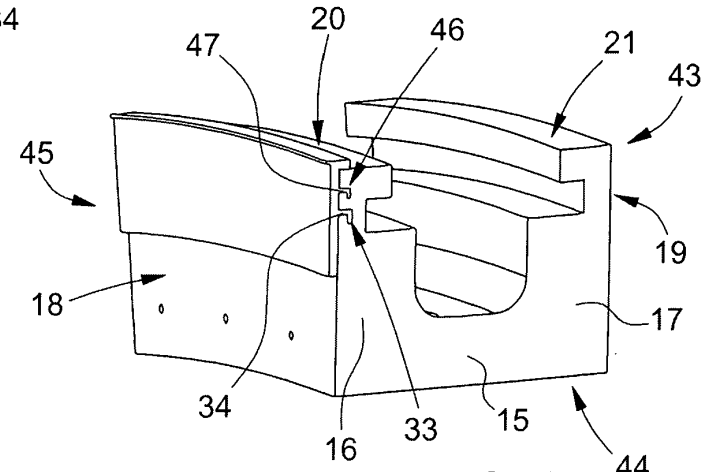

FIG. 9

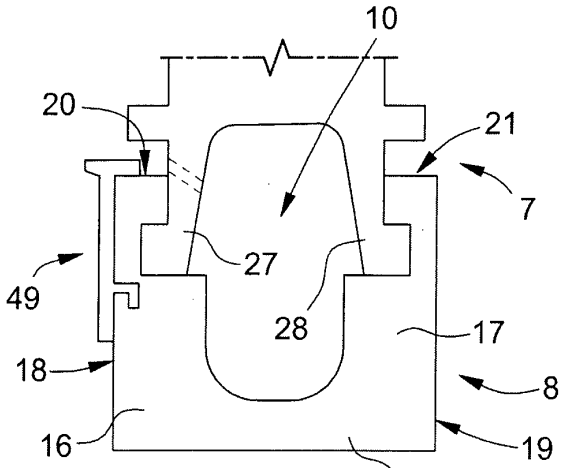

FIG. 10

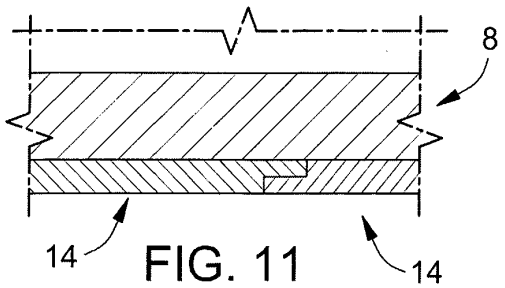

FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6082961 A **[0005]**
- EP 3663522 A1 **[0005]**