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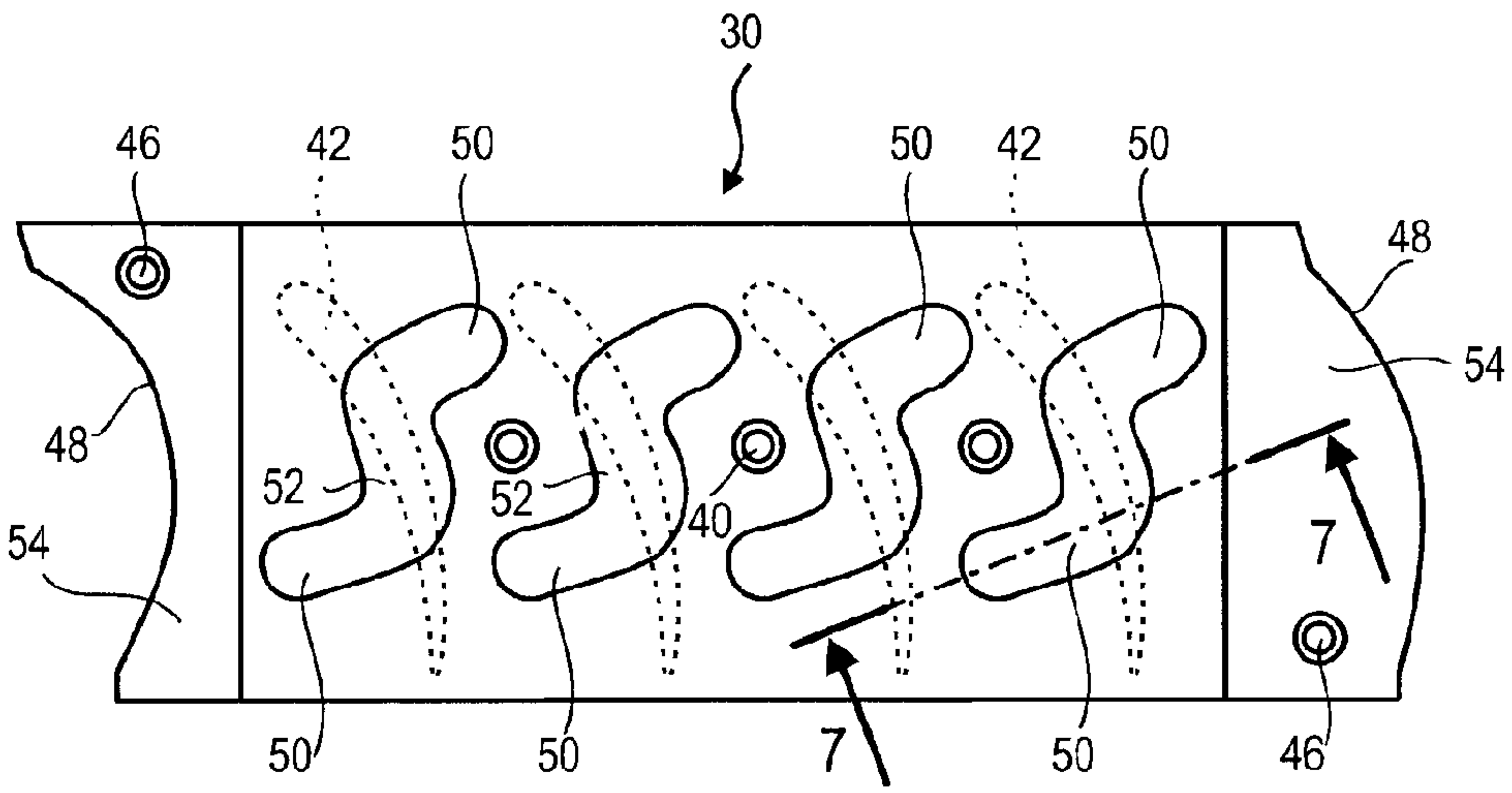
(72) Inventeur/Inventor:
DERCLAYE, ALAIN, BE

(73) Propriétaire/Owner:
SAFRAN AERO BOOSTERS SA, BE

(74) Agent: HILL & SCHUMACHER

(54) Titre : BOITE D'AUBE FIXE A AUBE GUIDE D'UN COMPRESSEUR DE TURBINE AXIAL
(54) Title: GUIDE VANE ASSEMBLY VANE BOX OF AN AXIAL TURBINE ENGINE COMPRESSOR



(57) Abrégé/Abstract:
An angular sector of a bladed stator of a low-pressure compressor of an axial turbine engine. The sector includes an outer shroud and an inner shroud in the form of circular arcs intended to be mounted in a concentric manner on the outer casing of the turbine engine compressor. The sector likewise includes a row of stator vanes extending radially and anchored in the shrouds in such a manner as to form a bladed box. The vanes of the box include anchoring lugs at their outer ends, the lugs being disposed in the thickness of the outer shroud. The inner shroud includes stubs for anchoring vanes.

Abstract

An angular sector of a bladed stator of a low-pressure compressor of an axial turbine engine. The sector includes an outer shroud and an inner shroud in the form of circular arcs intended to be mounted in a concentric manner on the outer casing of the turbine engine compressor. The sector likewise includes a row of stator vanes extending radially and anchored in the shrouds in such a manner as to form a bladed box. The vanes of the box include anchoring lugs at their outer ends, the lugs being disposed in the thickness of the outer shroud. The inner shroud includes stubs for anchoring vanes.

Description

GUIDE VANE ASSEMBLY VANE BOX OF AN AXIAL TURBINE ENGINE COMPRESSOR

Technical field

The present disclosure relates to a bladed stator for an axial turbine engine. More specifically, the disclosure relates to an angular sector of an axial turbine engine stator forming a bladed box. The present disclosure likewise relates to a turbine engine provided with a stator sector according to the disclosure.

Prior art

The function of guiding a flow in an axial turbine engine is guaranteed by portions of stators provided with vanes. In particular, a flow is diverted in an axial compressor with the help of guide vane assemblies provided with vanes extending between concentric shrouds. The outer shroud is fixed to an outer casing and the inner shroud is attached to the inner casing thanks to the vanes.

In order to relieve the stator, it is known in the art for certain shrouds to be realized in composite material. In order to simplify assembly of the stator, the shrouds may be semi-shrouds or they may be shroud sectors that extend over an angular fraction of the turbine engine. Since this choice can reduce the rigidity of the stator, this disadvantage can be mitigated by realizing the stator in the form of bladed boxes disposed end to end.

Document EP 2 339 120 A1 discloses the architecture of a guide vane assembly of an axial turbine engine with bladed boxes. The boxes are in the form of aviation vanes that are attached to inner and outer shrouds. The boxes thereby formed are fixed to the outer casing of the compressor with the help of structuring vanes disposed between the bladed boxes. However, the rigidity of a stator of this kind remains limited.

Summary of the disclosure

Technical problem

The aim of the present disclosure is to solve at least one of the problems posed by the prior art. The disclosure likewise aims to improve the rigidity of an angular sector of the stator forming a bladed box. The disclosure likewise aims to improve the torsional rigidity of an angular sector of the stator forming a bladed box.

Technical solution

The disclosure relates to an angular sector of a bladed stator of an axial turbine engine, particularly of a compressor, the sector comprising: an outer shroud in the form of a circular arc intended to be mounted on a casing of the turbine engine, an inner shroud in the form of a circular arc, a row of stator vanes extending radially and anchored in the shrouds in such a manner as to form a bladed box, notable in that at least one vane of the box comprises an anchoring lug disposed in the thickness of one of the shrouds in such a manner as to anchor the vane to said shroud to make the box rigid.

According to one embodiment of the disclosure, each box vane comprises a vane extending between the shrouds in the radial direction, the anchoring lugs extending perpendicularly to the radial direction and generally perpendicularly in respect of the chord of the associated vane airfoil.

According to another embodiment of the disclosure, the anchoring lugs disposed at the same vane end are generally flat and generally curved or are parallel or staggered one in respect of the other according to the chord of said vane.

According to another embodiment of the disclosure, at least one of the shrouds comprises a row of openings where the vanes are anchored, at least one anchoring lug being disposed in the opening of the side radially opposite the other of the two shrouds.

According to another embodiment of the disclosure, the anchoring lugs extend in the direction of neighbouring vanes over most of the width of the spaces between the neighbouring vanes, the anchoring lugs preferably occupying the totality of the width of the spaces between the neighbouring vanes.

According to another embodiment of the disclosure, at least one or each anchoring lug is flush with the surface of the associated shroud, each vane end preferably comprising at least one anchoring lug.

According to another embodiment of the disclosure, at least one of the shrouds, possibly the outer shroud, is realized in a composite material with an organic matrix and a fibrous preform and/or at least one of the shrouds, possibly the inner shroud, is realized in a composite material with an organic matrix and fibres generally directed in a random manner or short fibres, and fibres of the preform preferably join two neighbouring vanes.

According to another embodiment of the disclosure, the sector comprises between three and six box vanes, preferably comprising four box vanes made of metal, possibly titanium.

According to another embodiment of the disclosure, the shrouds are in the form of strips of material with constant thicknesses between the box vanes upstream to downstream, the sector comprising an annular layer of abradable material on the inner surface of the inner shroud, the abradable layer preferably covering the inner ends of the box vanes.

According to another embodiment of the disclosure, each box vane comprises at least two anchoring lugs at at least one of its radial ends, one of the two anchoring lugs preferably being situated on the front side of the vane at one of the two axial ends of the vane and the other of the two anchoring lugs being situated on the back side of the vane at the other of the two axial ends of the vane.

According to another embodiment of the disclosure, the box vanes comprise at least two anchoring lugs disposed at a same radial end and a link between the at least two anchoring lugs, the link preferably extending parallel to the profile of the vane.

According to another embodiment of the disclosure, the other of the two shrouds, possibly the inner shroud, comprises anchoring stubs projecting in respect of the other of the two shrouds towards the vanes, the vanes being anchored to the stubs in such a manner as to be anchored to the other of the two shrouds.

According to another embodiment of the disclosure, the shrouds and the stator vanes define channels to divert a flow in the turbine engine.

According to another embodiment of the disclosure, the fibres of at least one or each preform are generally oriented at +45° and -45° in respect of the axial direction of the turbine engine.

According to another embodiment of the disclosure, the short fibres have lengths of less than 5.00 mm, preferably less than 1.00 mm.

According to another embodiment of the disclosure, the anchoring lugs of each vane are disposed on an axis exhibiting an inverse inclination of the chord of the vane in respect of the rotational angle of the turbine engine.

According to another embodiment of the disclosure, the shrouds are adapted to delimit between them a channel to guide an angular portion of annular flow in the turbine engine.

According to another embodiment of the disclosure, the numerical majority of fibres in the preform between the box vanes extend from one vane opening to the neighbouring vane opening.

According to another embodiment of the disclosure, the vanes comprise vanes extending between the shrouds, each vane comprising a leading edge, a trailing edge, a front surface and a back surface, said surfaces extending from the leading edge to the trailing edge, the stubs being disposed in the extension of the vanes.

According to another embodiment of the disclosure, the radial height of at least one or each stub is greater than the maximum thickness of the associated stub, preferably the radial height of at least one or each stub is greater than the width of the vane.

The width of the vane is measured perpendicularly to its chord. For example, for a given profile, it may be the point of the vane furthest away from the chord.

According to another embodiment of the disclosure, the length of each anchoring lug is greater than the average width of the vane.

The length of a lug may be its main dimension and/or measured perpendicularly to the chord of the vane and/or by the circumference of the stator.

According to another embodiment of the disclosure, the composite material comprises an organic resin, possibly PEI or PEEK, and carbon fibres or glass fibres.

According to another embodiment of the disclosure, at least one or each anchoring lug is longer than it is wide.

According to another embodiment of the disclosure, the angular sector describes less than a semicircle, preferably less than an eighth of a circle, more preferably less than a twentieth of a circle.

The presence of an anchoring lug on a box vane is not an essential aspect of the disclosure.

The disclosure likewise relates to an angular sector of a bladed stator of an axial turbine engine, particularly of a compressor, the sector comprising: an outer shroud in the form of a circular arc intended to be mounted on a casing of the turbine engine, an inner shroud in the form of a circular arc, a row of stator vanes extending radially between the shrouds, the vanes being anchored to the shrouds in such a manner that the sector forms a bladed box capable of delimiting a channel between the shrouds, notable in that at least one or each shroud comprises an anchoring stub of one of the box vanes, the stub being in the radial extension of the vane projecting into the channel.

According to one embodiment of the disclosure, the shroud or each shroud comprises a plurality of vane anchoring stubs disposed in a row, the anchoring stubs being sockets in which the vanes are anchored and/or the stubs comprise wings enveloped by the vanes.

The disclosure likewise relates to a turbine engine comprising angular stator sectors, notable in that at least one or each sector conforms to the disclosure, the turbine engine comprising a casing on which are fixed the angular sectors and joint vanes placed between the stator sectors so as to form an alternating configuration, the joint vanes being fixed to the casing and to the stator sectors.

According to another embodiment of the disclosure, the casing is a composite outer casing with an organic matrix and a fibrous reinforcement with a stack of fibrous layers, the or each bladed box being fixed to said outer casing, at least one or each outer shroud comprising fixing openings to the outer casing, possibly provided with metal eyelets, the openings being disposed between the vanes of the box.

The present disclosure allows the rigidity of the box and of the stator to be increased, possibly independently of the presence of the joint vanes. The detailed configuration of the anchoring lugs increases the block effect. In fact, their placement creates an inner fitting in the thickness of the shrouds. In the case of (a) composite shroud(s), the lugs complete the reinforcing action of the fibres in the matrix. The anchoring lugs limit the switching of the vanes in respect of the shrouds, just like circumferential movements of one shroud in respect of the other. The two-luged architecture with at least one of the vane ends, on the outside for example, may allow a chain to be designed crossing the associated shroud. The use of an anchoring lug limits the space taken up by the anchoring in a shroud, which allows the mechanical resistance of the shroud to be preserved while at the same time improving rigidity.

Brief description of the drawings

Figure 1 represents an axial turbine engine according to the present disclosure.
Figure 2 is a diagram of a turbine engine compressor according to the disclosure.
Figure 3 illustrates a turbine engine casing with a stator according to the disclosure.
Figure 4 illustrates a shroud according to a first embodiment of the disclosure.
Figure 5 illustrates a bladed box according to a first embodiment of the disclosure.
Figure 6 illustrates a joint vane according to the disclosure.
Figure 7 illustrates a sectional view along axis 7-7 drawn in Figure 4 of an anchoring between an anchoring lug and a shroud according to the disclosure.
Figure 8 depicts a vane fixed to a shroud stub of a bladed box according to a first embodiment of the disclosure.
Figure 9 depicts a vane fixed to a shroud stub of a bladed box according to a second embodiment of the disclosure.
Figure 10 depicts a bladed box according to a third embodiment of the disclosure.

Description of embodiments

In the following description, the terms “inner” or “inner” and “outer” or “outer” relate to a position in respect of the rotational axis of an axial turbine engine.
Figure 1 depicts an axial turbine engine in simplified form. In this particular case it is a double-flow turbojet engine. The turbojet engine 2 comprises a first compression level referred to as a low-pressure compressor 4, a second compression level referred to as a high-pressure compressor 6, a combustion chamber 8 and one or a plurality of turbine levels 10. During operation, the mechanical power of the turbine 10 transmitted via the central shaft to the rotor 12

sets the two compressors 4 and 6 in operation. Gear resocketion means can increase the rotational speed transmitted to the compressors. Or also, the different turbine stages may each be connected to the compressor stages via concentric shafts. Said compressor stages comprise a plurality of rows of rotor blades associated with rows of stator vanevanes. The rotation of the rotor about its rotational axis 14 thereby allows an air flow rate to be generated and progressively compressed up to the inlet of the combustion chamber 8.

An input blower commonly referred to as a fan 16 is coupled with the rotor 12 and generates an air flow that divides up into a primary flow 18 crossing the different levels of the turbine engine mentioned above and a secondary flow 20 crossing an annular conduit (partially represented) along the engine, after which it joins up with the primary flow again at the turbine outlet. The secondary flow may be accelerated so as to generate a reaction. The primary flow 18 and secondary flow 20 are annular flows; they are channelled through the casing of the turbine engine. To this end, the casing exhibits cylindrical walls or shrouds that may be inner or outer.

Figure 2 is a sectional view of a compressor of an axial turbine engine such as that shown in Figure 1. The compressor may be a low-pressure compressor 4. It is possible to see here part of the fan 16 and the separation spout 22 of the primary flow 18 and of the secondary flow 20. The rotor 12 comprises a plurality of rows of rotor blades 24, in this case three.

The low-pressure compressor 4 comprises a plurality of guide vane assembles, in this case four, which each contain a row of stator vanes 26. The guide vane assemblies are associated with the fan 16 or with a row of rotor blades to guide the flow of air, so as to convert the flow speed rate into pressure.

The stator vanes 26 are regularly spaced relative to one another and exhibit the same angular orientation in the flow. The space between the vanes, just as their angular orientation, may possibly vary locally. Certain vanes may differ from the rest of the vanes in their row.

The turbine engine may comprise a stator with a casing 28, for example an outer compressor casing. The casing 28 may be of metal, such as a titanium alloy, or realized in a composite material. It comprises a circular wall that can be attached to the intermediate casing of the turbine engine with the help of an annular flange.

The casing may likewise form a mechanical link supporting the separation spout, thanks to an annular flange. It may be formed from die halves.

The casing 28 further supports the stator vanes 26. It may support them directly or via outer shrouds 30. Said outer shrouds act as a fixing support for the stator vanes 26 which themselves support the inner shrouds 32 at their inner ends. Layers of abradable material 34 can be applied to the inside of the inner shrouds 32. Other layers of abradable material 36 may be applied to the inner surface of the casing 28, possibly between the outer shrouds 30 that form shoulders.

Figure 3 depicts a stator portion, such as a portion of an annular row of stator vanes fixed to the casing. The stator is viewed from the inside. The layer of abradable material applied to the inner shroud is not shown. Portions of box vanes can cross the inner shrouds; however, these portions are not represented.

The stator comprises bladed angular sectors 38 which comprise a plurality of vanes. An angular sector can be understood to be an angular portion or an angular fraction of the rotation of a stator stage. The angle being considered is relative to the rotational axis 14 of the turbine engine. The angular sectors 38 may be bladed boxes 38 or bladed angular segments. They may be disposed end to end in such a manner as to describe a circle. The sectors 38 may be fixed to the casing 28 with the help of fixing openings 40 disposed between their vanes. They may likewise be in contact with the circumference and possibly fixed one to the other.

Each box 38 or sector 38 may form a structure in which each joint between a vane and one of the shrouds (30; 32), preferably each shroud (30; 32), is formed by an anchoring or a sealing. The anchoring allows a vane to be consolidated and immobilized in respect of a shroud.

The stator may possibly comprise at least two types of stator vanes, namely box 42 vanes and joint vanes 44 disposed between the boxes 38. The joint vanes 44 may form mechanical links between the boxes 38, and their presence is optional. The circumferential ends of the shrouds (30; 32) may exhibit fixing openings 46 to the joint vanes 44. In particular, the outer shrouds 30 may exhibit at their ends, according to the circumference, openings allowing them to be joined to the casing 28 and the junction vanes 44, for example with the help of their fixing platforms.

Figure 4 depicts a bladed box shroud, for example an outer shroud 30 viewed from the outside. This shroud could likewise be an inner shroud viewed from the inside, possibly by adapting the angular orientation of the vanes.

The shroud 30 forms a sector or a segment. It may exhibit the form of a strip of material with an axial length and/or a constant thickness. The sections of its ends 48 according to the circumference may be curved to correspond to a joint vane profile, for example.

In order to be fixed, for example by anchoring to one of the shrouds, possibly to each shroud, at least one box vane 42 may comprise at least one anchoring lug 50 at one of its radial ends. At least one or each vane 42 may possibly comprise two anchoring lugs 50 on the same radial side of the vane or at least two anchoring lugs on each radial vane end. At least one or each vane may possibly comprise at least one anchoring lug at each radial end.

At least one box vane 42 or each box vane 42 may comprise on the radially outer side two anchoring lugs 50, possibly one on the front side, for example in the downstream half of the vane or axially at the level of the trailing edge, and the other of the two anchoring lugs 50 on the back side, for example in the upstream half of the vane 42 or axially at the level of the leading edge.

The anchoring lugs 50 may extend mainly in the circumferential direction. They may extend in the direction of the neighbouring vane 42, possibly perpendicularly to the chord of the associated radial vane end. At least each vane end comprises a link 52 between the at least two anchoring lugs, the link 52 preferably extending parallel to the vane profile. At least one or each link 52 may exhibit a sectional continuity with the anchoring lugs 50, in such a manner as to reinforce them when dealing with a torsional or bending force.

The maximum distance between the anchoring lugs 50 may be greater than half of the associated vane end 42. This maximum distance may be measured on an axis that is inclined by more than 30° in respect of the chord of the corresponding radial vane end 42, preferably by more than 45°, more preferably by more than 60°.

The anchoring lugs 50 may be generally curved and/or generally flat to fit in the thickness of the shroud 30 and/or to overlap. The anchoring lugs 50 may extend in the direction of the neighbouring vanes 42 over the majority, preferably over the totality, of the width of the channels between the neighbouring vanes.

The shroud 30 may exhibit linking zones 54 at its circumferential ends. These zones 54 may allow fixing to the joint vanes and to the casing thanks to the openings 46, said openings being capable of replacing the openings 40 between the box vanes 42.

Figure 5 exhibits an angular sector 38 that forms a bladed stator box 38.

The circumferential ends of the shrouds (30; 32) may differ from one side to the other and from one shroud to the other. The linking zones 54 may be zones with a smaller thickness, for example to integrate in the thickness of said shrouds the thickness of the fixing platforms of the joint vanes. The zones with a smaller thickness 54 of the outer shroud 30 may be disposed on the outside and the zones with smaller thickness 54 of the inner shroud 32 may be disposed on the inside.

The sector 38 may comprise between two and ten, preferably between three and seven, more preferably four, vanes 42. These numbers allow the rigidity of a stage of stator vanes to be optimized, thanks to the association of joint vanes and boxes 38. The vanes may be anchored in openings 56 formed in the shrouds (30; 32), the openings 56 may open out or form closed pockets.

The sector 38 may comprise a layer of abradable material 34 applied to the inner surface of the inner shroud 32. This layer 34 may be profiled to fit between ribs.

Figure 6 depicts a joint vane 44.

The joint vane 44 comprises a body or vane 58 which extends in the turbine engine flow. It comprises at least one, preferably at least two, fixing platforms 60, each at one of the radial ends of the vane 44. At least one or each platform 58 comprises at least one fixing opening 62, the two platforms 58 preferably comprise at least two fixing openings, one on the front side of the vane, the other on the back side. The joint vane 44 can be made of metal, for example a titanium or aluminium alloy. It may be produced by forging, machining or additive fabrication.

The or each inner platform 60 may comprise a layer of abradable material (not shown) to present a continuity of circular material with the abradable layers of the boxes, in order to form a circular joint, such as the abradable layer shown in Figure 2.

Figure 7 depicts a section of the stator according to the axis 7-7 drawn in Figure 4. A box vane 42 is visible with an anchoring lug 50 integrated in the thickness of a shroud, possibly the outer shroud 30.

At least one or each anchoring lug 50 may be integrated in the thickness of the shroud 30. The radial thickness of the anchoring lug 50 is smaller than or equal to the thickness of the shroud 30, preferably smaller than or equal to half the thickness of the shroud. The outer surface of the anchoring lug may be flush with the outer surface of the shroud, possibly forming a surface continuity. The vane possibly comprises a radial link between the or each anchoring lug 50 and its aerodynamic vane is present in the flow.

At least one or each anchoring lug 50 may extend parallel to the shroud 30. The anchoring lug 50 may extend generally perpendicularly in respect of the stacking axis of the aerodynamic profiles of the vane. The position on the outside of the anchoring lug favours a radial retention of the shroud vane.

The description that has just been given is made in the context of an outer shroud; however, it may likewise be applied to an inner shroud, possibly by reversing in the radial direction.

Figure 8 represents an angular stator segment 38 according to the first embodiment of the disclosure. A box vane 42 is anchored to an inner shroud with the help of a stub 66. However, the presence of stubs 66 in the stator is optional, since a box vane or each box vane may be anchored to the two shrouds via anchoring lugs. The anchoring stub and said shroud being integrally formed or made in one piece.

One of the ends of at least one or of each box vane 42 may be fixed to one of the shrouds, for example the inner shroud 32, with the help of anchoring stubs 66. Said shroud 32 may exhibit stubs 66 formed on its surface and extending towards the vane. Each stub 66 may exhibit an anchoring wing 68 in its extension, the surface whereof may be ribbed or pierced to increase anchoring, but the section whereof is smaller. The anchoring of the vanes 42 to the shrouds 32 may be mixed, one side of the vanes being anchored with the help of anchoring lugs 50, the other with the help of stubs 66.

Figure 9 depicts a bladed angular sector 138 according to a second embodiment of the disclosure. This Figure 9 reproduces the system of numbering used in the preceding figures for identical or similar components, the numbering being increased by 100, however. Specific numbers are used for specific components in this embodiment. A box vane 142 is anchored to a shroud with the help of a stub

166.

The shroud, for example an inner shroud 132, may be moulded on the end of at least one or of each box vane 142. At least one or each vane 142 may exhibit an end about which is formed an anchoring stub 166 of the shroud 132. The vanes may be of metal, such as titanium, and the shroud 132 may be of a polymer material, such as a composite material, with an organic matrix. At least one or each stub 166 may form a slot 170 in which is anchored the end of the box vane 142.

Figure 10 depicts a bladed angular sector 238 according to a third embodiment of the disclosure. This Figure 10 reproduces the numbering system from the preceding figures for identical or similar components, the numbers being increased by 200, however. The box is depicted in axial section.

The sector 238 comprises two shrouds (230; 232) between which extend a plurality of box vanes 242. These vanes are anchored to the shrouds with the help of stubs 266 formed on the inner shroud 232 and the outer shroud 230. The stubs 266 extend radially one towards the other in the channel delimited by the sector. The stubs 266 may comprise anchoring slots and/or anchoring wings.

The shrouds (230; 232) may be made of composite material and the vanes may be of titanium. The vanes 242 may possibly be of composite material.

Claims

1. An angular sector of a bladed stator of an axial turbine engine, said sector comprising:

an arcuate segment of an outer shroud intended to be mounted on a casing of the turbine engine;

an arcuate segment of inner shroud; and

a row of stator vanes extending radially from the outer shroud to the inner shroud, each of the stator vanes comprising an inner anchoring portion anchored to the inner shroud and an outer anchoring portion anchored to the outer shroud in such a manner that the stator vanes, the inner shroud and the outer shroud form a bladed box, wherein at least one anchoring portion of a box vane comprises an anchoring lug which mainly extends in the circumferential direction toward a neighboring vane over at least half the width of the space between the neighboring vanes, and which is disposed in the thickness of one of the shrouds in such a manner as to anchor the vane to the shroud to make the box rigid.

2. The angular sector in accordance with claim 1, wherein each box vane comprises an airfoil extending between the shrouds in the radial direction, the anchoring lugs extending perpendicularly to the radial direction and generally perpendicular in respect of a chord of the associated vane.

3. The angular sector in accordance with claim 1, wherein at least one box vane comprises two lugs disposed at a same end, the lugs being generally curved.

4. The angular sector in accordance with claim 1, wherein at least one box vane comprises two lugs disposed at a same end, the lugs being axially offset with respect of each other.

5. The angular sector in accordance with claim 1, wherein at least one of the shrouds comprises a row of openings where the vanes are anchored, at least one anchoring lug being disposed in the opening of the side radially opposite the other of the two shrouds.

6. The angular sector in accordance with claim 1, wherein at least one anchoring lug is flush with the outer surface of the bladed box.

7. The angular sector in accordance with claim 1, wherein each vane end comprises at least one anchoring lug.

8. The angular sector in accordance with claim 1, wherein at least one of the shrouds is made of a composite material with an organic matrix and a fibrous preform.

9. The angular sector in accordance with claim 8, wherein the preform comprises fibres joining two neighboring box vanes.

10. The angular sector in accordance with claim 1, wherein at least one of the shrouds is made of a composite material with an organic matrix and fibres generally directed in a random manner.

11. The angular sector in accordance with claim 1, wherein the angular sector comprises from three to six box vanes, the box vanes are made of metal including titanium.

12. The angular sector in accordance with claim 1, wherein each shroud forms a material strip with a constant thickness between the box vanes upstream to downstream, the sector comprising an annular layer of abradable material on the inner surface of the inner shroud, the abradable layer covering the inner ends of the box vanes.

13. The angular sector in accordance with claim 1, wherein each box vane comprises one anchoring lug situated downstream of a pressure side of the box vane, and one anchoring lug situated upstream of a suction side of the box vane.

14. The angular sector in accordance with claim 1, wherein each box vane comprises at least two anchoring lugs disposed at a same radial end and a link between the at least two anchoring lugs, the link extending parallel to the profile of the vane.

15. The angular sector in accordance with claim 1, wherein the shroud radially opposite the lug comprises anchoring stubs projecting in respect of the shrouds toward the lug, the vanes being anchored to the stubs in such a manner as to be anchored to the opposite shroud.

16. An angular sector of a bladed stator of an axial turbine engine, said sector comprising:

an outer shroud in the form of a circular arc intended to be mounted on a casing of the turbine engine;

an inner shroud in the form of a circular arc; and

a row of stator vanes extending radially from the outer shroud to the inner shroud, each of the stator vanes comprising an inner anchoring portion anchored to the inner shroud and an outer anchoring portion anchored to the outer shroud, in such a manner that the stator vanes, the inner shroud and the outer shroud form a bladed box, wherein at least one shroud comprises an anchoring stub anchoring one box vane to the shroud, the stub forming a radial extension of the vane and projecting radially into the turbine engine flow, the anchoring stub and the shroud being integrally formed, the anchoring stub comprising a wing enveloped by the corresponding vane and extending over at least half the length of the stub.

17. The angular sector in accordance with claim 16, wherein the shroud comprises a plurality of vane anchoring stubs disposed in a row fashion, the anchoring stubs being sockets in which the vanes are anchored.

18. An axial turbine engine comprising:

an outer casing with an annular inner surface;

a plurality of angular stator sectors; and

joint vanes placed between the stator sectors so as to form an alternating configuration, the joint vanes being fixed to the outer casing and to the stator sectors in order to link the stator sectors to the outer casing, at least one sector comprising:

an arcuate outer shroud segment, the outer shroud segment comprising a main outer surface matching the casing inner surface;

an arcuate inner shroud segment in the form of a circular arc; and

a row of stator vanes extending radially from the outer shroud segment to the inner shroud segment, and anchored in the shroud segments in such a manner as to form a bladed box, wherein at least one box vane comprises an anchoring lug disposed in the thickness of one of the shroud segments in such a manner as to anchor the vane to the shroud segment to make the box rigid, the anchoring lug comprising an outer surface in contact with the annular inner surface of the outer casing.

FIG 1

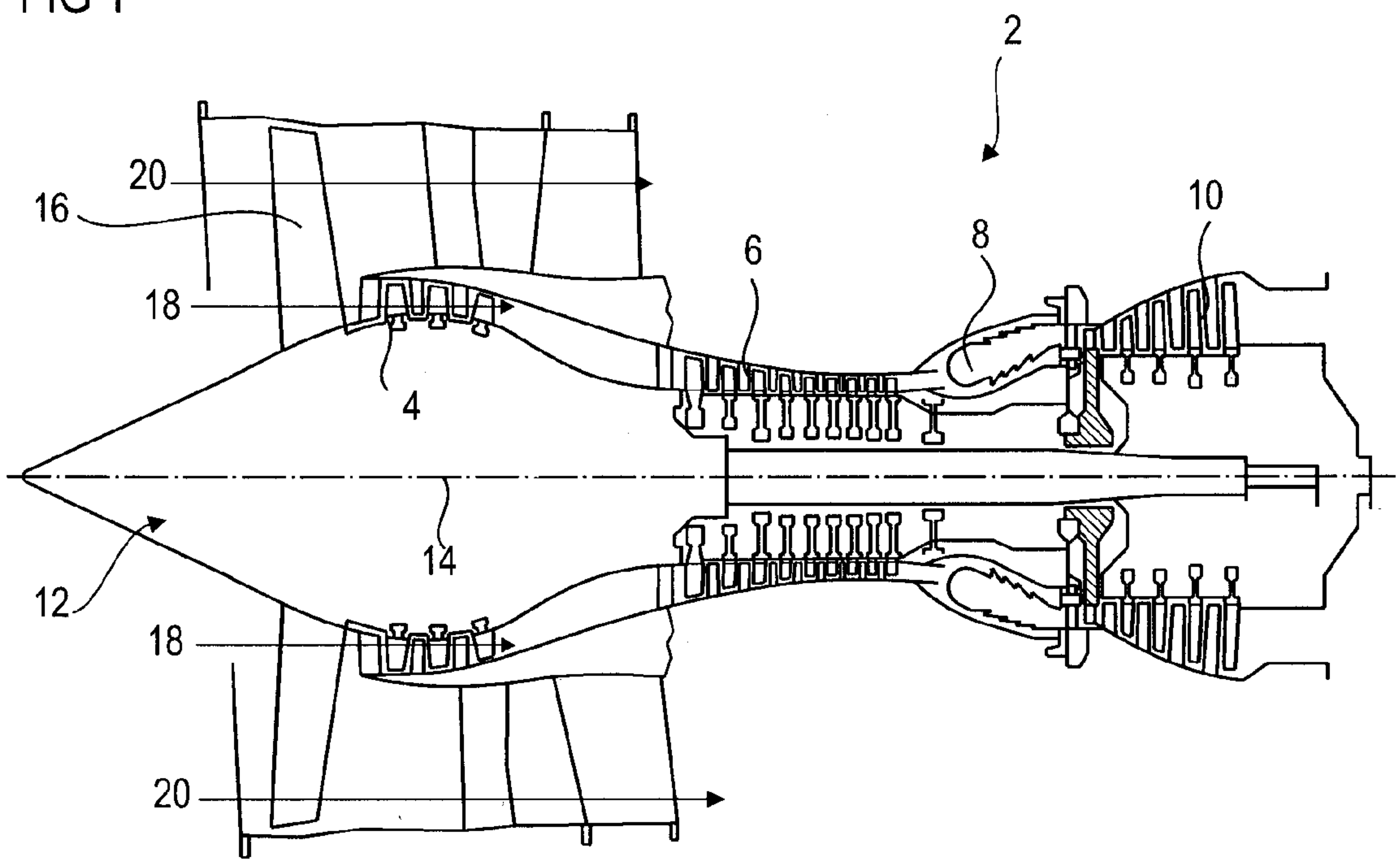

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FIG 2

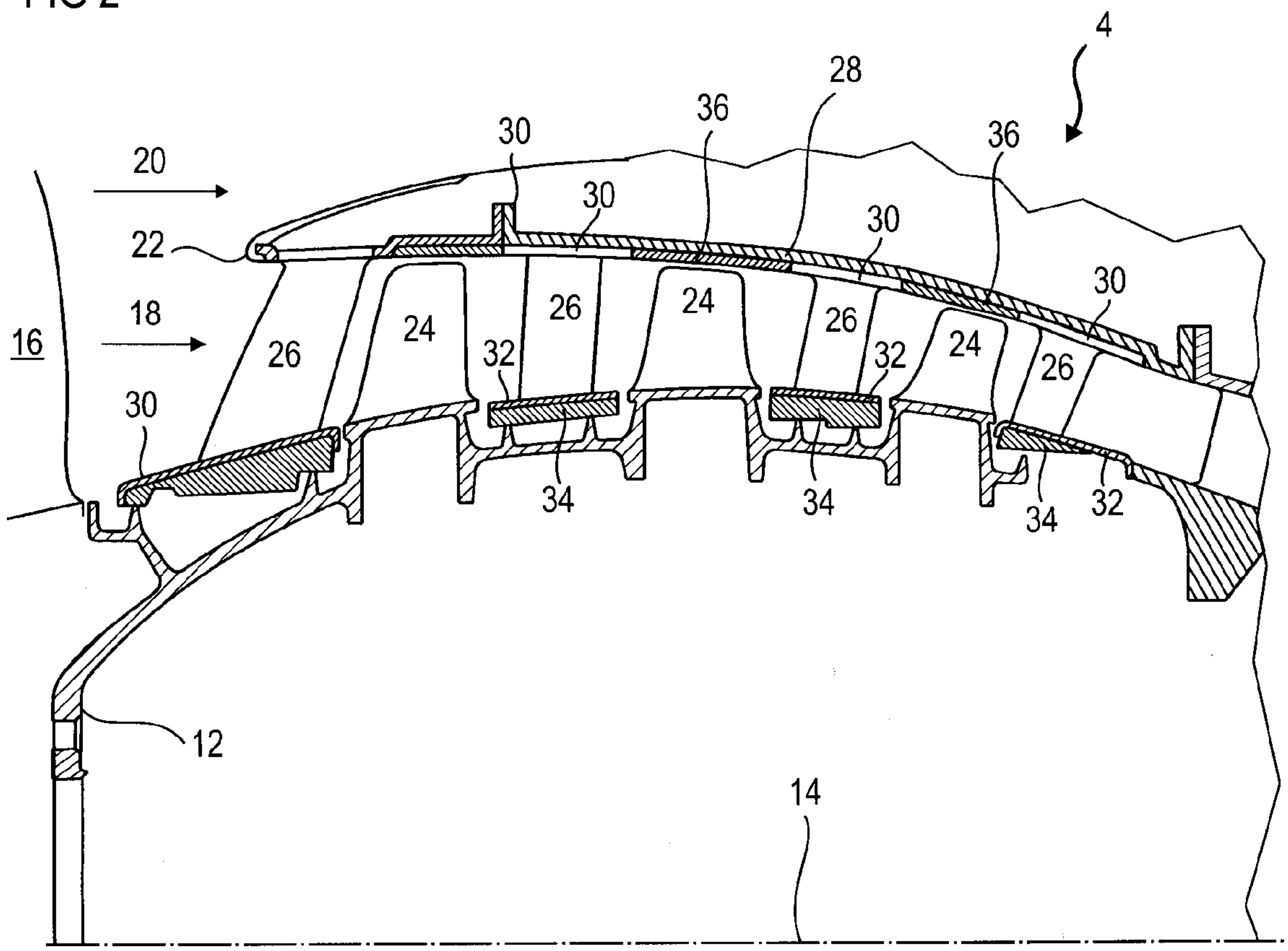
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FIG 3

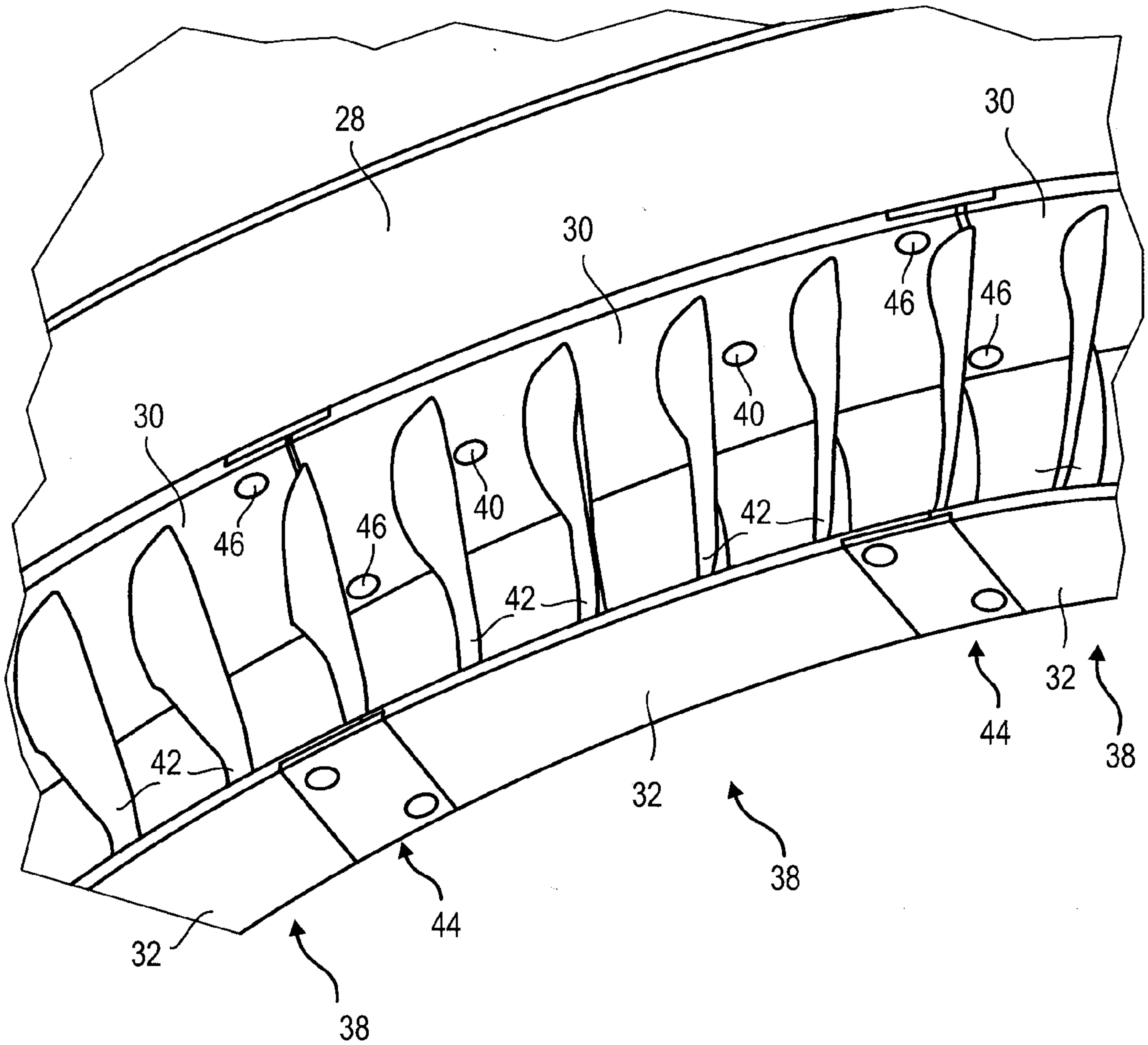
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FIG 4

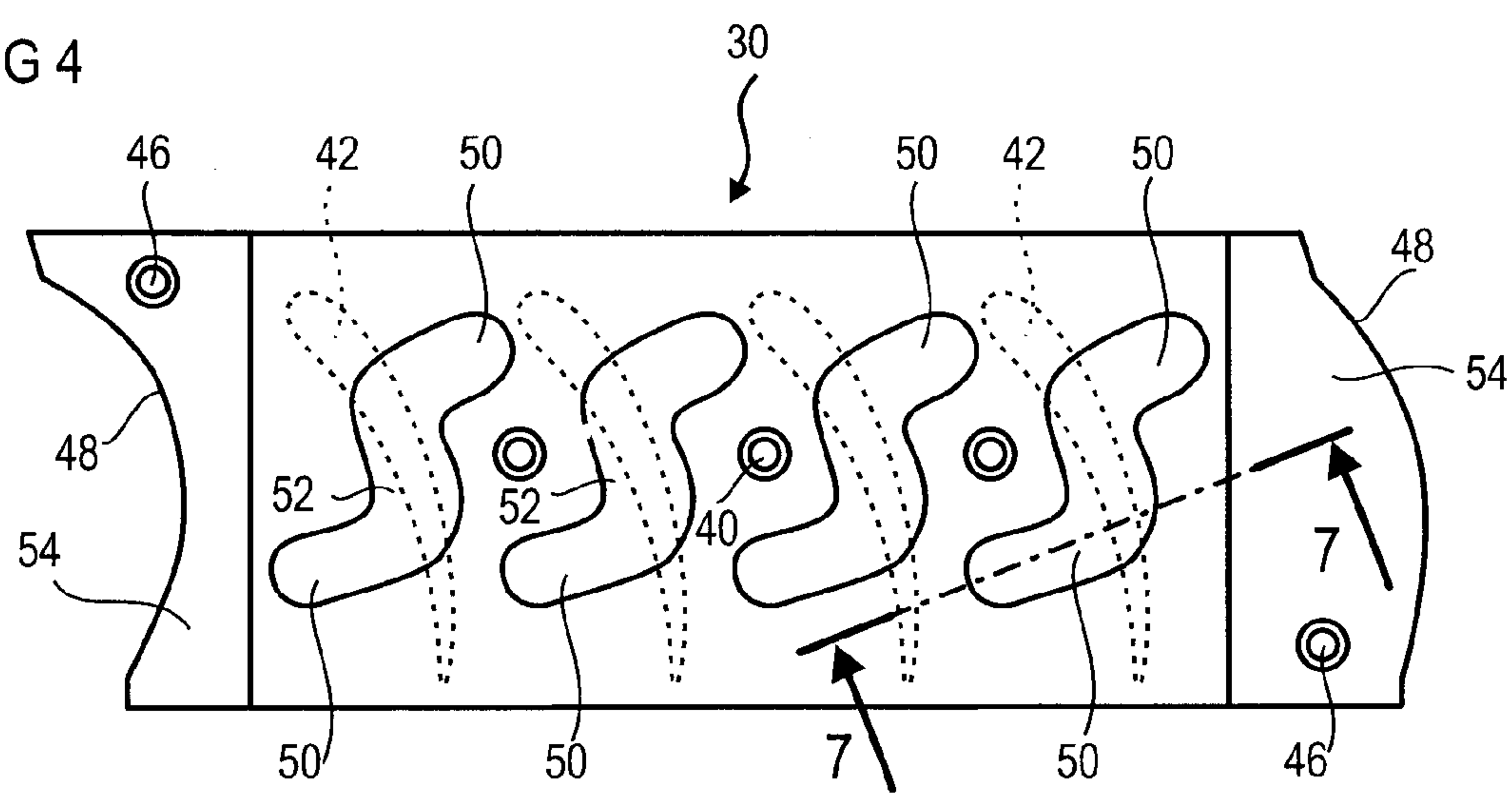
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FIG 5

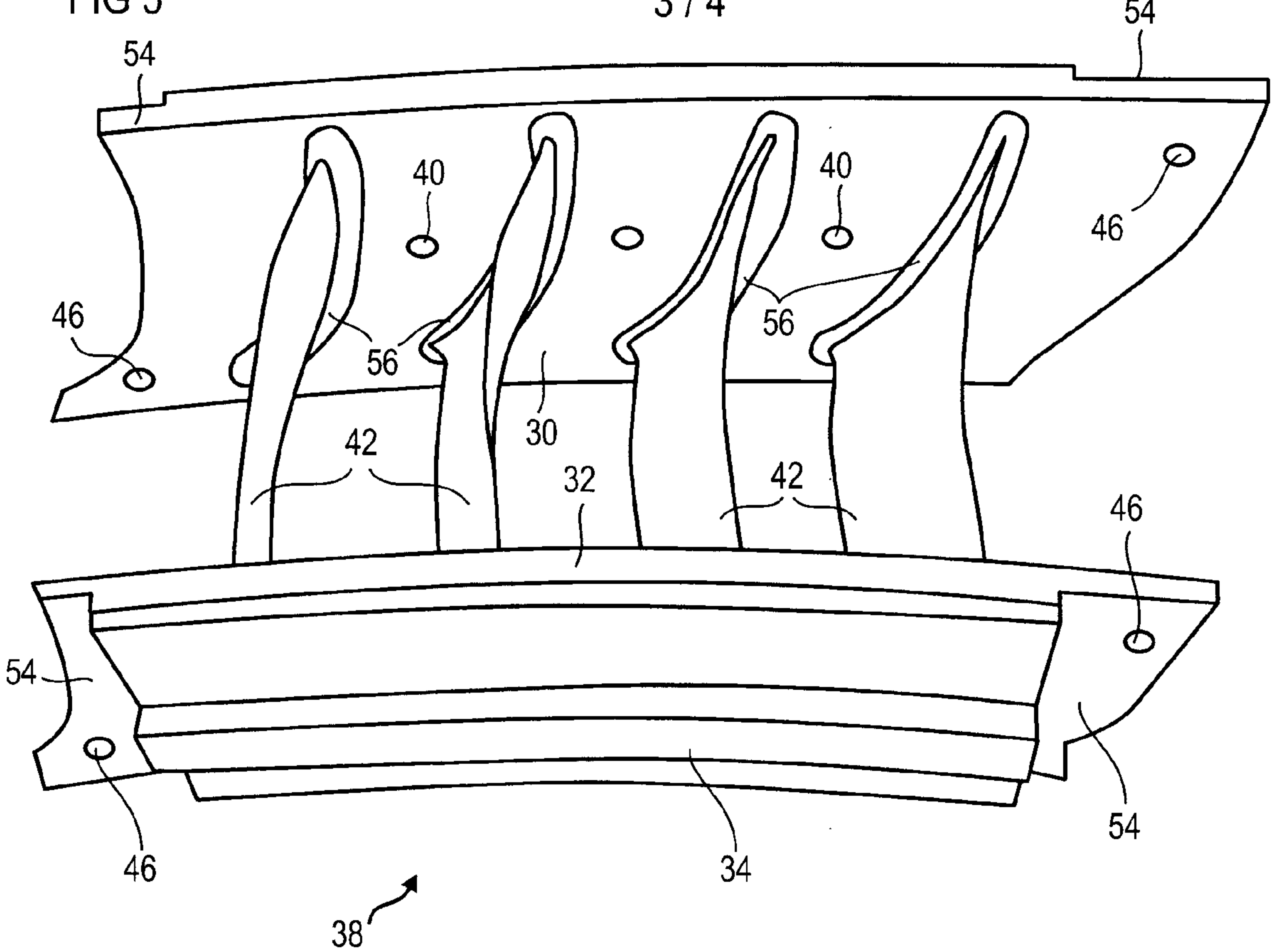


FIG 6

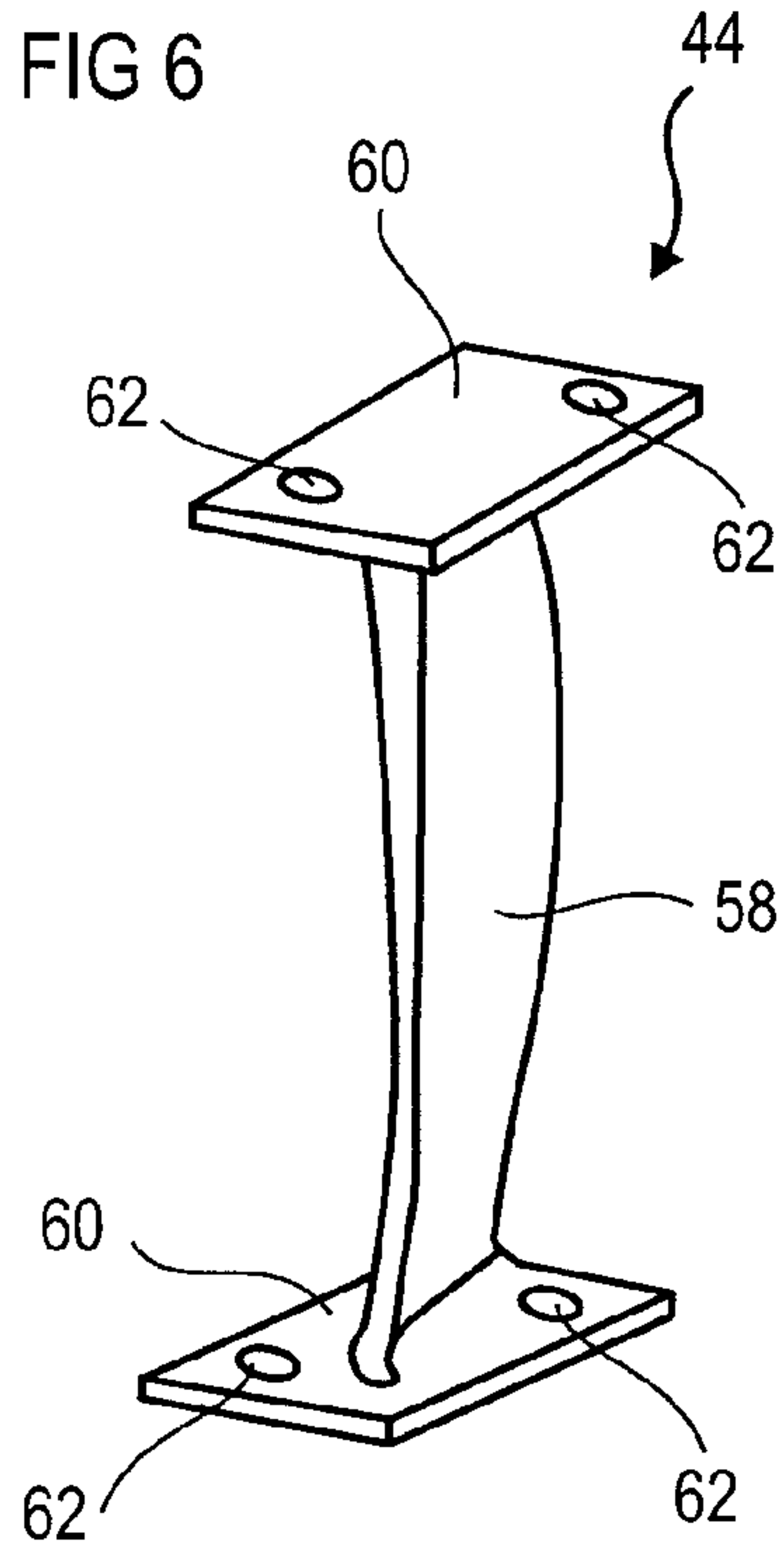


FIG 7

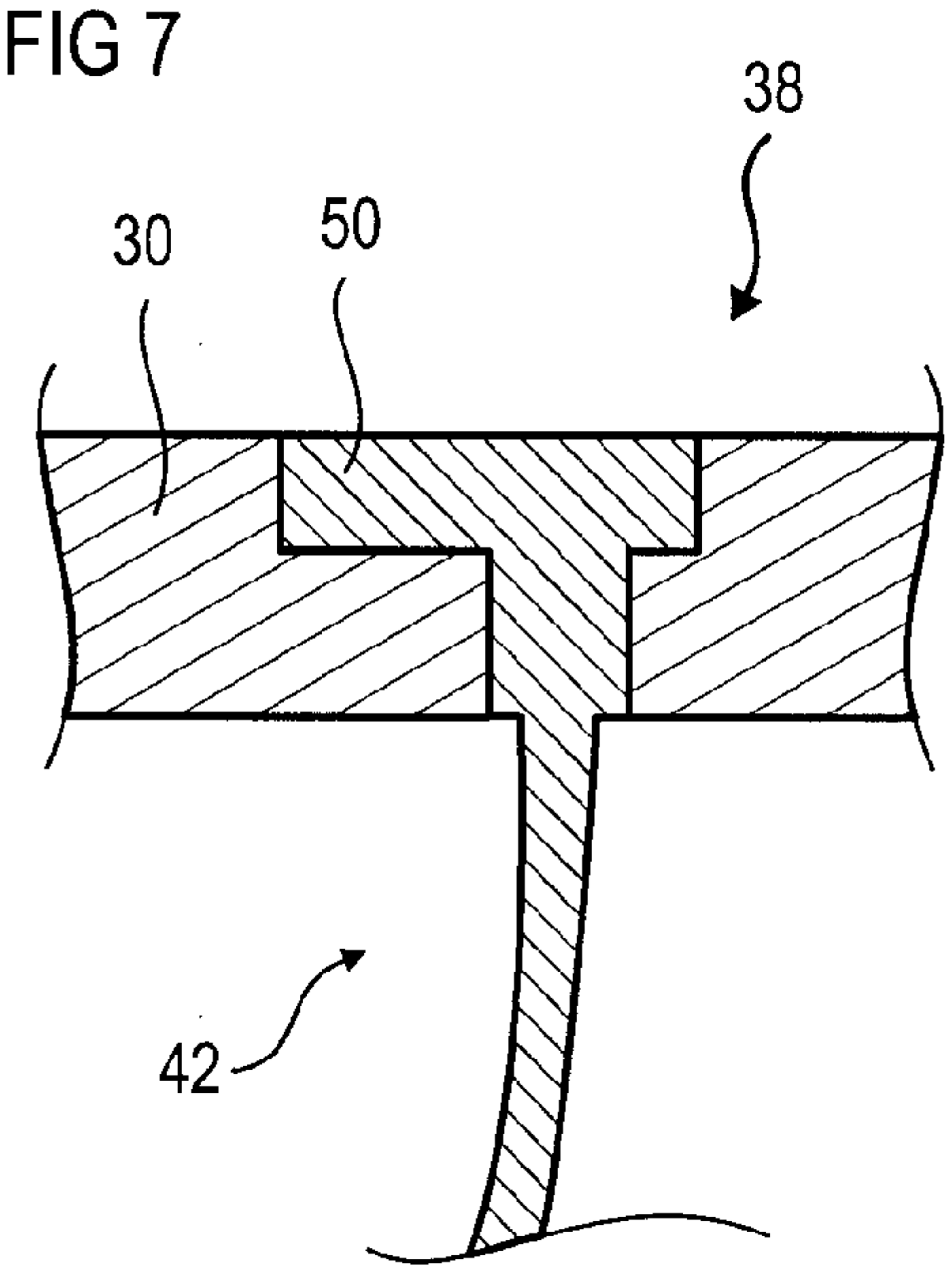


FIG 8

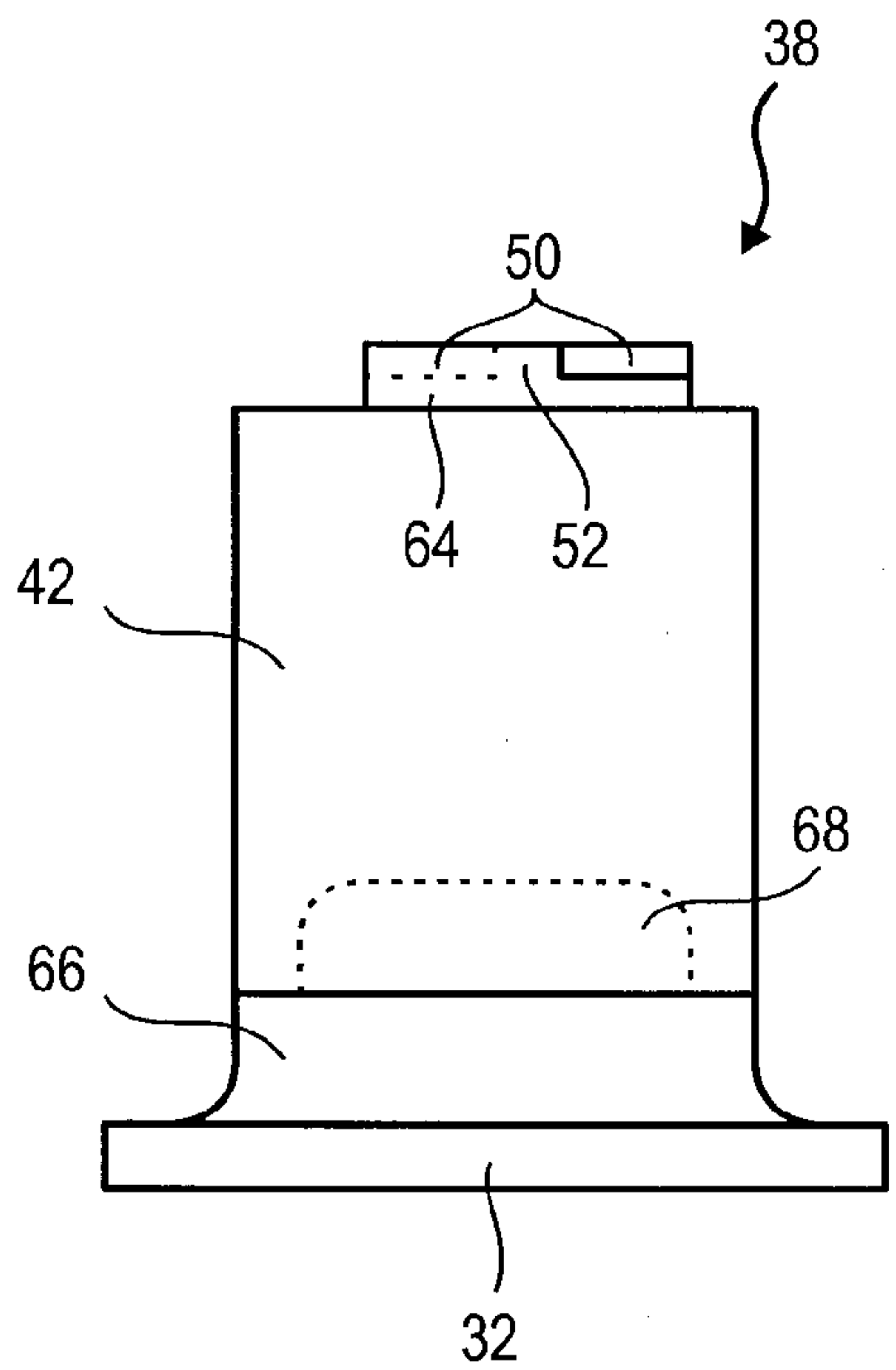


FIG 9

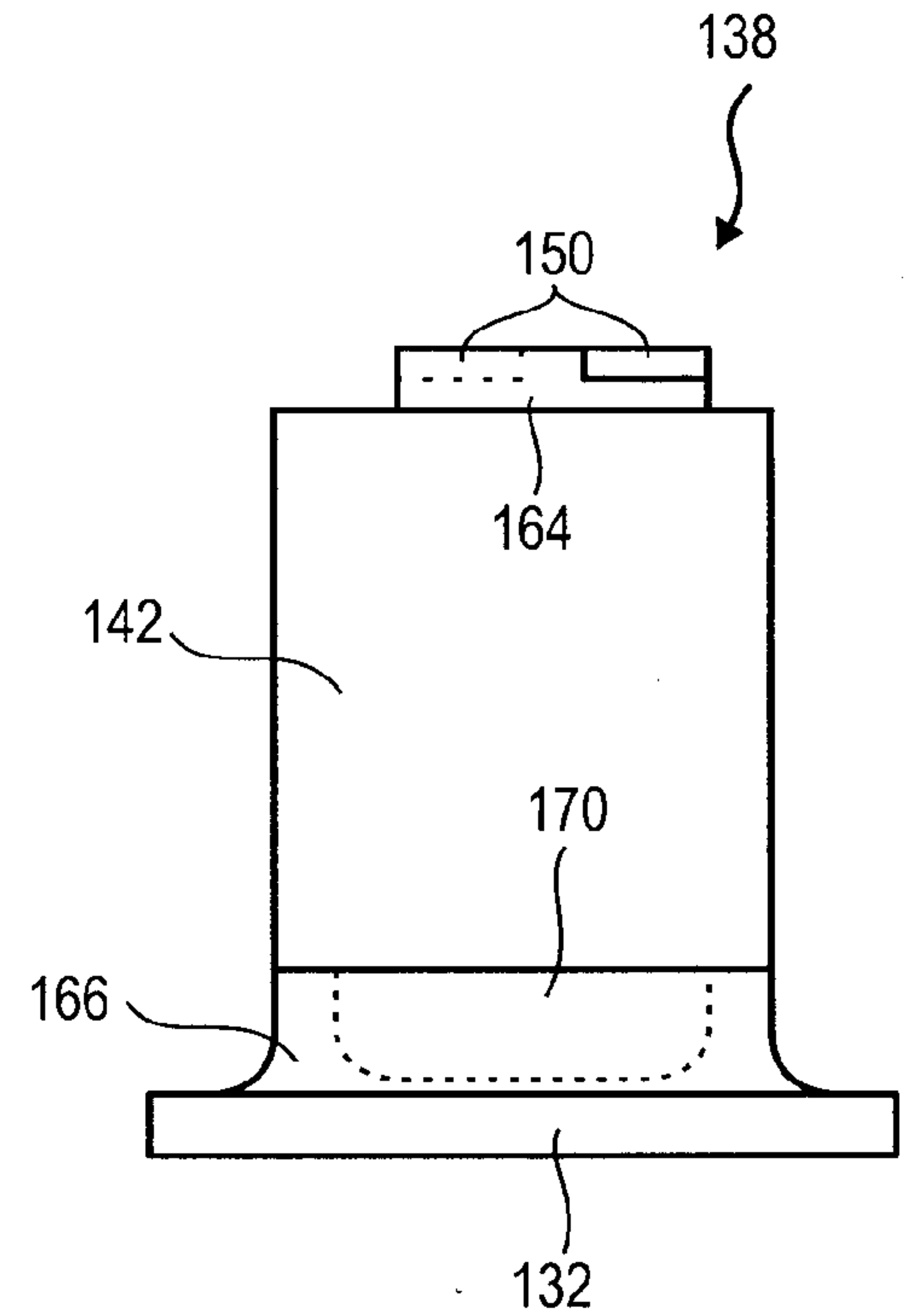
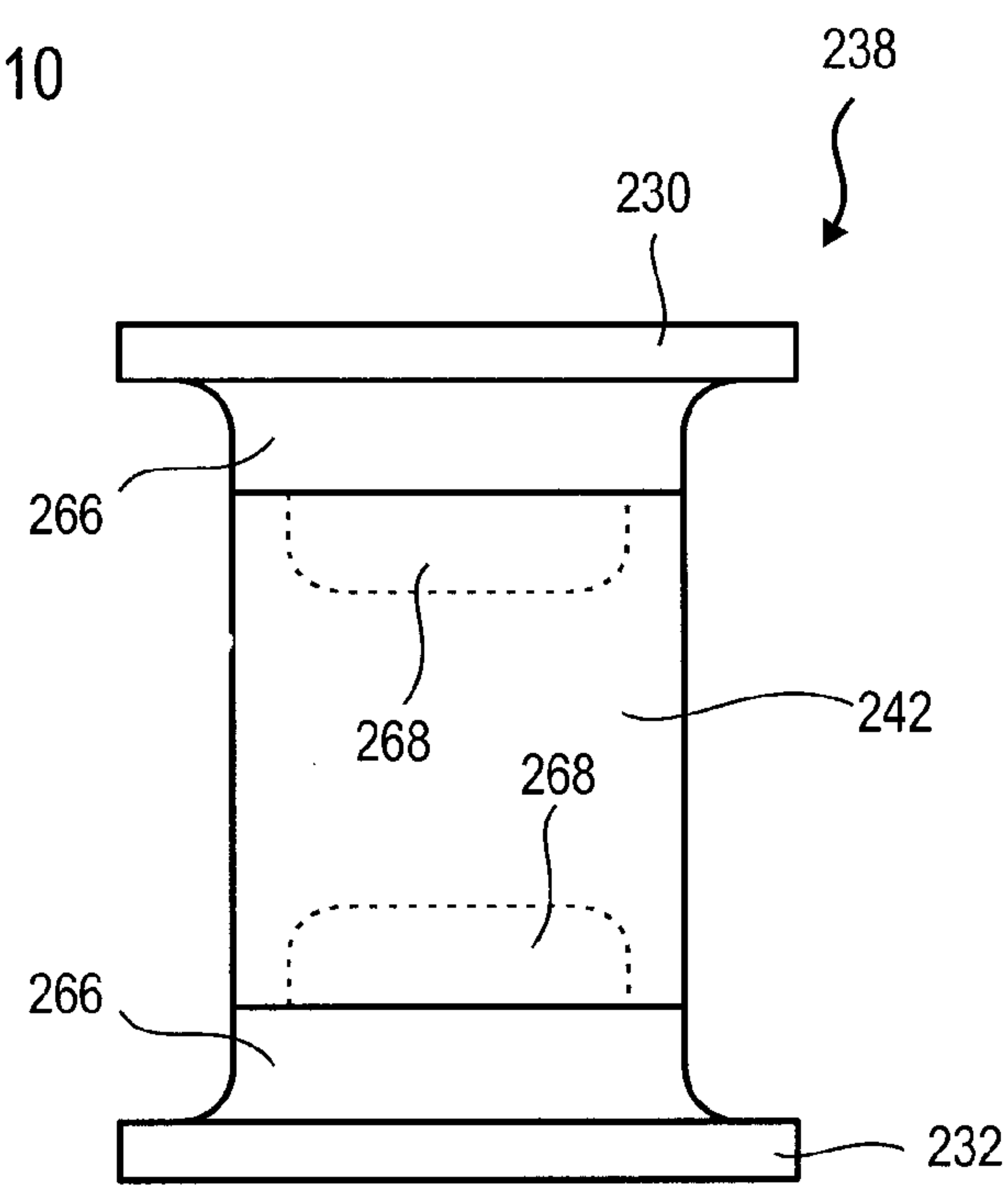
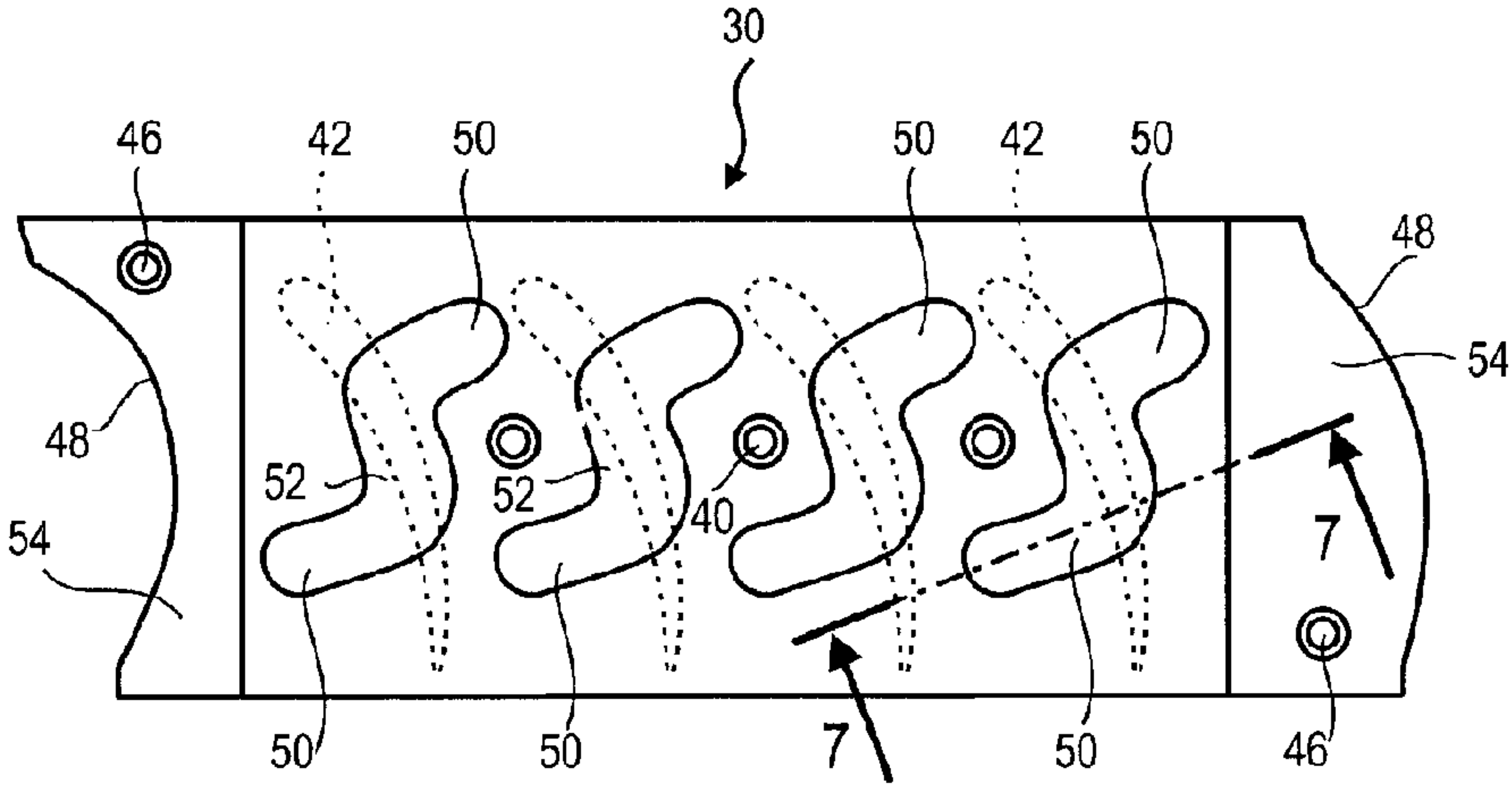


FIG 10

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