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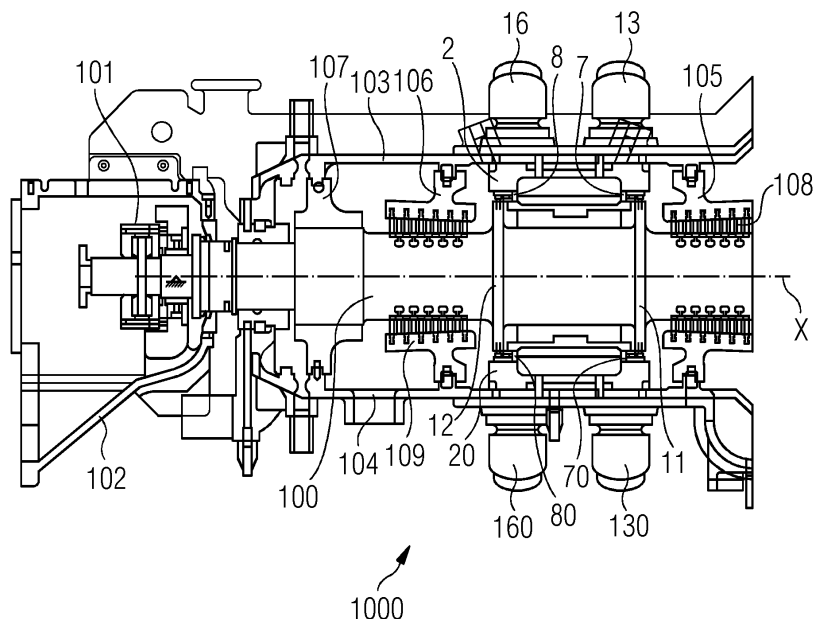
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(54) **NOZZLE CASING FOR A STEAM TURBINE WITH FOUR CHAMBERS AND TWO CONTROL WHEELS**

(57) It is described a nozzle casing (1) for a steam turbine (1000), comprising a first section (2) extending at least partly along a circumferential direction of the steam turbine (1000), wherein the first section (2) defines a first chamber (3) and a second chamber (4), which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine (1000), wherein the first section (2) further comprises a first inlet (5) configured to introduce a first steam flow from the outside into the first chamber (3), a second inlet (6) configured to introduce a second

and steam flow from the outside into the second chamber (4), a first outlet (7) being in a fluid communication with the first and second chambers (3, 4), and a second outlet (8) being in a fluid communication with the first and second chambers (3, 4), such that the first steam flow flowing from the first inlet (5) into the first chamber (3) is injectable through the first and second outlets (7, 8) into flow paths of the steam turbine (1000), and the second steam flow flowing from the second inlet (6) into the second chamber (4) is injectable through the first and second outlets (7, 8) into the flow paths of the steam turbine (1000).

FIG 2

Description

Field of invention

[0001] The present invention relates to the field of steam turbines. Particularly, the present invention relates to a nozzle casing for a steam turbine, and to a steam turbine.

Summary of the Invention

[0002] Fig. 9 shows a design of a steam turbine 900 according to the prior art, comprising a nozzle casing 921, 922 inside a turbine casing 911, 912. In Fig. 9 the nozzle casing 921, 922 is formed of an upper nozzle casing 921 and a lower nozzle casing 922. The upper nozzle casing 921 forms a first chamber therein (at the right upper side in Fig. 9), and the lower nozzle casing 922 forms a second chamber and a third chamber therein (at the left and right lower sides). Each chamber has an outlet (nozzle) in a shape of a circular ring segment. Downstream the outlets, a control wheel is arranged which is rotatable to adjust an amount of steam which is allowed to pass the corresponding outlet.

[0003] The upper nozzle casing 921 is surrounded by an upper turbine casing 911 and the lower nozzle casing 922 is surrounded by a lower turbine casing 912. A first turbine inlet 913 is connected to the upper turbine casing 911 at an upper right side of the steam turbine 900 in Fig. 9. Additionally, a second turbine inlet 914 and a third turbine inlet 915 are connected to the lower turbine casing 912 at a lower right side (second turbine inlet 914) and at a lower left side (third turbine inlet 915) of the steam turbine 900 in Fig. 9.

[0004] In the conventional solution, the control wheel is adjustable in such a way that the amount of steam of the first inlet steam flow 933, the second inlet steam flow 934 and the third inlet steam flow 935 are individually controlled depending on the load case.

[0005] There may be a need for a nozzle casing which enables a higher steam throughput and has a compacter size. This need may be met by the subject matters according to the independent claims. The present invention is further developed as set forth in the dependent claims.

[0006] According to a first aspect of the invention, a nozzle casing for a steam turbine, wherein the nozzle casing comprises a first section extending at least partly along a circumferential direction of the steam turbine. The nozzle casing is configured to be mounted around a turbine shaft of the steam turbine, wherein a lateral surface of the turbine shaft or a rotational direction of the turbine shaft corresponds to the circumferential direction of the steam turbine. The first section defines a first chamber and a second chamber, which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine. The first section further comprises a first inlet configured to introduce a first steam flow from the outside

into the first chamber, a second inlet configured to introduce a second steam flow from the outside into the second chamber, a first outlet being in a fluid communication with the first and second chambers, and a second outlet being in a fluid communication with the first and second chambers such that the first steam flow flowing from the first inlet into the first chamber is injectable through the first and second outlets into flow paths of the steam turbine, and the second steam flow flowing from the second inlet into the second chamber is injectable through the first and second outlets into the flow paths of the steam turbine. The first and second outlets preferably extend along an arc or ring segment in the circumferential direction and are shaped as a slit or a perforated grid. Advantageously, the nozzle casing which enables a higher steam throughput and has a compacter size.

[0007] In an embodiment, the first section further comprises a third inlet configured to introduce a third steam flow from the outside into the first chamber and a fourth inlet configured to introduce a fourth steam flow from the outside into the second chamber, such that the third steam flow flowing from the third inlet into the first chamber is injectable through the first and second outlets into the flow paths of the steam turbine, and the fourth steam flow flowing from the fourth inlet into the second chamber is injectable through the first and second outlets into the flow paths of the steam turbine. Advantageously, the nozzle casing which enables even a higher and uniform steam throughput.

[0008] In an embodiment, the nozzle casing further comprises a second section extending at least partly along the circumferential direction of the steam turbine, wherein the second section defines a third chamber and a fourth chamber, which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine. The second section further comprises a fifth inlet configured to introduce a fifth steam flow from the outside into the third chamber, a sixth inlet configured to introduce a sixth steam flow from the outside into the fourth chamber, a third outlet being in a fluid communication with the third and fourth chambers, and a fourth outlet being in a fluid communication with the third and fourth chambers, such that the fifth steam flow flowing from the fifth inlet into the third chamber is injectable through the third and fourth outlets into the flow paths of the steam turbine, and the sixth steam flow flowing from the sixth inlet into the fourth chamber is injectable through the third and fourth outlets into the flow paths of the steam turbine. Advantageously, the nozzle casing is easy to manufacture and provides a higher and uniform steam throughput.

[0009] In an embodiment, the nozzle casing comprises at least one of the following: extensions of the first chamber and the second chamber have an overlap in an axial direction of the steam turbine, and extensions of the third chamber and the fourth chamber have an overlap in an axial direction of the steam turbine. The axial direction can be defined by an axis of the turbine shaft. Advanta-

geously, the nozzle casing is very compact.

[0010] In an embodiment, the first and second sections are similarly or identically shaped, and the first and second sections are particularly cast parts. Thus, the first and second sections can be manufactured in a large lot size under low costs.

[0011] In an embodiment, the second section further comprises a seventh inlet configured to introduce a seventh steam flow from the outside into the third chamber and an eighth inlet configured to introduce an eighth steam flow from the outside into the fourth chamber, such that the seventh steam flow flowing from the seventh inlet into the third chamber is injectable through the third and fourth outlets into the flow paths of the steam turbine, and the eighth steam flow flowing from the eighth inlet into the fourth chamber is injectable through the third and fourth outlets into the flow paths of the steam turbine. As a result, the nozzle casing is equipped with eight steam inlets.

[0012] In an embodiment, the nozzle casing further comprises a first control wheel arranged downstream of the first outlet and a second control wheel arranged downstream of the second outlet, the first control wheel being configured to adjust a steam flow from the first outlet and the second control wheel being configured to adjust a steam flow from the second outlet.

[0013] In an embodiment, the first control wheel is further configured to adjust a steam flow from the third outlet and the second control wheel is further configured to adjust a steam flow from the fourth outlet.

[0014] According to a second aspect of the invention, a steam turbine comprises the above-mentioned nozzle casing, wherein a steam flow from the first outlet merges a steam flow from the third outlet in a first axial direction of the steam turbine, and a steam flow from the second outlet merges a steam flow from the fourth outlet in a second first axial direction of the steam turbine, wherein the second first axial direction of the steam turbine is opposite to the first axial direction of the steam turbine. Such a steam turbine has a high throughput and a compact size.

[0015] In an embodiment, the steam turbine further comprises at least one of the following: a first piping having a first branch connected to the first inlet and a second branch connected to the second inlet, wherein the first piping is particularly an elbow piping; and a second piping having a first branch connected to the third inlet and a second branch connected to the fourth inlet, wherein the second piping is particularly an elbow piping. The pipings are easy to manufacture, robust and compact.

[0016] In an embodiment, the first and second control wheels are supported by the first and second sections and by a turbine casing. A sealing can be arranged between the control wheel and the nozzle casing body.

[0017] It has to be noted that embodiments of the invention have been described with reference to different subject matters.

[0018] In particular, some embodiments have been described with reference to apparatus type claims whereas

other embodiments have been described with reference to method type claims. However, a person skilled in the art will gather from the above and the following description that, unless otherwise notified, in addition to any combination of features belonging to one type of subject matter also any combination between features relating to different subject matters, in particular between features of the apparatus type claims and features of the method type claims is considered as to be disclosed with this application.

Brief Description of the Drawings

[0019] The aspects defined above and further aspects of the present invention are apparent from the examples of embodiment to be described hereinafter and are explained with reference to the examples of embodiment. The invention will be described in more detail hereinafter with reference to examples of embodiment but to which the invention is not limited.

Fig. 1 shows a bottom view of a steam turbine according to an embodiment;

Fig. 2 shows a longitudinal section C-C of the steam turbine of Fig. 1;

Fig. 3 shows a cross section B-B of the steam turbine of Fig. 1;

Fig. 4 shows a bottom view of a nozzle casing;

Fig. 5 shows a cross section E-E of the nozzle casing of Fig. 4;

Fig. 6 shows a longitudinal section of the nozzle casing according to the embodiment;

Fig. 7 shows a cross section E1-E1 of the nozzle casing according to the embodiment;

Fig. 8 shows a cross section E2-E2 of the nozzle casing according to the embodiment;

Fig. 9 shows a design of a steam turbine according to the prior art.

Detailed Description

[0020] The illustrations in the drawings are schematically. It is noted that in different figures, similar or identical elements are provided with the same reference signs.

[0021] Fig. 1 shows a bottom view of a steam turbine 1000 according to an embodiment, Fig. 2 shows a longitudinal section C-C of the steam turbine 1000 of Fig. 1, and Fig. 3 shows a cross section B-B of the steam turbine 1000 of Fig. 1.

[0022] A turbine shaft 100 is rotatably supported in a

turbine casing 103 by means of a radial and axial bearing 101, which is arranged in a bearing pedestal 102, and another radial bearing (not shown). Between the turbine shaft 100 and the turbine casing 103, a nozzle casing 1 is arranged, through which steam flows are injected to stator and rotor bladings 108, 109 which are supported at the turbine shaft 100 via guide blade carriers 105, 106. After having passed the stator and rotor bladings 108, 109, the steam flow is discharged from the turbine case 103 at the right-hand side of Fig. 2 and through a bleed passage 104 at the left-hand side of Fig. 2. Reference sign 107 designates a balance piston gland.

[0023] As particularly shown in Figures 2 and 3, the nozzle casing 1 comprises a first section 2 extending at least partly along a circumferential direction of the steam turbine 1000. The nozzle casing 1 is configured to be mounted around the turbine shaft 100 of the steam turbine 1000, wherein a lateral surface of the turbine shaft 100 or a direction of rotation of the turbine shaft 100 around a rotational axis X corresponds to the circumferential direction of the steam turbine 1000. The first section 2 defines a first chamber 3 and a second chamber 4, which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine 1000.

[0024] The first section 2 further comprises a first inlet 5 configured to introduce a first steam flow from the outside into the first chamber 3, a second inlet 6 configured to introduce a second steam flow from the outside into the second chamber 4, a first outlet 7 being in a fluid communication with the first and second chambers 3, 4, and a second outlet 8 being in a fluid communication with the first and second chambers 3, 4. In the embodiment, each outlet 7, 8 extends along a circular ring segment or arc segment in the circumferential direction and is shaped as a slit or a perforated grid. The first inlet 5, the second inlet 6, the first outlet 7 and the second outlet 8 are configured such that the first steam flow flowing from the first inlet 5 into the first chamber 3 is injectable through the first and second outlets 7, 8 into flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109, and the second steam flow flowing from the second inlet 6 into the second chamber 4 is injectable through the first and second outlets 7, 8 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109.

[0025] Fig. 4 shows a bottom view of a nozzle casing 1, Fig. 5 shows a cross section E-E of the nozzle casing 1 of Fig. 4, Fig. 6 shows a longitudinal section of the nozzle casing according to the embodiment, Fig. 7 shows a cross section E1-E1 of the nozzle casing according to the embodiment, and Fig. 8 shows a cross section E2-E2 of the nozzle casing according to the embodiment. The first section 2 further comprises a third inlet 9 configured to introduce a third steam flow from the outside into the first chamber 3 and a fourth inlet 10 configured to introduce a fourth steam flow from the outside into the second chamber 4. The third inlet 9 and the fourth inlet

10 are configured such that the third steam flow flowing from the third inlet 9 into the first chamber 3 is injectable through the first and second outlets 7, 8 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109, and the fourth steam flow flowing from the fourth inlet 10 into the second chamber 4 is injectable through the first and second outlets 7, 8 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109.

[0026] In Fig. 3, reference sign P designates a horizontal split plane, wherein the first section 2 is arranged directly above the horizontal split plane P. The nozzle casing 1 further comprises a second section 20 extending at least partly along the circumferential direction of the steam turbine 1000, i.e. directly below the horizontal split plane P. In other words, the nozzle casing 1 is divided at the horizontal split plane P in the upper first section 2 and the lower second section 20. The first section 2 and the lower section 20 can be connected to each other by bolts, or they can also be welded at the horizontal split plane P.

[0027] The second section 20 defines a third chamber 30 and a fourth chamber 40, which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine 1000. The second section 20 further comprises a fifth inlet 50 configured to introduce a fifth steam flow from the outside into the third chamber 30, a sixth inlet 60 configured to introduce a sixth steam flow from the outside into the fourth chamber 40, a third outlet 70 being in a fluid communication with the third and fourth chambers 30, 40, and a fourth outlet 80 being in a fluid communication with the third and fourth chambers 30, 40. In the embodiment, each outlet 70, 80 extends along a circular ring or arc segment of the circumferential direction and is shaped as a slit or a perforated grid. The fifth inlet 50, the sixth inlet 60, the third outlet 70, and the fourth outlet 80 are configured such that the fifth steam flow flowing from the fifth inlet 50 into the third chamber 30 is injectable through the third and fourth outlets 70, 80 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109, and the sixth steam flow flowing from the sixth inlet 60 into the fourth chamber 40 is injectable through the third and fourth outlets 70, 80 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109.

[0028] As shown in Fig. 3, the first section 2 comprises a partition wall 17, by which the first chamber 3 is separated from the second chamber 4. Extensions of the first chamber 3 and the second chamber 4 have an overlap in an axial direction of the steam turbine 1000, wherein the axial direction is similar to the rotational axis X of the turbine shaft 100. In the same manner, the second section 20 comprises a partition wall 170, by which the third chamber 30 is separated from the fourth chamber 40. Extensions of the third chamber 30 and the fourth chamber 40 have an overlap in an axial direction of the steam turbine 1000.

[0029] The first and second sections 2, 20 are similarly

or identically shaped, and the first and second sections 2, 20 are particularly cast parts so that the first and second sections 2, 20 can be manufactured in a large lot size under low costs.

[0030] As shown in Figures 6 to 8, the second section 20 further comprises a seventh inlet 90 configured to introduce a seventh steam flow from the outside into the third chamber 30 and an eighth inlet 110 configured to introduce an eighth steam flow from the outside into the fourth chamber 40. The seventh inlet 90 and the eighth inlet 110 are configured such that the seventh steam flow flowing from the seventh inlet 90 into the third chamber 30 is injectable through the third and fourth outlets 70, 80 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109, and the eighth steam flow flowing from the eighth inlet 110 into the fourth chamber 40 is injectable through the third and fourth outlets 70, 80 into the flow paths of the steam turbine 1000 towards the stator and rotor bladings 108, 109.

[0031] Sealing rings (not shown) are placed at every steam inlet 5, 6, 9, 10, 50, 60, 90, 110. In particular, the sealing rings can be placed between the first section 2 and the turbine casing 103 and between the second section 20 and the turbine casing 103 (cf. Fig. 3).

[0032] As shown in Fig. 2, a first control wheel 11 is arranged downstream of the first outlet 7, and a second control wheel 12 is arranged downstream of the second outlet 8. The first control wheel 11 is configured to adjust a steam flow from the first outlet 7, and the second control wheel 12 is configured to adjust a steam flow from the second outlet 8. The first control wheel 11 is further configured to adjust a steam flow from the third outlet 70, and the second control wheel 12 is further configured to adjust a steam flow from the fourth outlet 80.

[0033] As can be taken from Fig. 2, a steam flow from the first outlet 7 merges a steam flow from the third outlet 70 in a first axial direction of the steam turbine 1000 (to the right in Fig. 2), and a steam flow from the second outlet 8 merges a steam flow from the fourth outlet 80 in second first axial direction of the steam turbine 1000 (to the left in Fig. 2), wherein the second first axial direction of the steam turbine 1000 is opposite to the first axial direction of the steam turbine 1000.

[0034] As shown in Figures 2 and 3, the steam turbine 1000 further comprises at the first section 2 a first piping 13 having a first branch 14 connected to the first inlet 5 and a second branch 15 connected to the second inlet 6, wherein the first piping 13 is embodied as an elbow piping. At the first section 2, second piping 16 is provided, which has a first branch connected to the third inlet 9 and a second branch (not shown) connected to the fourth inlet 10, wherein the second piping 16 is also embodied as an elbow piping.

[0035] The steam turbine 1000 further comprises at the second section 20 a first piping 130 having a first branch 140 connected to the first inlet 50 and a second branch 150 connected to the second inlet 60, wherein the first piping 130 is also embodied as an elbow piping.

At the second section 20, second piping 160 is provided, which has a first branch connected to the third inlet 9 and a second branch connected to the fourth inlet 10, wherein the second piping 160 is also embodied as an elbow piping. Preferably, the first and second pipings 13, 16, 130, 160 are similarly or identically shaped.

[0036] As shown in Fig. 2, the first and second control wheels 11, 12 are supported by the first and second sections 2, 20 and by the turbine casing 103, wherein a sealing can be arranged between the first and second control wheels 11, 12 and the first and second sections 2, 20.

[0037] It should be noted that the term "comprising" does not exclude other elements or steps and "a" or "an" does not exclude a plurality. Also, elements described in association with different embodiments may be combined. It should also be noted that reference signs in the claims should not be construed as limiting the scope of the claims.

20 List of reference signs:

[0038]

1	nozzle casing
2	first section
3	first chamber
4	second chamber
5	first inlet
6	second inlet
7	first outlet
8	second outlet
9	third inlet
10	fourth inlet
11	first control wheel
12	second control wheel
13	first piping
14	first branch
15	second branch
16	second piping
17	partition wall
20	second section
30	first chamber
40	second chamber
50	first inlet
60	second inlet
70	first outlet
80	second outlet
90	third inlet
100	turbine shaft
101	radial and axial bearing
102	bearing pedestal
103	turbine casing
104	bleed passage
105	guide blade carrier
106	guide blade carrier
107	balance piston gland
108	stator and rotor blading
109	stator and rotor blading

110	eighth inlet
130	first piping
140	first branch
150	second branch
170	partition wall
1000	steam turbine
X	rotational axis
P	horizontal split plane

Claims

1. A nozzle casing (1) for a steam turbine (1000), comprising:

a first section (2) extending at least partly along a circumferential direction of the steam turbine (1000), wherein the first section (2) defines a first chamber (3) and a second chamber (4), which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine (1000), wherein the first section (2) further comprises:

a first inlet (5) configured to introduce a first steam flow from the outside into the first chamber (3), a second inlet (6) configured to introduce a second steam flow from the outside into the second chamber (4), a first outlet (7) being in a fluid communication with the first and second chambers (3, 4), and a second outlet (8) being in a fluid communication with the first and second chambers (3, 4), such that:

the first steam flow flowing from the first inlet (5) into the first chamber (3) is injectable through the first and second outlets (7, 8) into flow paths of the steam turbine (1000), and
the second steam flow flowing from the second inlet (6) into the second chamber (4) is injectable through the first and second outlets (7, 8) into the flow paths of the steam turbine (1000).

2. The nozzle casing (1) according to the preceding claim,

wherein the first section (2) further comprises a third inlet (9) configured to introduce a third steam flow from the outside into the first chamber (3) and a fourth inlet (10) configured to introduce a fourth steam flow from the outside into the second chamber (4), such that:

the third steam flow flowing from the third inlet (9) into the first chamber (3) is injectable through the first and second outlets (7, 8) into the flow paths of the steam turbine (1000), and
the fourth steam flow flowing from the fourth inlet (10) into the second chamber (4) is injectable through the first and second outlets (7, 8) into the flow paths of the steam turbine (1000).

3. The nozzle casing (1) according to any one of the preceding claims, further comprising:

a second section (20) extending at least partly along the circumferential direction of the steam turbine (1000), wherein the second section (20) defines a third chamber (30) and a fourth chamber (40), which are not in a fluid-communication with each other and extend along different sections along the circumferential direction of the steam turbine (1000), wherein the second section (20) further comprises:

a fifth inlet (50) configured to introduce a fifth steam flow from the outside into the third chamber (30), a sixth inlet (60) configured to introduce a sixth steam flow from the outside into the fourth chamber (40), a third outlet (70) being in a fluid communication with the third and fourth chambers (30, 40), and a fourth outlet (80) being in a fluid communication with the third and fourth chambers (30, 40), such that:

the fifth steam flow flowing from the fifth inlet (50) into the third chamber (30) is injectable through the third and fourth outlets (70, 80) into the flow paths of the steam turbine (1000), and
the sixth steam flow flowing from the sixth inlet (60) into the fourth chamber (40) is injectable through the third and fourth outlets (70, 80) into the flow paths of the steam turbine (1000).

4. The nozzle casing (1) according to any one of the preceding claims, comprising at least one of the following:

extensions of the first chamber (3) and the second chamber (4) have an overlap in an axial direction of the steam turbine (1000), and
extensions of the third chamber (30) and the fourth chamber (40) have an overlap in an axial direction of the steam turbine (1000).

5. The nozzle casing (1) according to any one of the preceding claims 3 and 4, wherein
the first and second sections (2, 20) are similarly or identically shaped, and the first and second sections (2, 20) are particularly cast parts.

6. The nozzle casing (1) according to any one of the preceding claims 3 to 5, wherein
the second section (20) further comprises a seventh inlet (90) configured to introduce a seventh steam flow from the outside into the third chamber (30) and an eighth inlet (110) configured to introduce an eighth steam flow from the outside into the fourth chamber (40), such that:

the seventh steam flow flowing from the seventh inlet (90) into the third chamber (30) is injectable through the third and fourth outlets (70, 80) into the flow paths of the steam turbine (1000), and

the eighth steam flow flowing from the eighth inlet (110) into the fourth chamber (40) is injectable through the third and fourth outlets (70, 80) into the flow paths of the steam turbine (1000).

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7. The nozzle casing (1) according to any one of the preceding claims, further comprising:
a first control wheel (11) arranged downstream of the first outlet (7) and a second control wheel (12) arranged downstream of the second outlet (8), the first control wheel (11) being configured to adjust a steam flow from the first outlet (7) and the second control wheel (12) being configured to adjust a steam flow from the second outlet (8).
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8. The nozzle casing (1) according to the preceding claim, wherein
the first control wheel (11) is further configured to adjust a steam flow from the third outlet (70) and the second control wheel (12) is further configured to adjust a steam flow from the fourth outlet (80).
20
9. A steam turbine (1000) comprising the nozzle casing (1) according to any one of the preceding claims, wherein
a steam flow from the first outlet (7) merges a steam flow from the third outlet (70) in a first axial direction of the steam turbine (1000), and a steam flow from the second outlet (8) merges a steam flow from the fourth outlet (80) in second first axial direction of the steam turbine (1000), the second first axial direction of the steam turbine (1000) being opposite to the first axial direction of the steam turbine (1000).
25
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10. The steam turbine (1000) according to the preceding claim, further comprising at least one of the following:
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a first piping (13) having a first branch (14) connected to the first inlet (5) and a second branch (15) connected to the second inlet (6), wherein the first piping (13) is particularly an elbow piping; and
40
a second piping (16) having a first branch connected to the third inlet (9) and a second branch connected to the fourth inlet (10), wherein the second piping (16) is particularly an elbow piping.
45
11. The steam turbine (1000) according to any one of the preceding claims 9 and 10 comprising the nozzle casing (1) according to claim 3 and one of claims 7 or 8, wherein
the first and second control wheels (11, 12) are supported by the first and second sections (2, 20) and by a turbine casing.
50
55

FIG 1

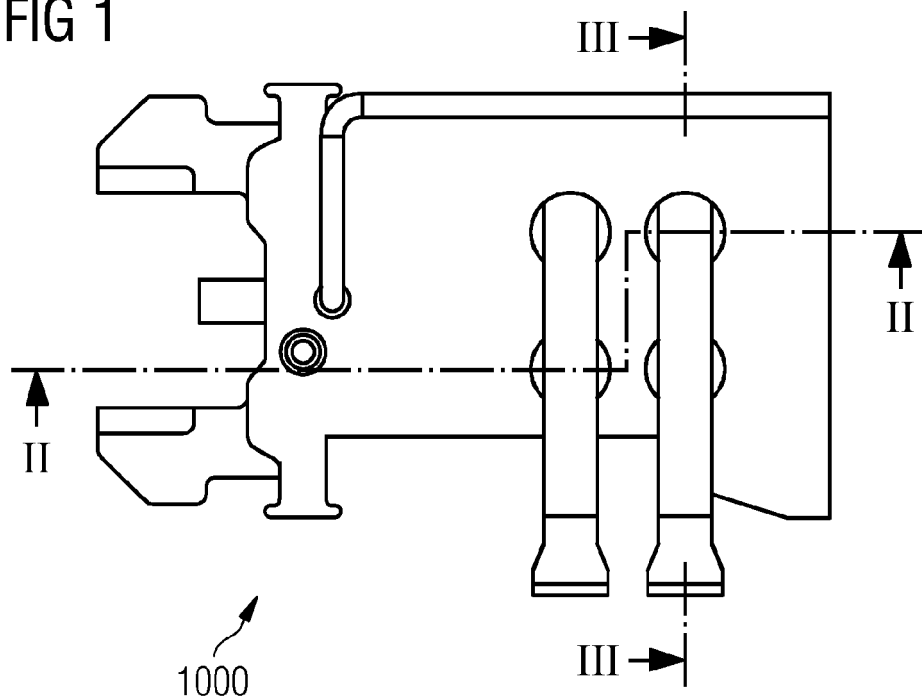


FIG 2

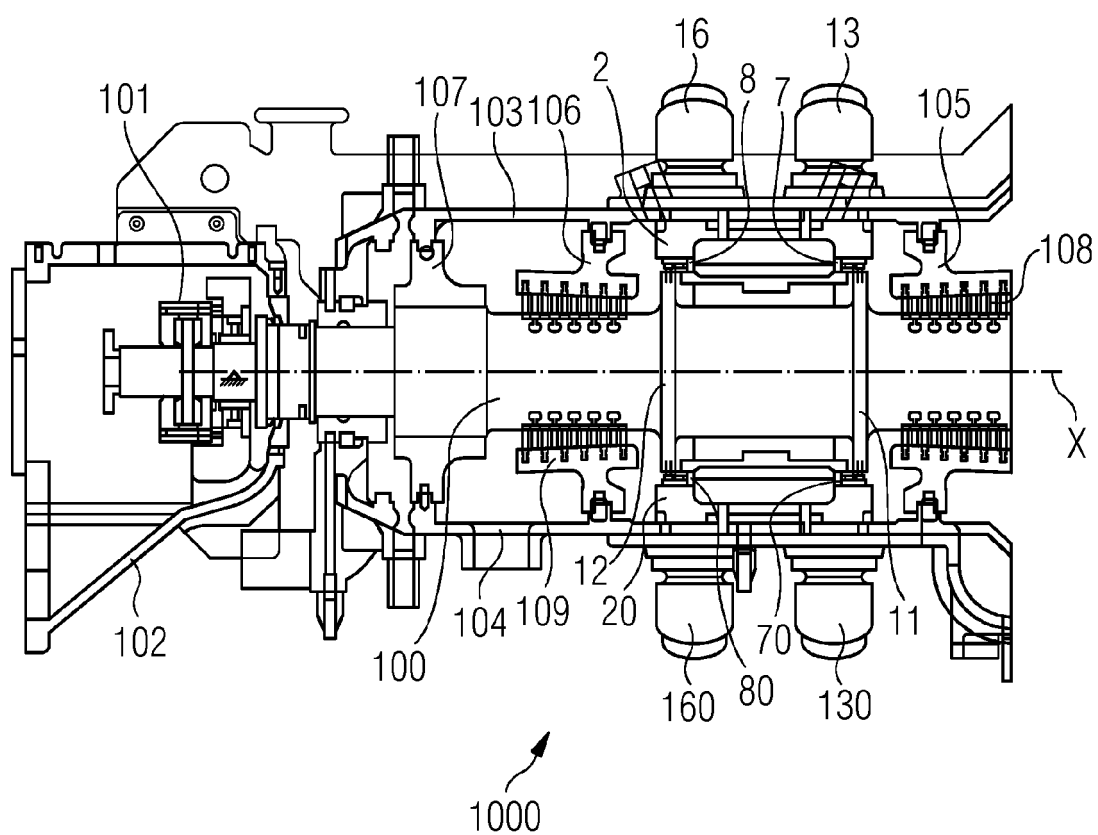


FIG 3

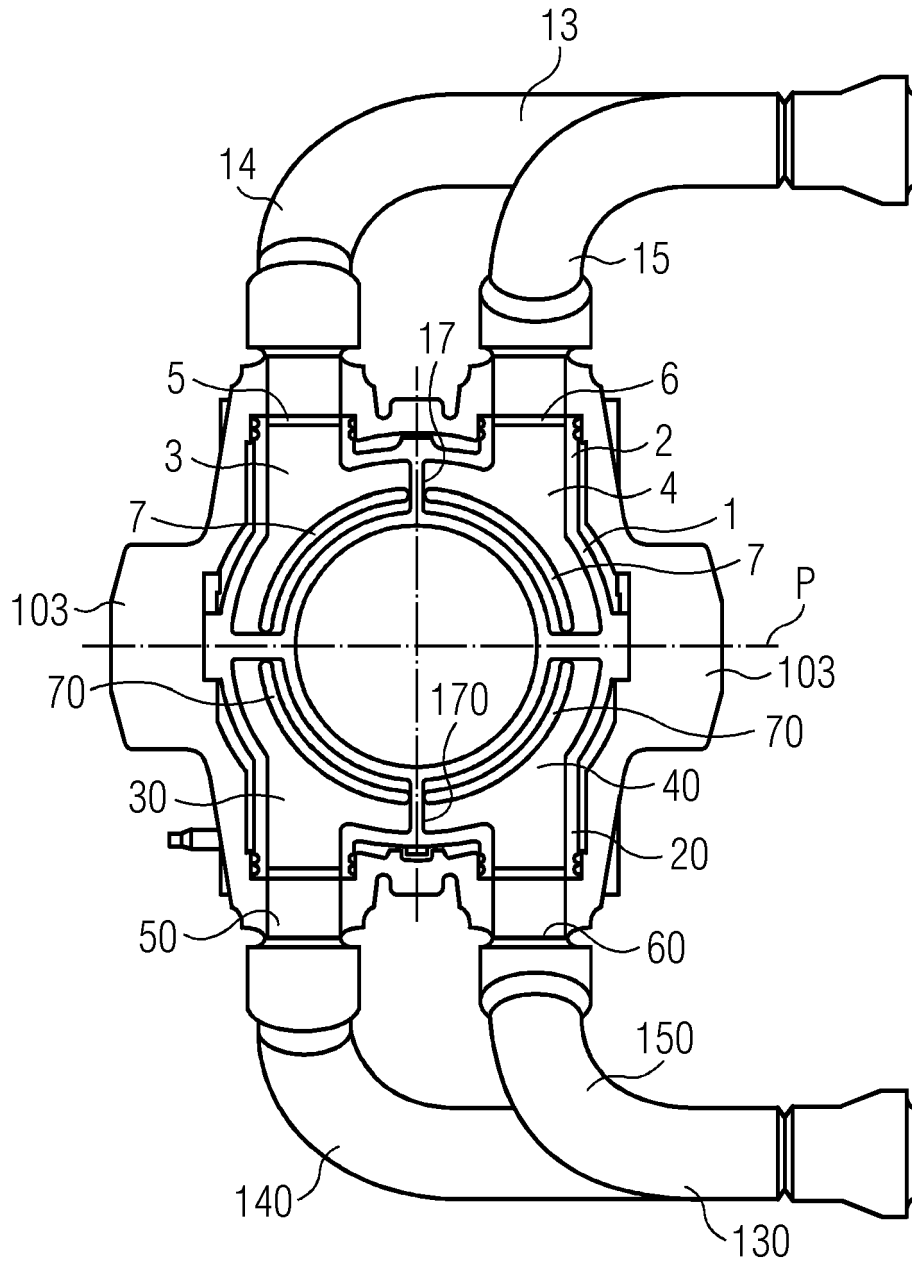


FIG 4

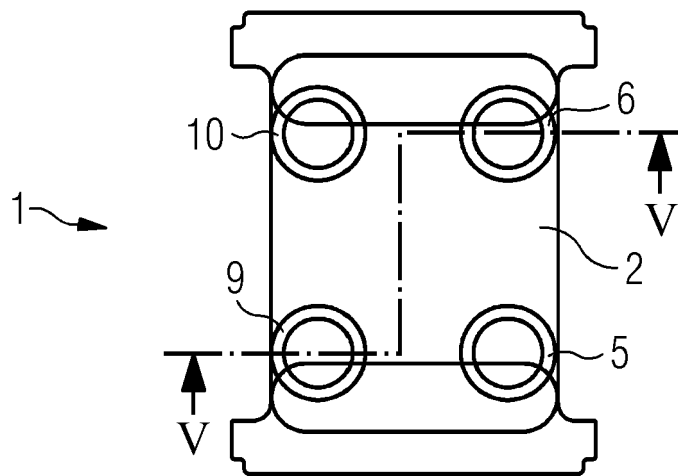


FIG 5

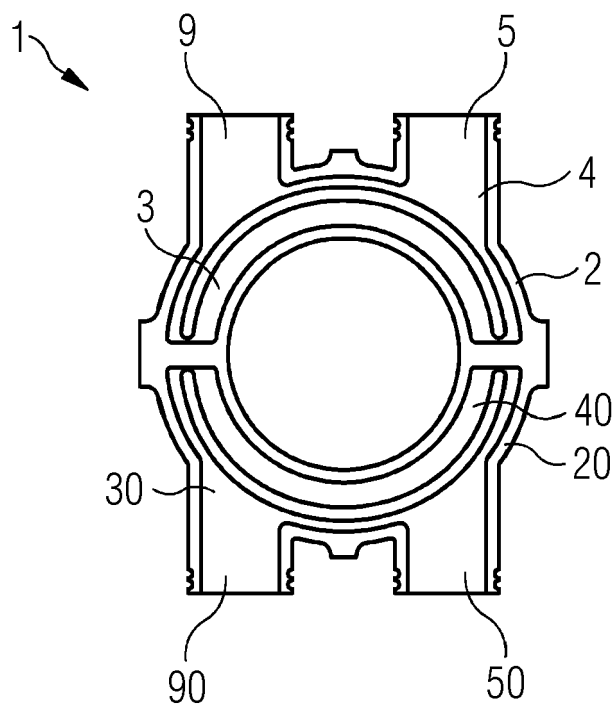


FIG 6

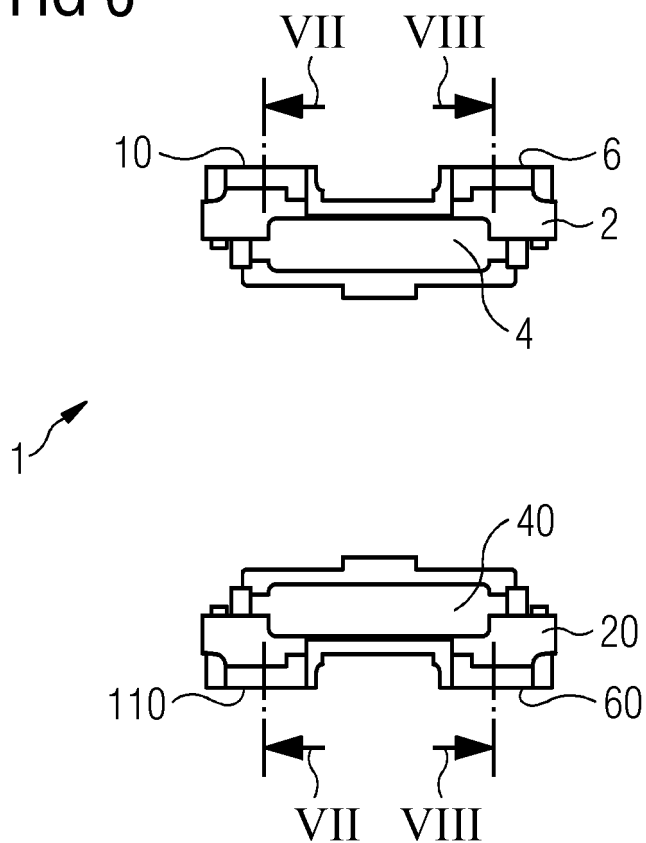


FIG 7

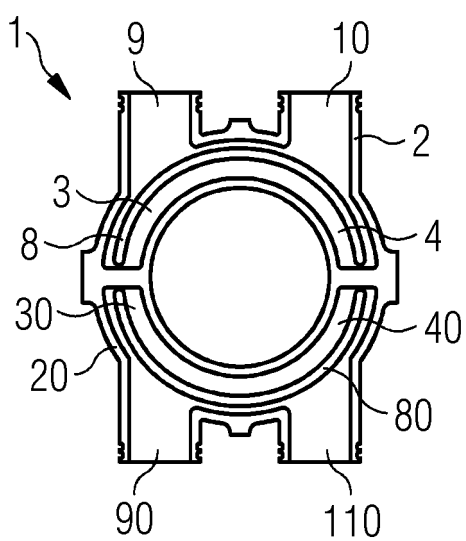


FIG 8

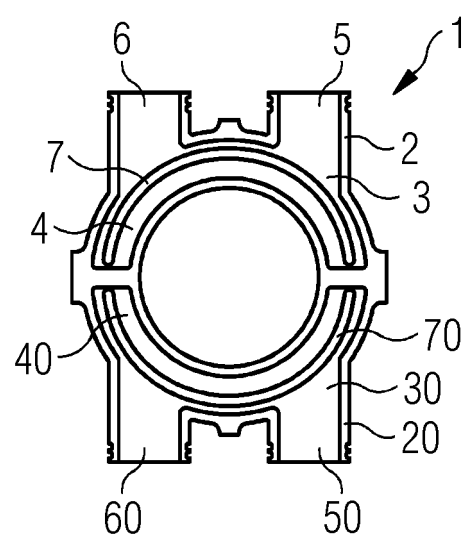
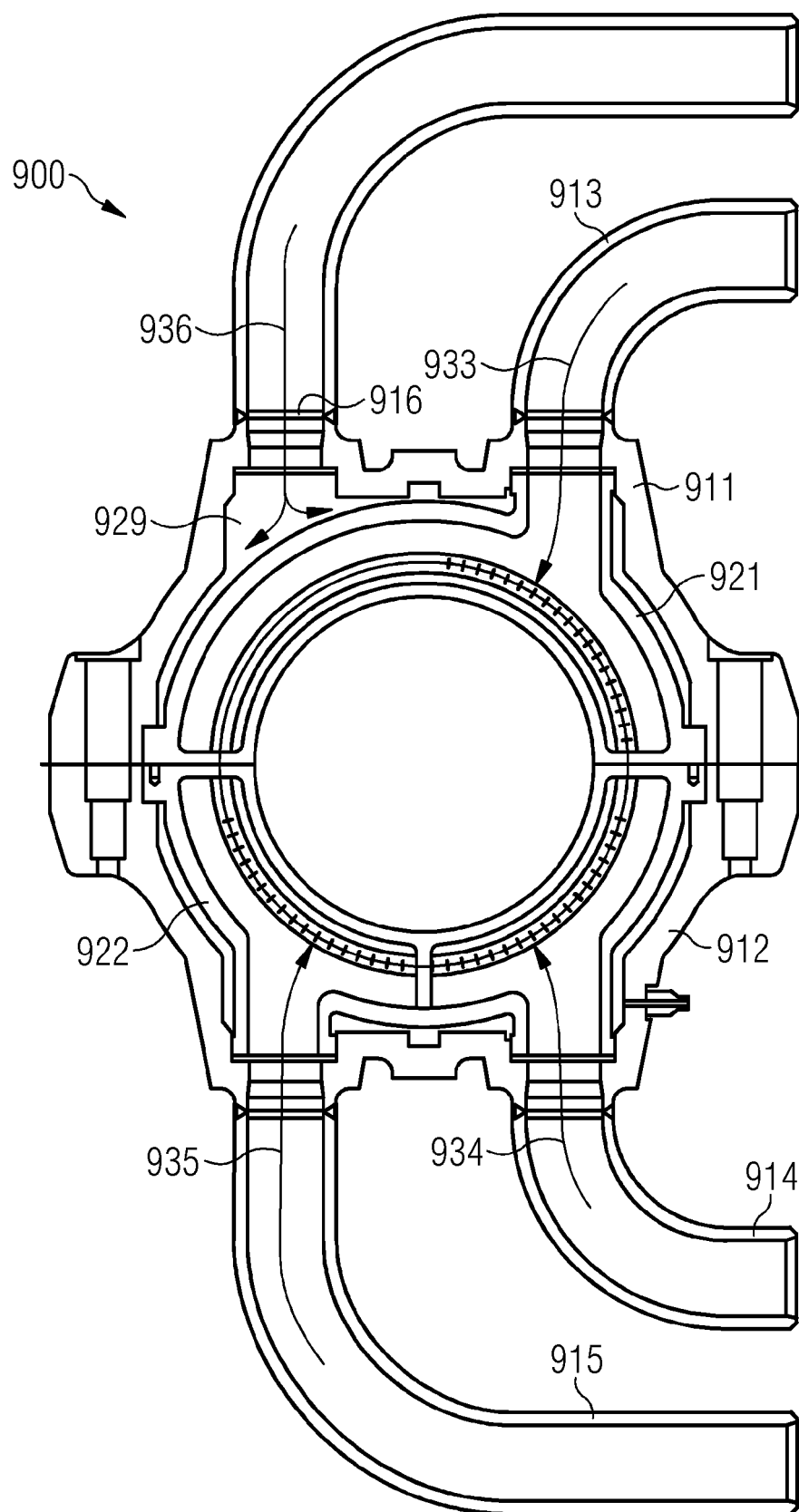


FIG 9 PRIOR ART





EUROPEAN SEARCH REPORT

Application Number
EP 20 18 1856

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 3 409 895 A1 (SIEMENS AG [DE]) 5 December 2018 (2018-12-05) * abstract; figure 6 * * paragraphs [0082], [0083], [0104] *	1,4	INV. F01D25/24 F01D9/02 F01D9/06 F01D25/26 F01D9/04
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