(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 566 626 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.11.2019 Bulletin 2019/46

(21) Application number: **19169749.9**

(22) Date of filing: **17.04.2019**

(51) Int Cl.:
A47K 10/06 *(2006.01)* ***F28D 1/047*** *(2006.01)*
F28D 1/053 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **17.04.2018 IT 201800004633**

(71) Applicant: **Deltacalor S.r.L.**
23801 Calolziocorte (LC) (IT)

(72) Inventor: **DODESINI, Fabio**
23801 CALOLZIOCORTE (LC) (IT)

(74) Representative: **Brunacci, Marco**
BRUNACCI & PARTNERS S.r.l.
Via Scaglia Est, 19-31
41126 Modena (IT)

(54) **TOWEL HEATER AND RELATED MANUFACTURING PROCESS**

(57) The present invention relates to a towel heater (1) comprising a first upright (2) and a second upright (3) connected by a plurality of rectilinear cross members (4) to comprehensively define a main irradiation surface (X-Y) and at least one supporting cross member (10, 20, 30) in which at least one intermediate portion (11, 21, 31) thereof protrudes cantilevered from said main irradiation surface (X-Y).

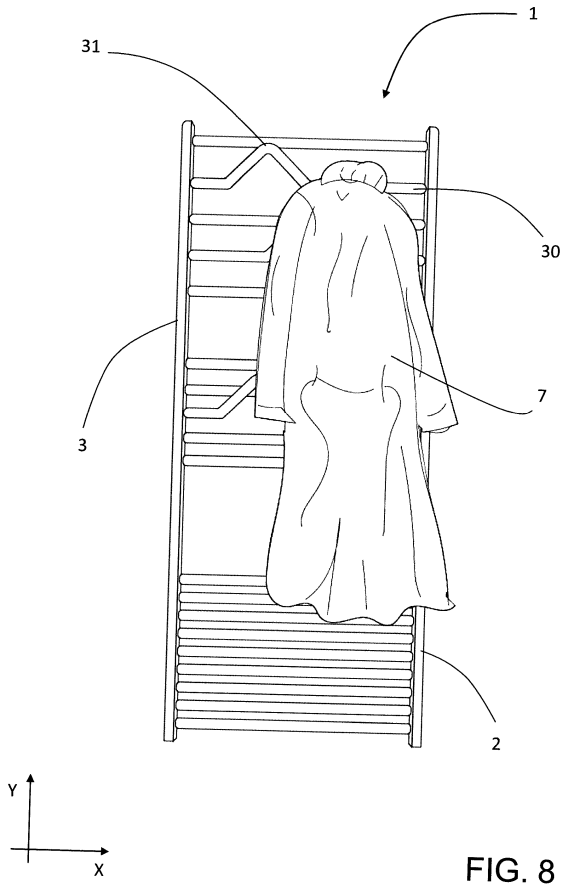

FIG. 8

EP 3 566 626 A1

Description

[0001] The present invention relates to a towel heater, in particular a hydraulic, electric or hybrid towel heater, adapted to effectively hold and heat one or more bathrobes and to the related manufacturing process.

[0002] Typically, a towel heater is a special heater adapted to be installed in bathrooms or the like and which by its very nature and conformation, in addition to radiating heat to warm the surrounding environment, allows the support of one or more towels.

[0003] The hydraulic towel heater is usually made up of a plurality of hollow heating members in fluid communication with each other inside which a heat convector liquid flows. In particular, the heating members comprise a liquid inlet collector or upright and a liquid outlet collector or upright which are vertically oriented and connected with each other by several horizontal pipes spaced apart from each other and each acting as elements to hang towels therefrom. The most typical manufacturing process of a towel heater involves welding the collectors to the horizontal elements to create a single monobloc element and a final painting phase of the monobloc element.

[0004] As described for the hydraulic towel heater, an electric towel heater is also made up of a plurality of heating members but, differently, inside one of the collectors is inserted an electrically powered resistance that transmits the heat to the heat convector liquid.

[0005] Finally, there are hybrid towel heaters with differentiated heating areas, such as e.g. the one described in publication EP 1 615 9514, which in addition to the classic radiant section can have a heat convector section wherein both sections can be powered by the same heat transfer liquid. The heat convector section comprises one or more outlet openings of heated air that can be directed either horizontally to heat the room, or upwards so as to skim the towels hanging from the radiator section.

[0006] When using the towel heater, it is common practice for users to hang their bathrobes from the vertical collectors, for example by fitting the bathrobes' hood onto the free upper end of each collector. During the winter months, this practice is used, for example, to find a heated bathrobe or to dry it quickly after a shower. During the summer months, the towel heater, on the contrary, is mostly used as a clothes hanger. As a result, the towel heater can typically host two bathrobes, one on the liquid inlet collector and one on the liquid outlet collector, and one or more towels hung from the horizontal heating elements. The Applicant has observed that the practice of hanging the bathrobe from the side collectors has several drawbacks.

[0007] First of all, it should be noticed that the upper end of the collectors is usually closed by a vent valve and/or a plug. By continuously hanging and removing the bathrobe from the collector, over time the bathrobe's fabric fibers may become entangled in the valve, damaging it and in some cases making it unusable. It follows that, periodically, the intervention of specialized technicians is necessary to replace or repair the valve with the consequence of having to face repair or replacement costs which are sometimes very high. Additionally, in smaller rooms or bathrooms, hanging a bathrobe from the collector has the detrimental effect of occupying space that is usually occupied at its side by furniture or other sanitary fittings. In the case, for example, of a bidet or toilet installed at the side of the towel heater, the presence of a hanging bathrobe would create particular encumbrance for the user. Similarly, in the presence of a piece of furniture, the bathrobe could even hinder the opening of the corresponding door.

[0008] The Applicant has observed a number of attempts to prevent lateral encumbrance. For this purpose, radiators have been designed provided with movable or rotating elements to allow general garments to be hung therefrom, for example, by using appendages or hangers in front of the towel heater. Such solutions however are complicated and expensive to implement and their aesthetic result is often unsatisfactory. In addition, the presence of movable elements in an apparatus filled with heat convector liquid can lead to possible leaks, especially at the joints between the movable elements.

[0009] The Applicant has also noticed that the heating and the subsequent drying of a bathrobe when hung from a collector is slow and not completely homogeneous as part of the bathrobe is in contact with the clearly colder rear wall of the towel heater during the operation thereof. This results in uneven drying as the part of the bathrobe in contact with the wall dries out later than the opposite part with the result that some parts of the bathrobe may be drier or warmer and other parts are colder or wetter giving the user a sense of discomfort during use.

[0010] The Applicant felt the need to create a towel heater in a simple and fast manner and adapted to hold one or more bathrobes without any particular encumbrance and heat them quickly and as uniformly as possible with consequent well-being for the users.

[0011] The Applicant has therefore discovered that by providing a towel heater with a rectilinear supporting cross member in which an intermediate portion thereof protrudes cantilevered from the main irradiation plane, it is possible to create a supporting portion for a bathrobe that is extremely advantageous both for the uniformity of heating and for its compactness.

[0012] In its first aspect, the present invention therefore relates to a towel heater in accordance with claim 1.

[0013] The Applicant has also thought of a solution that does not require for specific complications or additional phases to the assembly and welding of the monobloc towel heater thus developing a rapid and fast manufacturing process without any particular burden on the overall costs of production.

[0014] In a further aspect thereof, the present invention therefore relates to a manufacturing process of a towel heater in accordance with claim 10.

[0015] Further characteristics and advantages of the

towel heater and of the related manufacturing process in accordance with the present invention will result from the description below of a preferred embodiment thereof, given as an indicative yet not limiting example, with reference to the attached figures, wherein:

- Figure 1 represents a view of the towel heater in accordance with a first embodiment of the present invention,
- Figure 2 shows a cross-sectional side view of the towel heater of Figure 1,
- Figures 3, 4 and 5 show front views of the supporting cross members in accordance with the present invention,

- Figure 6 represents a cross-sectional view of the supporting cross member of Figure 5,
- Figure 7 represents a view of the towel heater in accordance with a second embodiment of the present invention,
- Figure 8 represents a towel heater in accordance with the present invention with a hanging bathrobe.

[0016] With reference to the attached illustrations, reference numeral 1 globally indicates a towel heater in accordance with the present invention.

[0017] The towel heater 1 comprises a first upright or collector 2 and a second upright or collector 3 which, in use, extend along a substantially vertical direction Y-Y. The uprights 2, 3 are connected by means of a plurality of rectilinear cross members 4 to comprehensively define a main radiation surface X-Y. In the following of the present description and in the subsequent claims, by main radiation surface is meant the surface or the side of the towel heater opposite that facing the wall where the towel heater is installed.

[0018] The uprights 2, 3 and the rectilinear cross members 4 are preferably internally hollow.

[0019] The towel heater 1 is preferably made of a single monobloc element in which the uprights 2, 3 are welded to the rectilinear cross members 4 to form a single hydraulic circuit for the circulation of a heat transfer liquid. In particular, the first upright 2 acts as a collector for the inlet of the heat carrier liquid while the second upright 3 acts as a collector for the outlet of the liquid, or vice versa. Each rectilinear cross member 4 is placed between the first upright 2 and the second upright 3. As a whole, the rectilinear cross members 4 are sized and positioned in such a way so as to form elements for hanging towels or the like. For this purpose, the rectilinear cross members 4 are arranged parallel to each other, positioned one on top of the other and spaced away from each other by a predefined distance, e.g. 2 cm, along the uprights 2, 3.

[0020] The rectilinear cross members 4 can preferably be arranged in groups. For example, a first group of rectilinear cross members 4a may be arranged at a distance from a second group of rectilinear cross members 4b by a predefined distance comprised e.g. between 7 cm and 50 cm. In the example shown in Figure 1, the first group of rectilinear cross members 4a is made up of thirteen rectilinear cross members 4 spaced away by a predefined distance from the second group of rectilinear cross members 4b, the latter being made up of seven rectilinear cross members 4.

[0021] Advantageously, the towel heater 1 comprises a supporting cross member 10 for a bathrobe 7 that extends mainly along its own axial direction K orthogonal to the vertical direction Y-Y.

[0022] The supporting cross member 10 is also placed between the first upright 2 and the second upright 3 and is in fluid communication with the first upright 2 and with the second upright 3. Preferably, the supporting cross member 10 connects the first upright 2 to the second upright 3 without interruption.

[0023] As shown in the example in Figure 3, the supporting cross member 10 comprises a first rectilinear portion 12, a second rectilinear portion 13 and at least one intermediate portion 11 positioned between said rectilinear portions 12, 13 and protruding cantilevered with respect to its own axial extension direction K. When mounted on the towel heater 1, the intermediate portion 11 protrudes cantilevered from the main irradiation plane X-Y.

[0024] In a version not shown, the supporting cross member 10 may comprise a single cantilevered intermediate portion 11.

[0025] The intermediate portion 11 comprises a curved portion 11c which is made from a rectilinear cross member which is then bent to form a sort of appendage which will serve as an element to hang a bathrobe 7 therefrom, as shown in the example in Figure 8.

[0026] In particular, a first bending is carried out so that a first stretch 11a of the intermediate portion 11 is bent by an angle α comprised between 95° and 160°, preferably 120°, with respect to the first rectilinear portion 12 of the cross member 10. A second bending is carried out so that a second stretch 11b of the intermediate portion 11 is bent by an angle δ comprised between 95° and 160°, preferably 120°, with respect to the first stretch 11a of the intermediate portion 11. A third bending is carried out so that the second stretch 11b of the intermediate portion 11 is bent by an angle β comprised between 95° and 160°, preferably 120°, with respect to the second rectilinear portion 13. Advantageously, the bending is carried out so that at the bending spots there aren't bottlenecks so that the supporting cross member 10 has a diameter D, in cross section, substantially corresponding along its entire length L. This way, the heat transfer liquid always flows uniformly in the supporting cross member 10.

[0027] In a preferred embodiment, the diameter D of the supporting cross member 10 is approximately equal to 22 mm.

[0028] Usefully, the diameter D of the supporting cross member 10 substantially corresponds to the diameter D' of the rectilinear cross member 4.

[0029] The first rectilinear portion 12 and the second

rectilinear portion 13 preferably have substantially the same length. This way, as shown in the examples in Figures 1 and 3, the curved portion 11c is substantially in a central position with respect to the towel heater 1 along the horizontal direction X-X.

[0030] With reference to the examples shown in Figures 4 and 5, variations in the manufacturing of the supporting cross member are indicated.

[0031] In particular, Figure 4 shows an example of a supporting cross member 20 in which the first rectilinear portion 22 is longer than the second rectilinear portion 23. Figure 5 shows, on the other hand, an example of a supporting cross member 30 in which the first rectilinear portion 32 is shorter than the second rectilinear portion 33. This way, comprehensively, the towel heater 1 in accordance with the present invention may have a plurality of supporting cross members arranged to receive more than two bathrobes 7.

[0032] As shown in Figure 1, for example, the towel heater 1 has a third upper group of rectilinear cross members 4c consisting of four rectilinear cross members 4 and of three supporting cross members 10,20,30 in which the respective curved intermediate portions 11,21,31 are staggered to each other. As a result, the towel heater is capable of receiving three bathrobes. In this configuration, the intermediate portions 11,21,31 are arranged in the upper half of the main irradiation surface. More preferably, the intermediate portions 11, 21, 31 are arranged in the highest group of cross members making up the towel heater 1. In accordance with a preferred embodiment, the towel heater 1 comprises, starting from the top, a rectilinear cross member 4 and subsequently adjacent thereto, descending downwards, a supporting cross member 30. Even more preferably, the towel heater 1 comprises a plurality of rectilinear cross members 4 interspersed with a plurality of supporting cross members 30.

[0033] As shown in the example in Figure 8, the intermediate portion 31 of the supporting cross member 30 located higher up in the towel heater 1 is preferably in a lower position with respect to the rectilinear cross member 4 located above said supporting cross member 30.

[0034] In a version not shown in the illustration, the towel heater 1 can have supporting cross members also in the lower groups of rectilinear cross members 4a, 4b so as to accommodate, e.g., smaller children's bathrobes. As a result, a single towel heater can potentially receive up to 10 bathrobes and also more, to meet the needs of an entire family.

[0035] With reference to the example shown in Figure 7, a second embodiment of the towel heater is shown in accordance with the present invention. In this case, each rectilinear cross member 4 has two or three intermediate portions 11. Potentially, the number of intermediate portions may be even higher depending on the length of the supporting cross member.

[0036] With reference to the example shown in Figure 6, the intermediate portion 11 usefully protrudes by a distance P comprised between 3 cm and 40 cm, preferably 10 cm, with respect to the main irradiation surface X-Y. In particular, the rectilinear cross member 4 can be oriented during assembly so that its curved intermediate portion 11 lies on a plane A totally rotated by an angle γ comprised between 15° and 90°, preferably 45°, with respect to the main irradiation surface X-Y.

[0037] Preferably, each supporting cross member 10 is internally hollow.

[0038] The manufacturing process of the towel heater in accordance with the invention provides for having a first upright 2 and a second upright 3 and a plurality of rectilinear cross members 4 and at least one supporting cross member 10 bent as described above. The uprights 2, 3 are provided, on one side, with a plurality of holes sized to receive, by shape coupling, the terminal ends of the rectilinear cross members 4 and the supporting cross member 10. Each rectilinear cross member 4 and each supporting cross member 10 (if more than one) is inserted into the relevant holes of the first upright 2 and, subsequently, of the second upright 3 to form the towel heater. The supporting cross members 10 are axially rotated so that each intermediate portion is oriented according to predefined angles.

[0039] Subsequently, an application phase of a tin paste is provided in the junction spots between the uprights and the rectilinear and supporting cross members.

[0040] The towel heater is then placed a kiln for about an hour so that the tin paste closes any holes that may be present in the junction spots in order to obtain a comprehensive hydraulic seal of the entire towel heater. Finally, there is a final phase of painting and application of vent valves and/or plugs.

[0041] In the event of an electric towel heater having to be manufactured, a phase of insertion of an electrical resistance inside one of the two uprights is provided and the towel heater is filled with heat transfer liquid at the factory up to about 95% of its volumetric capacity.

[0042] As can be seen from the present description, it can be noticed that the described invention achieves the intended objects and in particular the fact is underlined that through the towel heater it is possible to receive a plurality of bathrobes heating each one in a homogeneous and uniform manner.

[0043] In addition, thanks to the possibility of being able to insert a supporting cross member bent between the rectilinear cross members, the manufacturing process of the towel heater can be carried out quickly and without any particular increase in overall production costs. The configurations and types of curvature of the intermediate portions are potentially endless and obviously a technician in the specific field, in order to satisfy contingent and specific needs, can make a number of modifications and variations to the aforementioned towel heater, all included within the scope of protection of the invention, as defined by the following claims.

Claims

1. Towel heater (1) comprising:

   a first upright (2) and a second upright (3) extending in use mainly along a vertical direction (Y-Y) and connected by a plurality of rectilinear cross members (4) to comprehensively define a main irradiation surface (X-Y), **characterized by** the fact that it comprises
   at least one supporting cross member (10, 20, 30) extending in use mainly along its own axial direction (K) orthogonal to said vertical direction (Y-Y) and in which at least one intermediate portion (11, 21, 31) thereof protrudes cantilevered from said main irradiation surface (X-Y).

2. Towel heater (1) according to claim 1, wherein said cantilevered intermediate portion (11, 21, 31), as a whole, lies on a plane oriented by an angle (γ) lower than 90° with respect to said main irradiation surface (X-Y).

3. Towel heater (1) according to claim 2, wherein said angle (γ) is greater than 15°.

4. Towel heater (1) according to any one of the preceding claims, wherein said at least one supporting cross member (10, 20, 30) comprises a single cantilevered intermediate portion (11, 21, 31).

5. Towel heater (1) according to any one of the preceding claims, wherein said cantilevered intermediate portion (11, 21, 31) comprises a curved portion (11c, 21c, 31c) interposed between a first rectilinear portion (11a, 21a, 31a) and a second rectilinear portion (11b, 21b, 31b).

6. Towel heater (1) according to claim 5, wherein said first rectilinear portion (11a, 21a, 31a) and said second rectilinear portion (11b, 21b, 31b) form between them an angle (α) comprised between 95° and 160°, preferably 120°.

7. Towel heater (1) according to any one of the preceding claims, wherein said cantilevered intermediate portion (11, 21, 31) is positioned in the upper half of said main irradiation surface (X-Y).

8. Towel heater (1) according to any one of the preceding claims, comprising a plurality of supporting cross members (10, 20, 30), each having its own cantilevered intermediate portion (11, 21, 31), said intermediate portions (11, 21, 31) being vertically staggered to each other.

9. Towel heater (1) according to claim 8, wherein said plurality of supporting cross members (10, 20, 30) have each its own intermediate portion (11, 21, 31) and are arranged in the upper half of said main irradiation surface (X-Y).

10. Manufacturing process of a towel heater (1) comprising the phases of:

    - providing a first upright (2) and a second upright (3),
    - providing a plurality of rectilinear cross members (4),
    - bending at least one supporting cross member (10, 20, 30) so that one of its intermediate portions (11) protrudes cantilevered with respect to its axial extension direction (K, W, J),
    - joining said uprights (2, 3), said plurality of rectilinear cross members (4) and said at least one supporting cross member (50) to one another to form a towel heater (1) according to any one of claims 1 to 10.

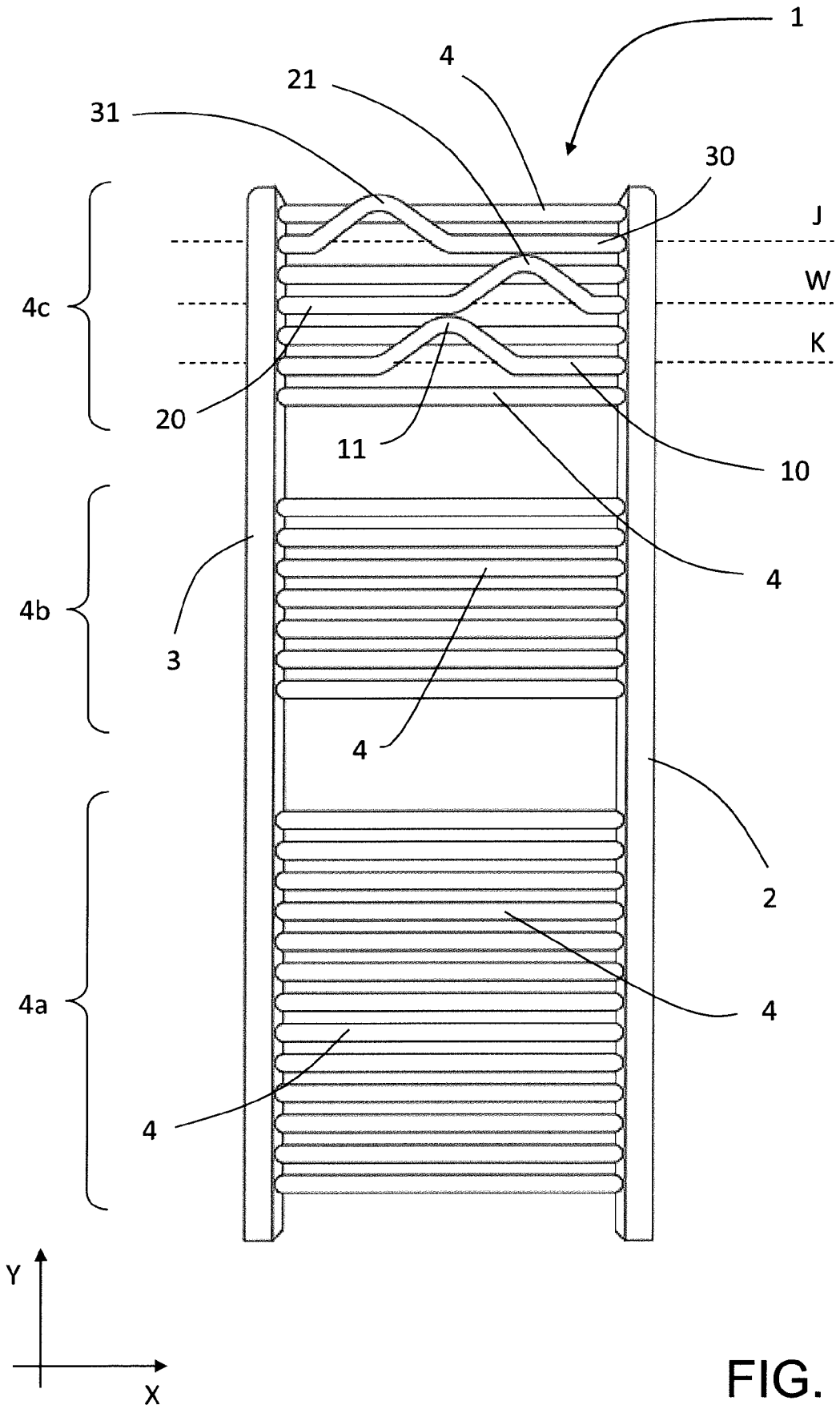

FIG. 1

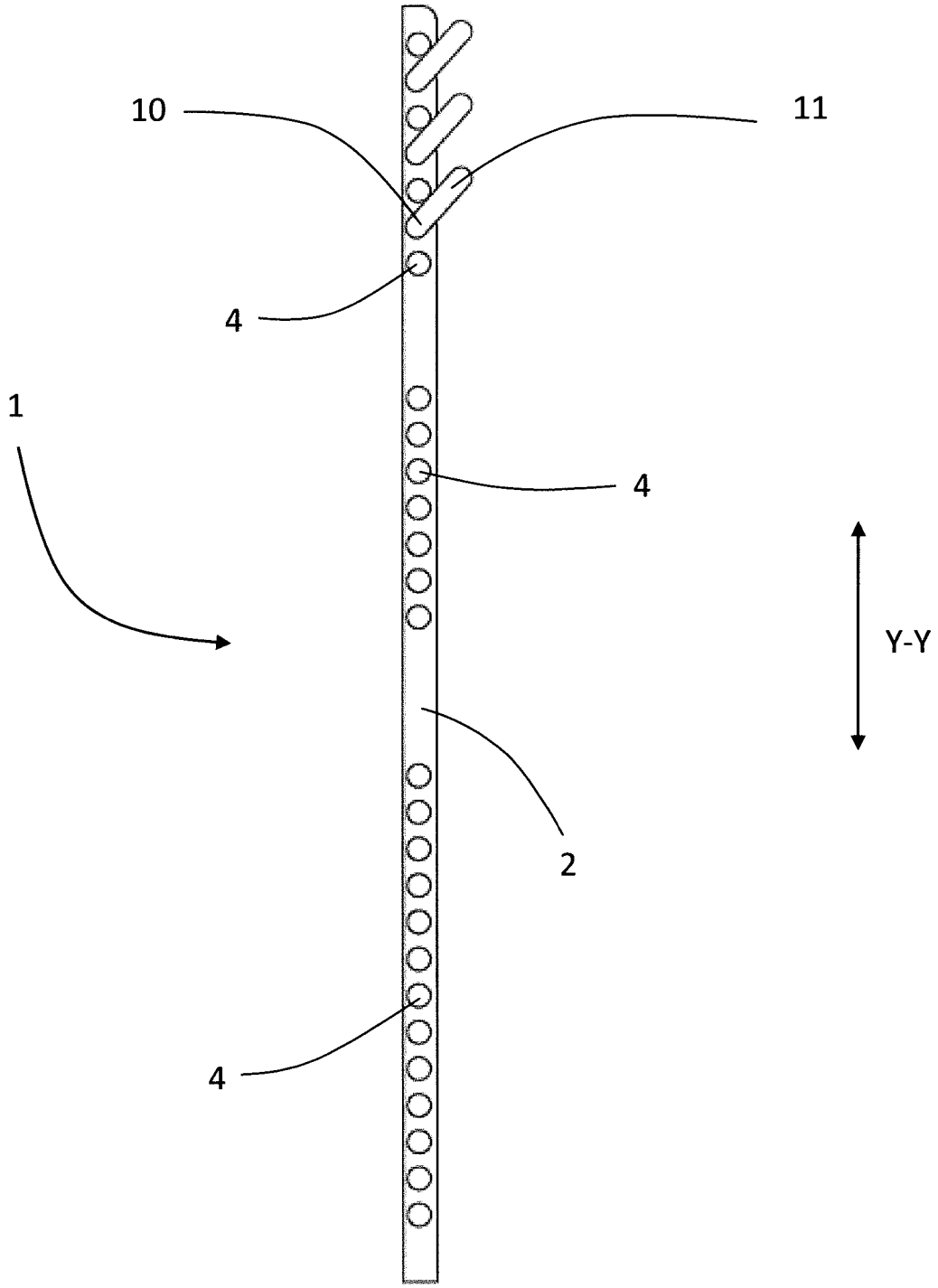

FIG. 2

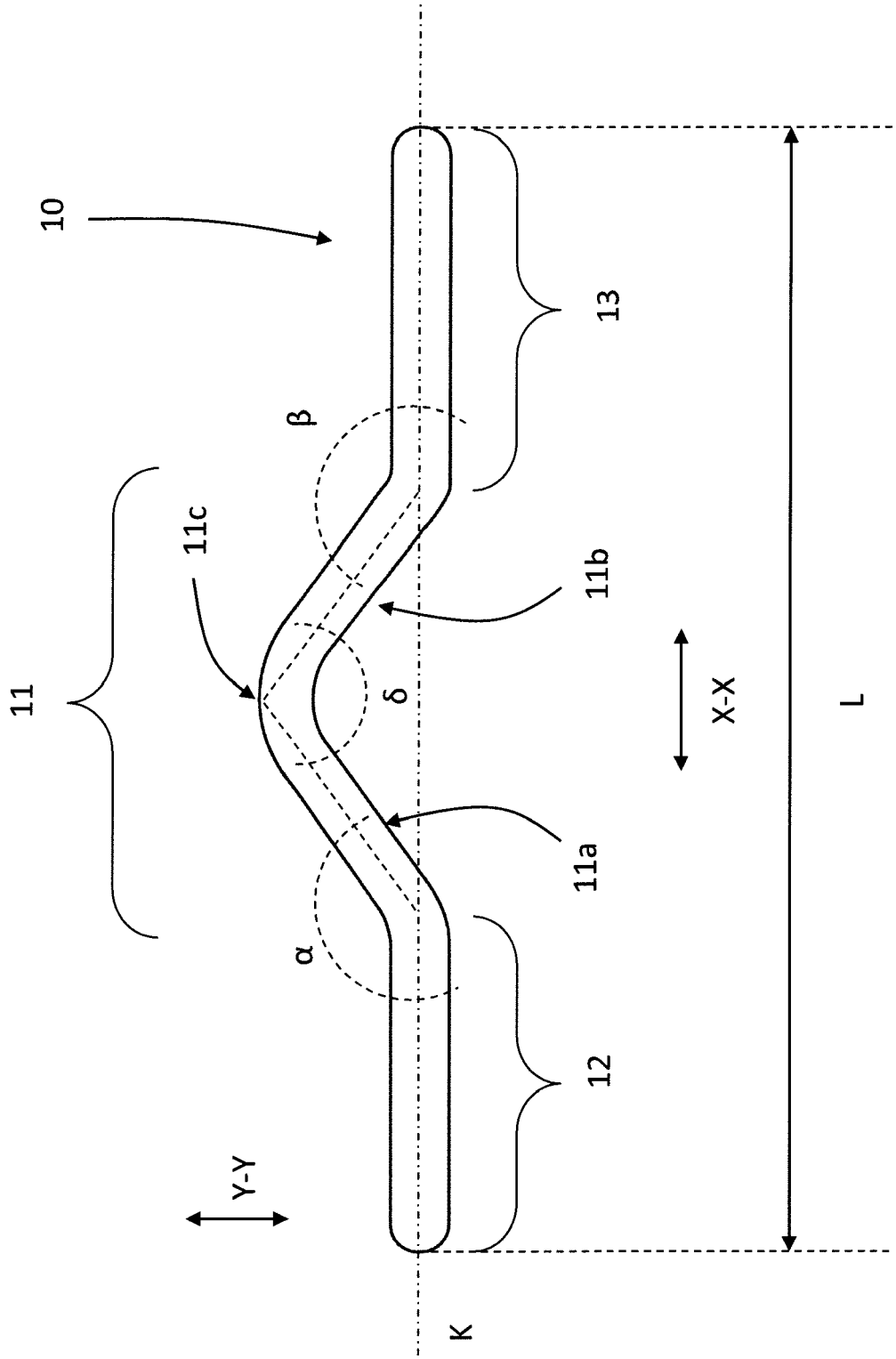

FIG. 3

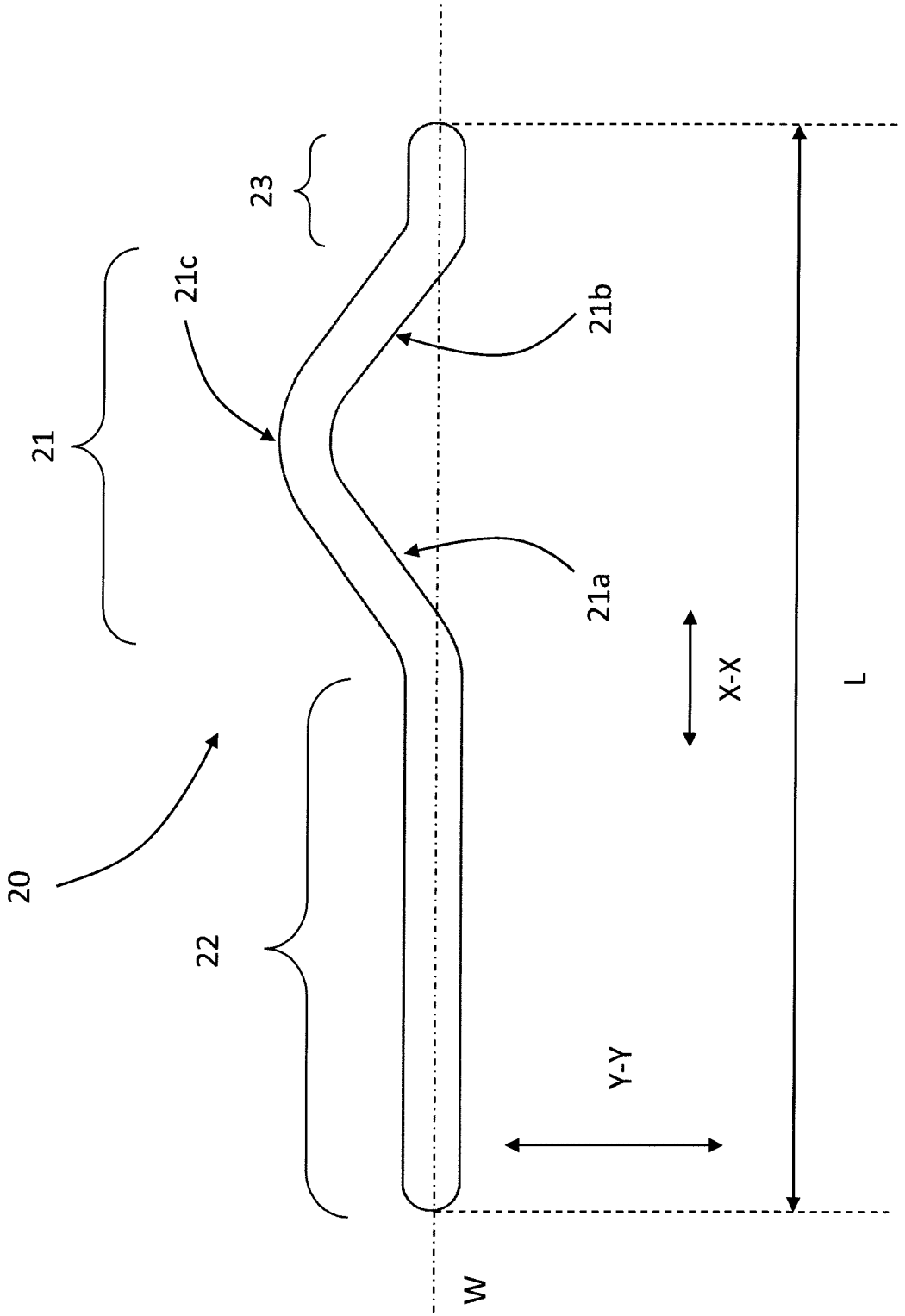

FIG. 4

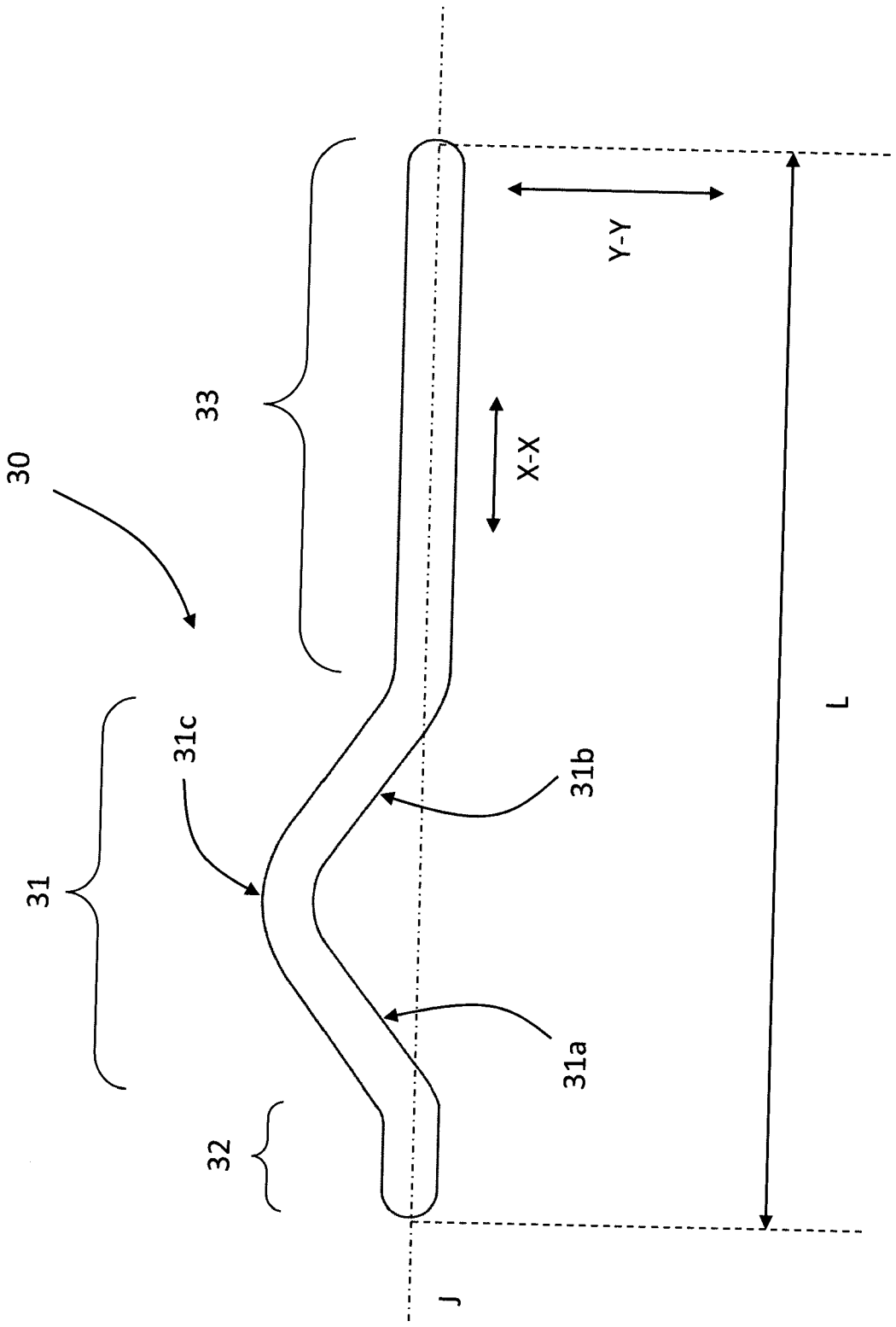

FIG. 5

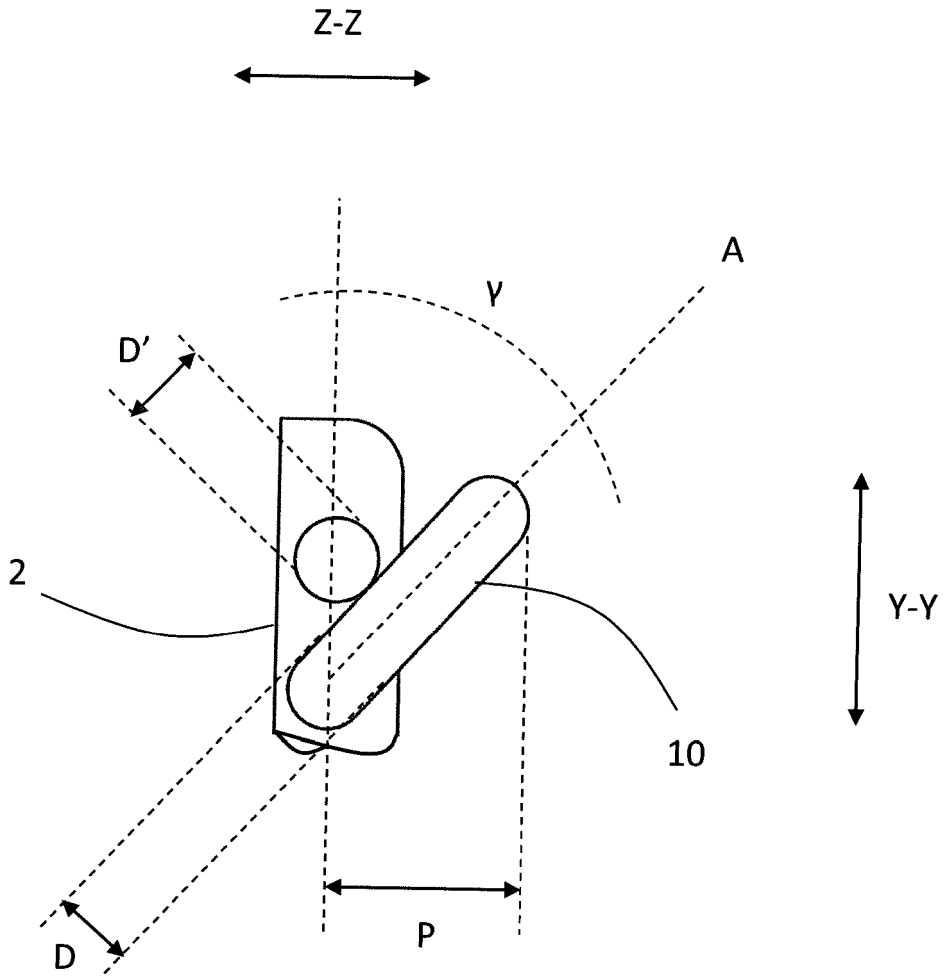

FIG. 6

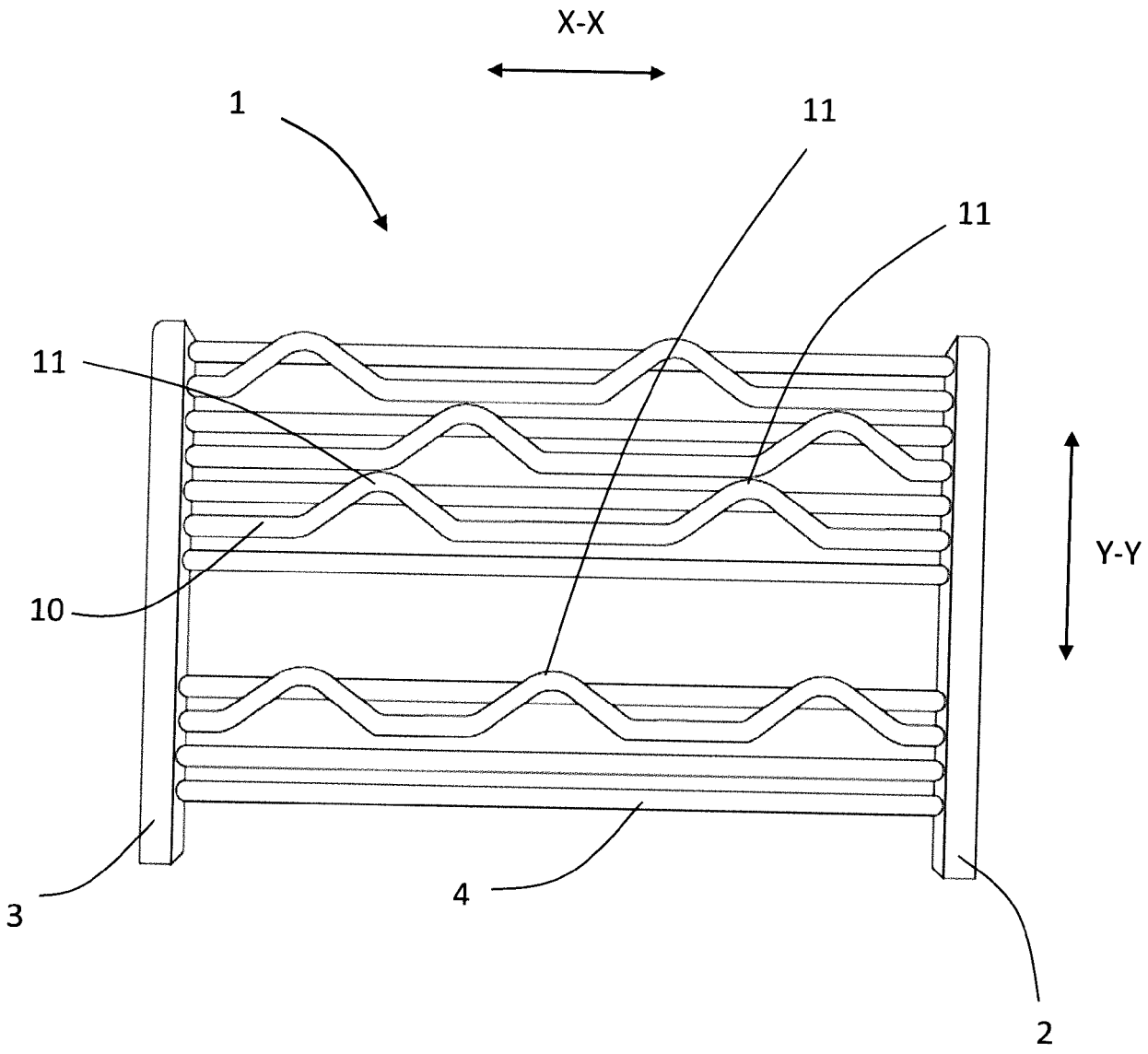

FIG. 7

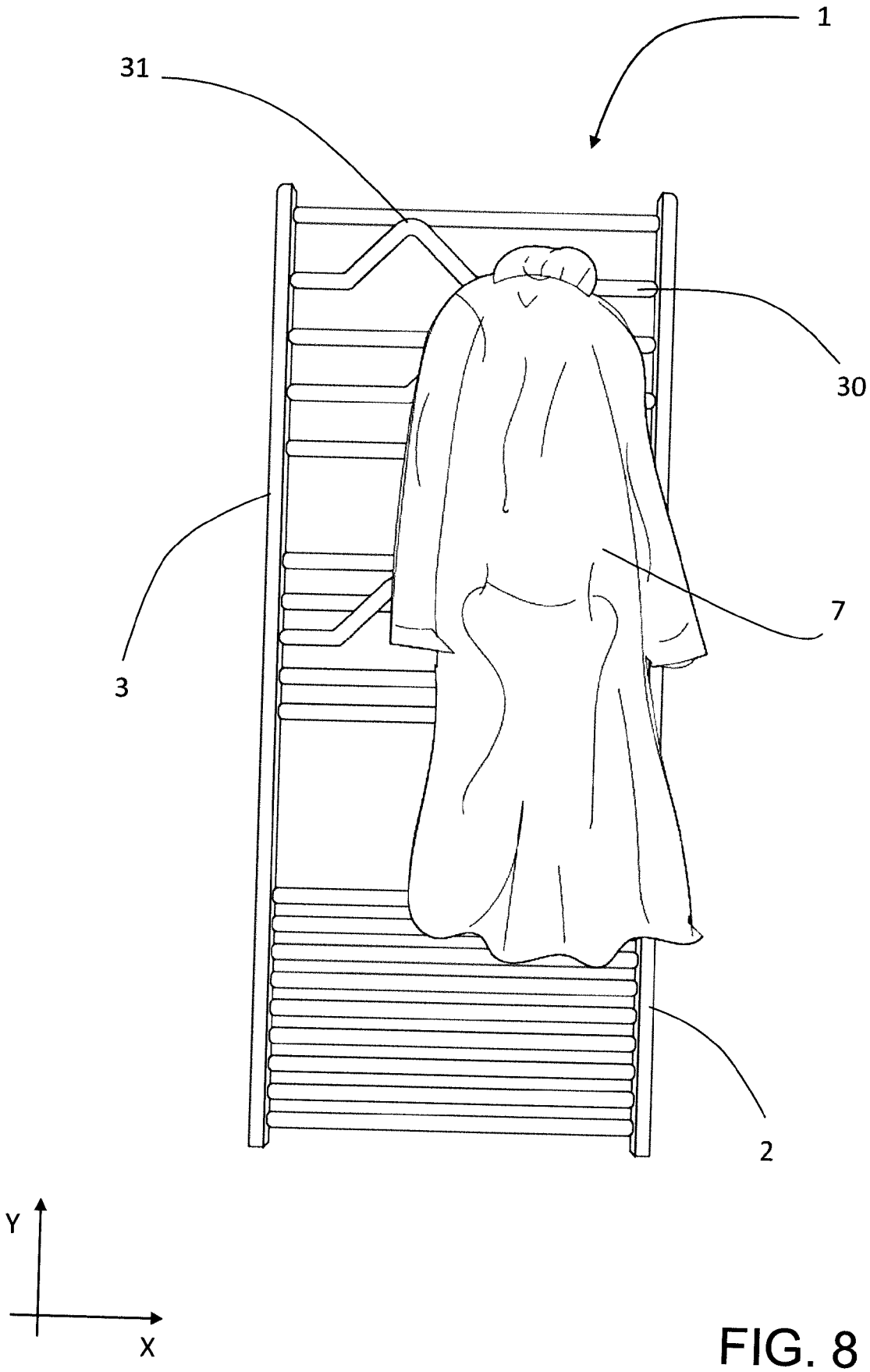

FIG. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 19 16 9749

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 Y A	GB 2 430 873 A (LAZZARINI SRL [IT]) 11 April 2007 (2007-04-11) * pages 6-9; figures 11-14 *	1-7,10 8 9	INV. A47K10/06 F28D1/047 F28D1/053
Y A	DE 299 12 161 U1 (ZEHNDER VERKAUF VERWALTUNG [CH]) 18 November 1999 (1999-11-18) * paragraph [0047]; figures 4,5 *	8 1-7,9,10	
X A	DE 83 11 222 U1 (JOHN & CO, 7590 ACHERN, DE) 9 June 1983 (1983-06-09) * the whole document *	1-8,10 9	
X A	DE 299 08 737 U1 (AUGUST BROETJE GMBH [DE]) 18 November 1999 (1999-11-18) * the whole document *	1-3,6-8,10 4,5,9	

TECHNICAL FIELDS SEARCHED (IPC)

A47K
F28F
F28D
F24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 September 2019	von Mittelstaedt, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 16 9749

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-09-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2430873 A	11-04-2007	ES 1064780 U	01-05-2007
		GB 2430873 A	11-04-2007
		IT TV20050049 U1	11-04-2007
DE 29912161 U1	18-11-1999	DE 29912161 U1	18-11-1999
		EP 1069391 A2	17-01-2001
DE 8311222 U1	09-06-1983	NONE	
DE 29908737 U1	18-11-1999	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 16159514 A **[0005]**