

(19)



(11)

EP 3 284 892 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.02.2018 Bulletin 2018/08

(51) Int Cl.:
E06B 3/96 (2006.01) E06B 3/968 (2006.01)

(21) Application number: **17185675.0**

(22) Date of filing: **10.08.2017**

(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:
MA MD

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(30) Priority: **16.08.2016 IT 201600085391**

(54) FRAME, IN PARTICULAR FOR WINDOWS

(57) A frame (100) comprises: profiles (2, 2') having a long side (21) and a short side (22), a first longitudinal space (3) obtained in correspondence of the short side (22), a second longitudinal space (5) obtained in correspondence of the long side (21), fixing devices (4) inserted in the first longitudinal spaces (3) of a the profiles (2, 2'), alignment devices (1) inserted in the second longitudinal spaces (5) of the profiles (2, 2'); the alignment de-

vice (1) has a disc-like shape with a thickness (W1) equal to or slightly higher than the width (W2) of the second longitudinal spaces (5) of the two profiles (2, 2') and a diameter (D) higher than the depth (D2) of the second longitudinal spaces (5) in such manner to be forcedly inserted in the second longitudinal spaces (5) of the two profiles (2, 2').

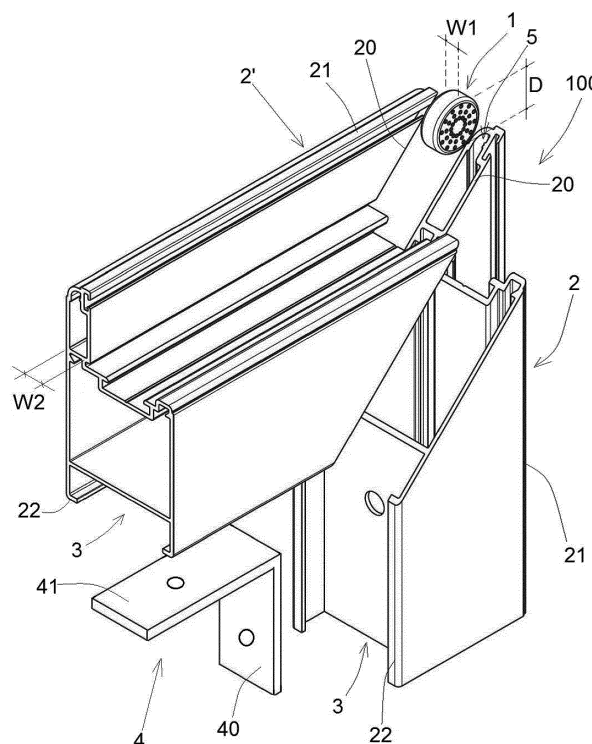


FIG. 4

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Description

[0001] The present patent application for industrial invention relates to a frame, in particular for windows. The reference sector is the one of window frames, with special reference to the assembly of window frames obtained by joining coplanar profiles in a frame-like configuration. Such windows are intended to be installed inside openings provided on the wall of a building.

[0002] With reference to Figs. 1 to 3, a frame (200) according to the prior art is disclosed. The frame (200) comprises profiles (2, 2') that are fixed together. In particular, the profiles (2, 2') comprise ending surfaces (20) inclined by 45° with respect to the longitudinal axis of the profile (2, 2'). The ending surfaces (20) of a profile (2) are stopped against the ending surfaces (20) of another profile (2'). In this way, the profiles (2, 2') form a rectangular frame.

[0003] Therefore each profile (2, 2') comprises a long side (21) intended to be disposed towards the exterior of the frame (200) and a short side (22) parallel to the long side and intended to be disposed towards the interior of the frame (200).

[0004] Moreover, each profile (2, 2') comprises a first side (23) intended to be directed towards the interior of the building, and a second side (24) intended to be directed towards the exterior of the building. Alternatively, the first side (23) can be directed towards the exterior of the building and the second side (24) can be directed towards the interior of the building.

[0005] The profiles (2, 2') are connected by means of fixing devices (4), such as squares, disposed in correspondence of the short sides (22) of the profiles.

[0006] Because the profiles are fixed in correspondence of the short sides (22), the ending surfaces (20) of two profiles (2, 2') tend to be misaligned in correspondence of the long sides (21) of the profiles (2, 2'). In particular, two types of misalignment are possible: a stepped configuration, which is shown in Fig. 2, and a non-coplanar configuration, which is shown in Fig. 3.

[0007] With reference to Fig. 2, when the two profiles are stepped, the long side (21) of the first profile (2) protrudes outwards with respect to the long side (21) of the second profile (2').

[0008] With reference to Fig. 3, when the two profiles are non-coplanar, the first side (23) of a first profile (2) does not lie on the same plane as the first side (23) of a second profile (2'), thus forming a tooth (T). Likewise, the second side (24) of the first profile (2) does not lie on the same plane as the second side (24) of the second profile (2').

[0009] When the profiles are misaligned, in addition to being aesthetically impaired, the frame becomes less resistant and less stable. Moreover, being misaligned, the frame may be difficult to mount and install.

[0010] Because of such a misalignment, the corners of the profiles are exposed, with the risk of hurting and cutting the user.

[0011] As shown in Fig. 1, the problem caused by the misalignment of the profiles is partially solved by inserting a second fixing device (4') in correspondence of the long sides (21) of the profiles.

[0012] In particular, the profiles comprise a longitudinal space along the long sides of the profiles and an opening that provides access to the longitudinal space, disposed in correspondence of the ending surface (20) of the profile.

[0013] The second fixing device (4') comprises a first wing inserted in the longitudinal space of the first profile (2) and a second wing inserted in the longitudinal space of the second profile (2').

[0014] The wings of the second fixing device are fixed to the profiles in such manner to align the profiles in correspondence of the long sides (21) of the profiles.

[0015] In spite of aligning the two profiles in correspondence of the long sides, the use of the second fixing device is impaired by some drawbacks.

[0016] A first drawback consists in the fact that the operator must be highly skilled in manual works in order to connect both fixing devices (4, 4') to the profiles correctly. In fact, both fixing devices (4, 4') are to be simultaneously inserted in housings of the first profile (2) and fixed to the first profile (2), making sure that such a positioning of the fixing devices (4, 4') permits the alignment of the profiles (2, 2').

[0017] Then, both fixing devices (4, 4') are to be fixed to the second profile (2').

[0018] Moreover, the insertion of the second fixing device (4') in the longitudinal spaces of the profiles (2, 2') and the fixing of said second fixing device (4') to the profiles (2, 2') is especially difficult because the space is closed laterally.

[0019] A second drawback consists in the fact that the insertion and fixing operations of both fixing devices (4, 4') to the profiles (2, 2') are very time-consuming. In view of the above, the assembly cost of the profiles (2, 2') is high because of the long assembly time and of the difficulties encountered in fixing and aligning the profiles (2, 2').

[0020] The purpose of the present intention is to overcome the drawbacks of the prior art by disclosing a frame that comprises an alignment device that is simple to install in the profiles and permits a correct alignment of the profiles, avoiding the stepped and the non-coplanar configuration of the profiles.

[0021] Another purpose is to disclose such a frame that is reliable, and simple to make and install.

[0022] A frame for windows according to the invention comprises profiles provided with inclined ending surfaces, in such manner to define a long side, intended to be directed towards the exterior of the frame, and a short side, intended to be directed towards the interior of the frame.

[0023] The frame comprises a first longitudinal space obtained in each profile in correspondence of the short side and having an opening in correspondence of the

ending surfaces of the profile,

[0024] The frame comprises a second longitudinal space obtained in each profile in correspondence of the long side and having an opening in correspondence of the ending surfaces of the profile,

[0025] Moreover, the frame comprises fixing devices. Each fixing device comprises a first wing disposed inside the first longitudinal space of a first profile and a second wing disposed in the first longitudinal space of a second profile in such manner to join the first profile and the second profile.

[0026] The frame comprises at least one alignment device inserted in the second spaces of the first profile and of the second profile in correspondence of the openings that provide access to the second spaces in order to align the first profile and the second profile.

[0027] The peculiarity of the frame according to the invention consists in the fact that the alignment device has a disc-like shape with a thickness equal to or slightly higher than the width of the second spaces of the two profiles. Furthermore, the alignment device has a diameter that is higher than the depth of the second longitudinal spaces of the two profiles, in such manner to be forcedly inserted in the spaces of the two profiles.

[0028] The advantages of the frame according to the invention are evident: because of the provision of the alignment device, which is forcedly inserted in the second longitudinal spaces of the profiles, the profiles can be aligned easily and rapidly in correspondence of the long sides of the profiles.

[0029] For the sake of clarity, the description of the frame according to the invention continues with reference to the attached drawings, which have a merely illustrative, not limiting value, wherein:

Fig. 1 is a front view of a frame according to the prior art;

Fig. 2 is an axonometric view of a portion of the frame according to the prior art, wherein the profiles are in stepped configuration;

Fig. 3 is the same view as Fig. 2, wherein the profiles are in non-coplanar configuration;

Fig. 4 is an exploded axonometric view of a portion of the frame according to the invention,

Fig. 5 is a sectional view of a portion of the frame according to the invention, cut along a vertical plane;

Fig. 6 is an axonometric view of the alignment device of the frame of Fig. 4;

Fig. 7 is a front view of the alignment device of Fig. 6;

Fig. 8 is a side view of the alignment device of Fig. 6.

[0030] With reference to Figs. 4 and 5, a window frame according to the invention is disclosed, which is generally indicated with reference numeral (100).

[0031] The frame (100) comprises profiles (2, 2') that are joined in a frame-like configuration. In particular, the profiles (2, 2') comprise ending surfaces (20) inclined by 45° with respect to the longitudinal axis of the profile (2,

2'). The ending surface (20) of a profile (2) is stopped against the ending surface (20) of another profile (2').

[0032] Each profile (2, 2') comprises a long side (21) directed towards the exterior of the frame (100) and a short side (22) parallel to the long side and directed towards the interior of the frame (100).

[0033] The frame (100) comprises a first longitudinal space (3) obtained in each profile (2, 2') in correspondence of the short side (22). The first longitudinal space (3) has an opening that provides access in correspondence of the ending surfaces (20) of the profile (2, 2'). In particular, the short side (22) of the profiles (2, 2') is shaped as a "C" in such manner to define a channel that coincides with the first longitudinal space (3).

[0034] The frame (100) comprises a second longitudinal space (5) obtained in each profile (2, 2') in correspondence of the long side (21). The second longitudinal space (5) has an opening that provides access in correspondence of the ending surfaces (20) of the profile (2, 2'). In particular, the second longitudinal space (5) is a laterally closed channel obtained on the long side (21) of the profiles (2, 2').

[0035] The first longitudinal space (3) and the second longitudinal space (5) are parallel.

[0036] The profiles (2, 2') are joined by means of fixing devices (4), disposed in the first longitudinal space (3) of a first profile (2) and of a second profile (2') to join the first profile (2) and the second profile (2').

[0037] Each fixing device (4) comprises a first wing (40) disposed inside the first longitudinal space (3) of the first profile (2), and a second wing (41) disposed in the first longitudinal space (3) of the second profile (2') in such manner to join the first profile (2) and the second profile (2');

[0038] Moreover, the frame (100) comprises alignment devices (1), disposed in the second longitudinal space (5) of the first profile (2) and of the second profile (2') to align the first profile (2) and the second profile (2').

[0039] Each alignment device (1) is inserted in the second longitudinal spaces (5) of the first profile (2) and of the second profile (2') in correspondence of the openings that provide access to said second longitudinal spaces (5).

[0040] The alignment device (1) is made of a non-deformable rigid material, and has a disc-like shape, as shown in Figs. 6 to 8, with a thickness (W1) equal or slightly higher than the width (W2) of the second longitudinal spaces (5) of the two profiles (2, 2'), shown in Fig. 4. In particular, the thickness (W1) of the alignment device (1) is comprised between 6.5 mm and 8.5 mm.

[0041] The alignment device (1) has a diameter (D) that is higher than the depth (D2) of the second longitudinal spaces (5) of the two profiles (2, 2') in such manner to be forcedly inserted in the openings of the second longitudinal spaces (5) of the two profiles (2, 2'). In particular, the diameter (D) of the alignment device (1) is comprised between 15 mm and 20 mm.

[0042] The profiles (2, 2') have three contact points (A,

B, C) with the alignment device (1), in non-aligned position, when the alignment device (1) is inserted in the second longitudinal spaces (5) of the profiles (2, 2'), as shown in Fig. 5. In a first point (A) the first profile (2) is in contact with the alignment device (1), in a second point (B) the second profile (2') is in contact with the alignment device (1) and in a third point (C) the alignment device is in contact both with the first profile (2) and with the second profile (2'), in correspondence of a corner formed by the first profile (2) and by the second profile (2').

[0043] A triangle is formed by joining the three contact points (A, B, C). The length of the diameter (D) is calculated with formulas of known type for obtaining a circumference starting from a triangle. In fact, it is known that three non-aligned points define a circumference. The three sides of the triangle are chords of the circumference, and therefore the center of the circumference belongs to their axis of symmetry. By intersecting the axes of symmetry of the three sides of the triangle, the center of the circumference wherein the triangle is inscribed is found. The vertexes of the triangle are equidistant from the center. The distance between the center and the vertexes of the triangle coincides with the radius of the circumference.

[0044] All contact points (A, B, C) are equidistant from the center of symmetry of the triangle and their distance from the center of symmetry of the triangle is equal to the radius of the alignment device. The diameter (D) of the alignment device (1) is twice the distance between:

- the center of symmetry of the triangle, whose vertexes are the contact points (A, B, C) between the profiles (2, 2') and the alignment device (1); and
- one of the contact points (A, B, C).

[0045] Otherwise said, the formula used to calculate the diameter (D) of the alignment device (1), inscribed in the second spaces (5) of the two profiles (2, 2') cut at 45°, in correspondence of the openings, is $D = 2 \times (\tan(22.5^\circ) \times D2 \times \sqrt{2})$, where D is the diameter (D) of the alignment device (1) and D2 is the depth (D2) of the second space (5) wherein the alignment device (1) is inserted.

[0046] The alignment device (1) comprises a first surface (10) and a second surface (11), which is parallel to the first surface (10). The surfaces (10, 11) of the alignment device (1) are knurled and have a circular shape.

[0047] The alignment device (1) comprises a plurality of projections (12), disposed on the first surface (10) and on the second surface (11).

[0048] The projections (12) of the alignment device (1) lie on concentric circumferences, with center in the center of the first surface (10) and of the second surface (11). Each projection (12) of the alignment device (1) has a circular shape. Moreover, the height of the projections (12) of the alignment device (1) increases when their distance from the center of the alignment device (1) decreases, in such manner that the total thickness of the

alignment device (1) is higher in correspondence of its center and lower in correspondence of its lateral edge in order to make installation easier.

[0049] The projections (12) of the alignment device (1) are intended to interfere with the internal walls of the profile (2, 2') that define the second longitudinal space (5) in order to prevent the alignment device (1) from moving inside the second longitudinal spaces (5) of the profiles (2, 2').

[0050] In particular, said projections (12) are malleable cusps that get deformed when they are pushed in the second longitudinal space (5), in such manner to forcedly enter said second longitudinal space (5).

Claims

1. Frame (100) for windows and doors comprising:

- profiles (2, 2') provided with inclined ending surfaces (20) in such manner to define a long side (21) facing towards the exterior of the frame, and a short side (22) facing towards the interior of the frame,
- a first longitudinal space (3) obtained in each profile in correspondence of the short side (22) and having an opening in correspondence of the ending surfaces (20) of the profile,
- a second longitudinal space (5) obtained in each profile in correspondence of the long side (21) and having an opening in correspondence of the ending surfaces (20) of the profile,
- fixing devices (4), wherein each fixing device (4) comprises a first wing (40) disposed inside said first space (3) of a first profile (2), and a second wing (41) disposed in said first space (3) of a second profile (2') in such manner to join said first profile (2) and said second profile (2');
- at least one alignment device (1) inserted in the second spaces (5) of the first profile (2) and of the second profile (2') in correspondence of the openings that provide access to said second spaces (5) in order to align said first profile (2) and said second profile (2');

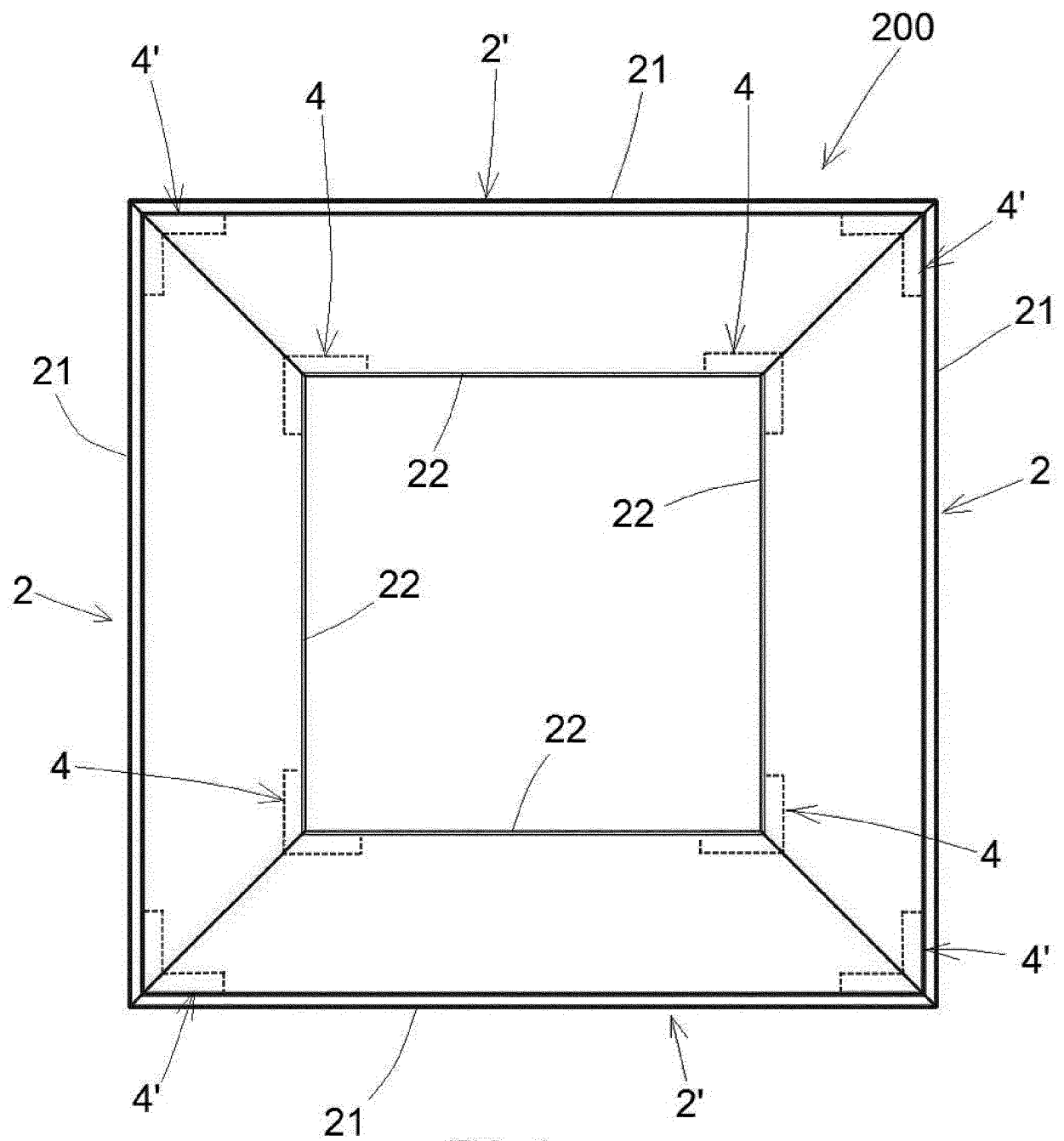
characterized in that

said alignment device (1) has a disc-like shape with a thickness (W1) equal to or slightly higher than the width (W2) of the second spaces (5) of the two profiles (2, 2') and a diameter (D) higher than the depth (D2) of the second spaces (5) of the two profiles (2, 2') in such manner to be forcedly inserted in the spaces (5) of the two profiles (2, 2').

2. The frame (100) of claim 1, wherein said alignment device has a diameter (D) that is double than the distance between:

- the center of symmetry of a triangle, whose vertexes are the contact points (A, B, C) between the profiles (2, 2') and the alignment device (1); and
 - one of said contact points (A, B, C). 5
3. The frame of claim 1 or 2, wherein said alignment device (1) comprises:
- a first circular surface (10), 10
 - a second circular surface (11) that is parallel to the first surface (10),
 - a plurality of projections (12) disposed on the first surface (10) and on the second surface (11); said projections (12) being configured in such manner to interfere with the internal walls of the profile (2, 2') that define the second space (5) in order to prevent the alignment device (1) from moving inside the second spaces (5) of two profiles (2, 2'). 15 20
4. The frame (100) of claim 3, wherein said projections (12) of the alignment device (1) lie on concentric circumferences, having their center in the center of the first surface (10) and of the second surface (11) of the alignment device (1). 25
5. The frame (100) of claim 3 or 4, wherein the height of said projections (12) of the alignment device (1) increases when their distance from the center of the alignment device (1) decreases, so that the total thickness of the alignment device (1) is higher in correspondence of its center and lower in correspondence of its lateral edge in order to make installation easier. 30 35
6. The frame (100) of any one of claims 3 to 5, wherein said projections (12) are malleable cusps that are configured in such a way to get deformed when they are pushed in the second space (5) of the profiles (2, 2') in such manner to forcedly enter said second space (5). 40
7. The frame (100) of any one of claims 3 to 6, wherein said surfaces (10, 11) of the alignment device (1) are knurled. 45
8. The frame (100) of any one of the preceding claims, wherein said alignment device (1) is made of non-deformable rigid material. 50

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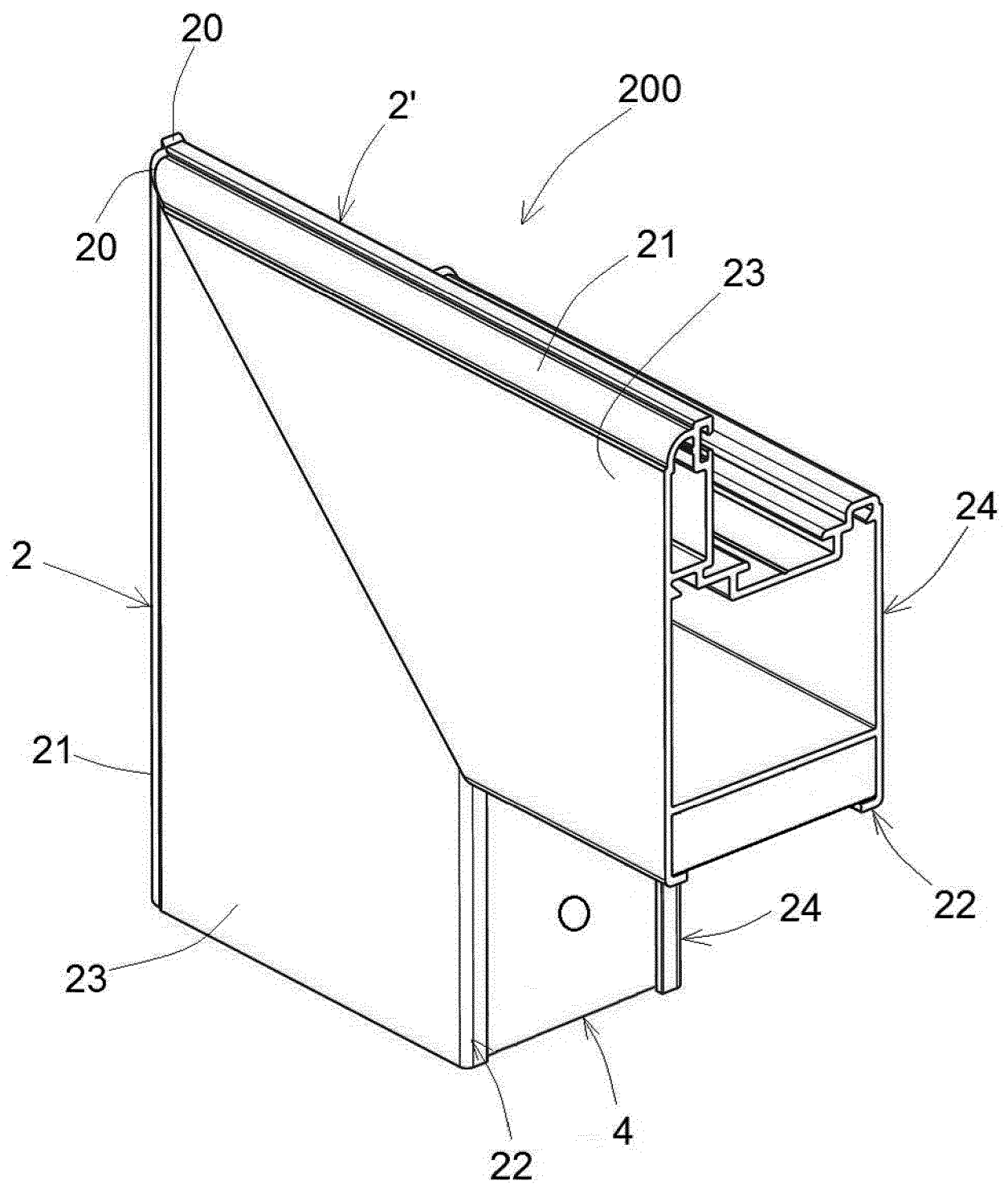


FIG. 2
PRIOR ART

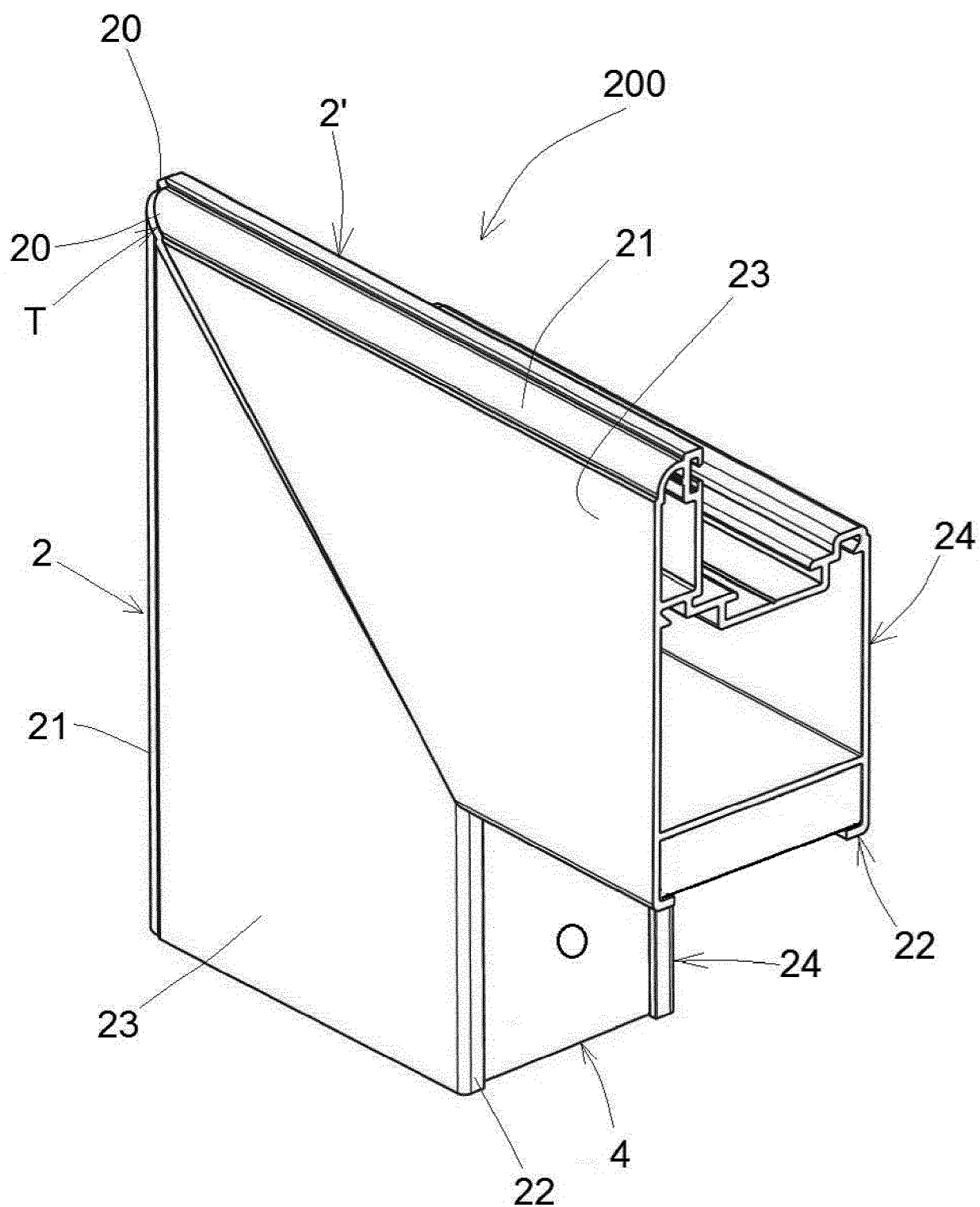


FIG. 3
PRIOR ART

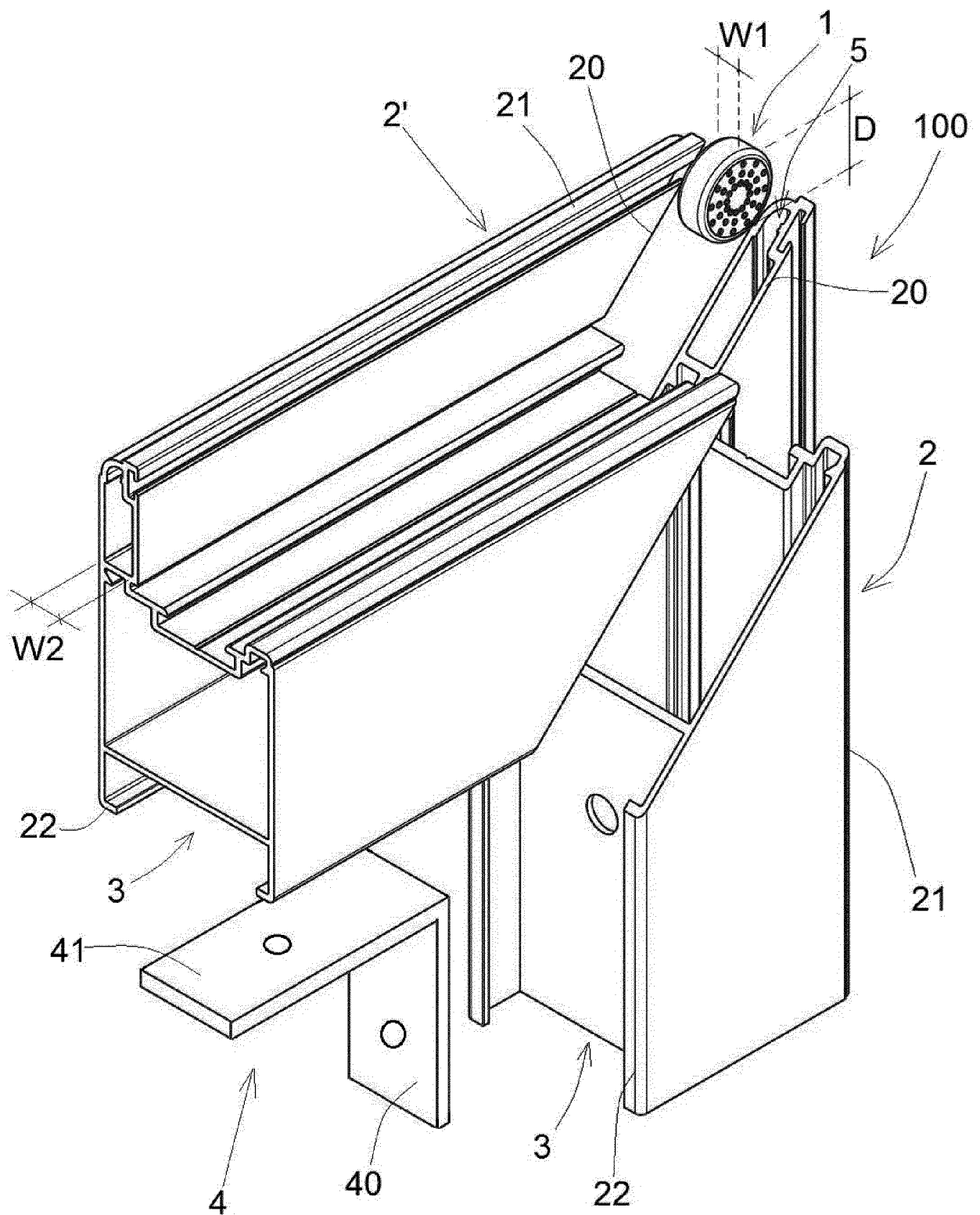
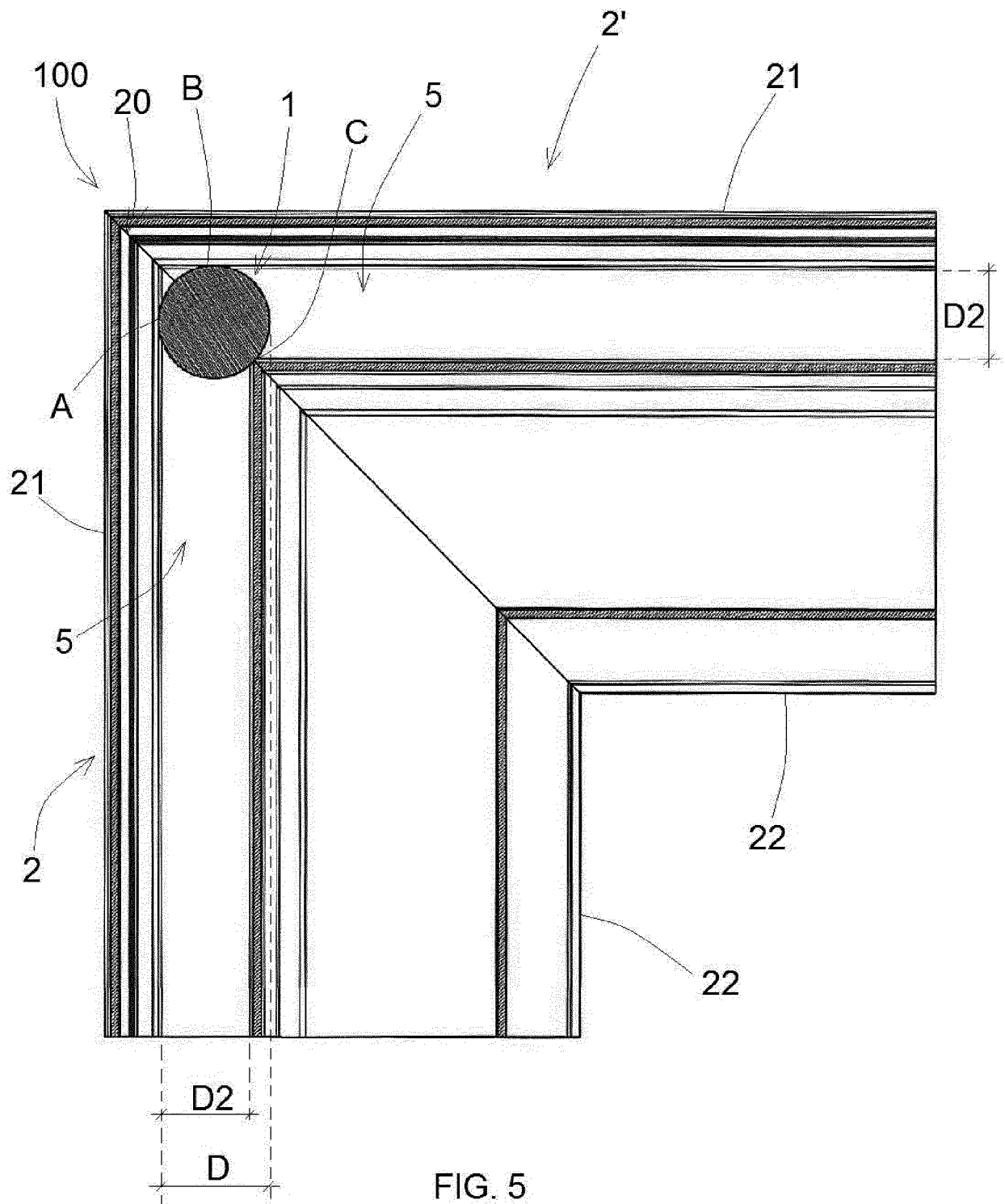


FIG. 4



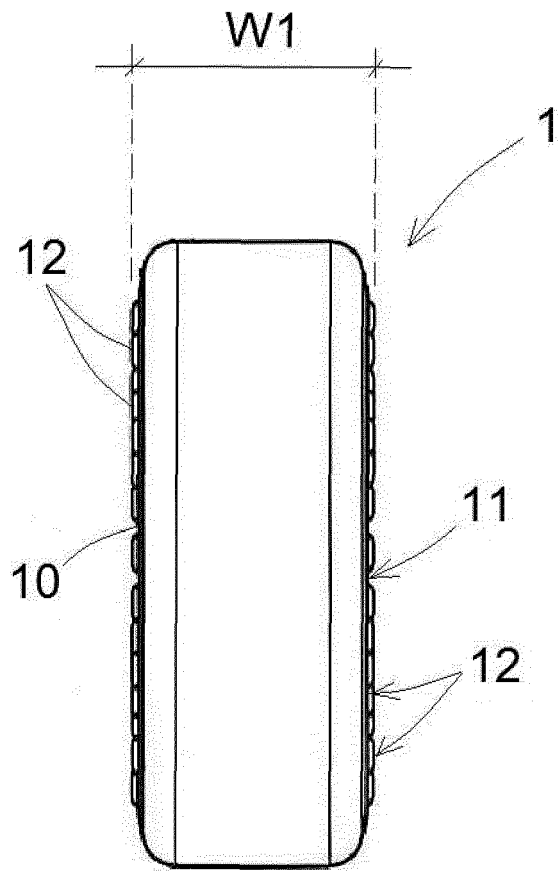


FIG. 8

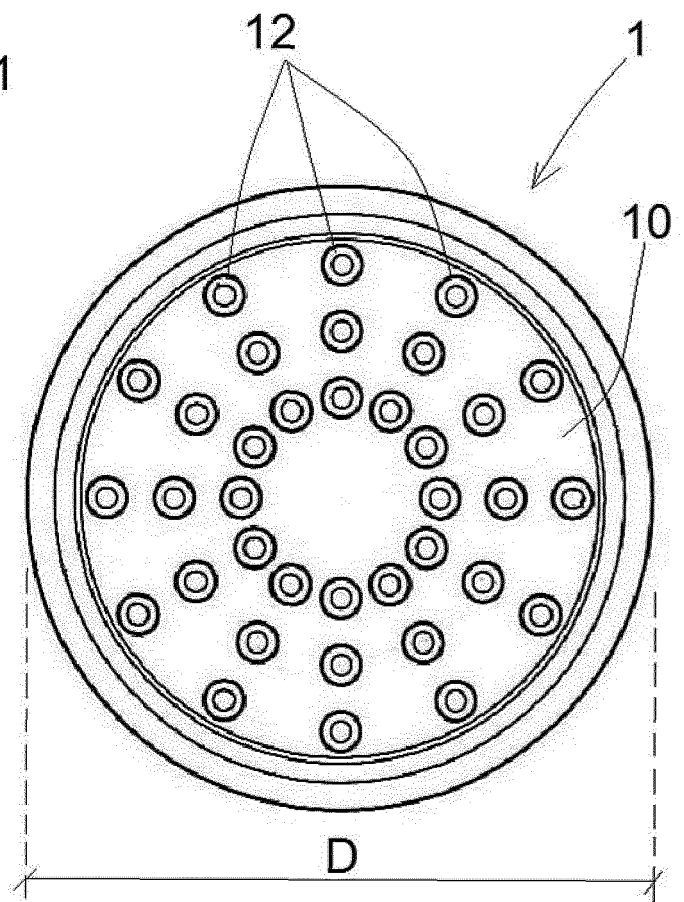


FIG. 7

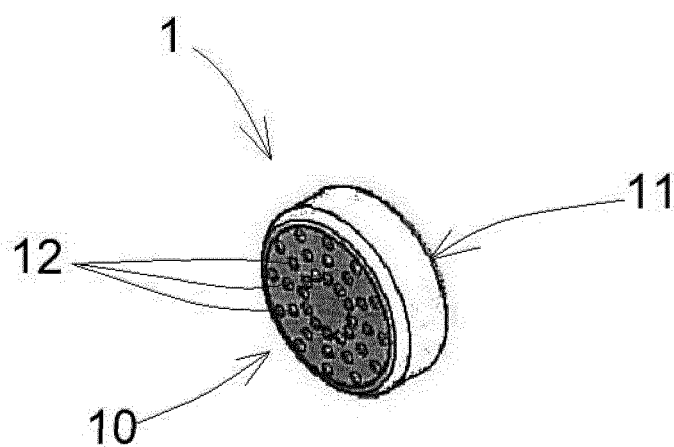


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 17 18 5675

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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)
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			E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 December 2017	Examiner Jülich, Saskia
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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