

(19)



(11)

EP 3 101 355 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.12.2016 Bulletin 2016/49

(51) Int Cl.:
F24F 7/00 (2006.01) **F24F 13/02** (2006.01)
F16L 5/02 (2006.01)

(21) Application number: **15170741.1**

(22) Date of filing: **04.06.2015**

(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

(72) Inventors:
• **HONETH, Hans**
363 31 Rottne (SE)
• **BATEMAN, Philip Kenneth Roderick**
Bracknell, Berkshire RG42 6PA (GB)

(74) Representative: **Boden, Keith McMurray**
Fry Heath & Spence LLP
The Gables
Massetts Road
Horley
Surrey RH6 7DQ (GB)

(71) Applicant: **Fresh AB**
360 32 Gemla (SE)

(54) **AIR VENT**

(57) An air vent for providing ventilation through a bore in a building structure, the air vent comprising a first body, which is located to a first, internal side of the building structure, a second body, which is located to a second, external side of the building structure and is coupled

to the first body to provide a duct which extends through the building structure, and a cover unit, which is movably disposed within the second body between a first non-deployed position and a deployed position.

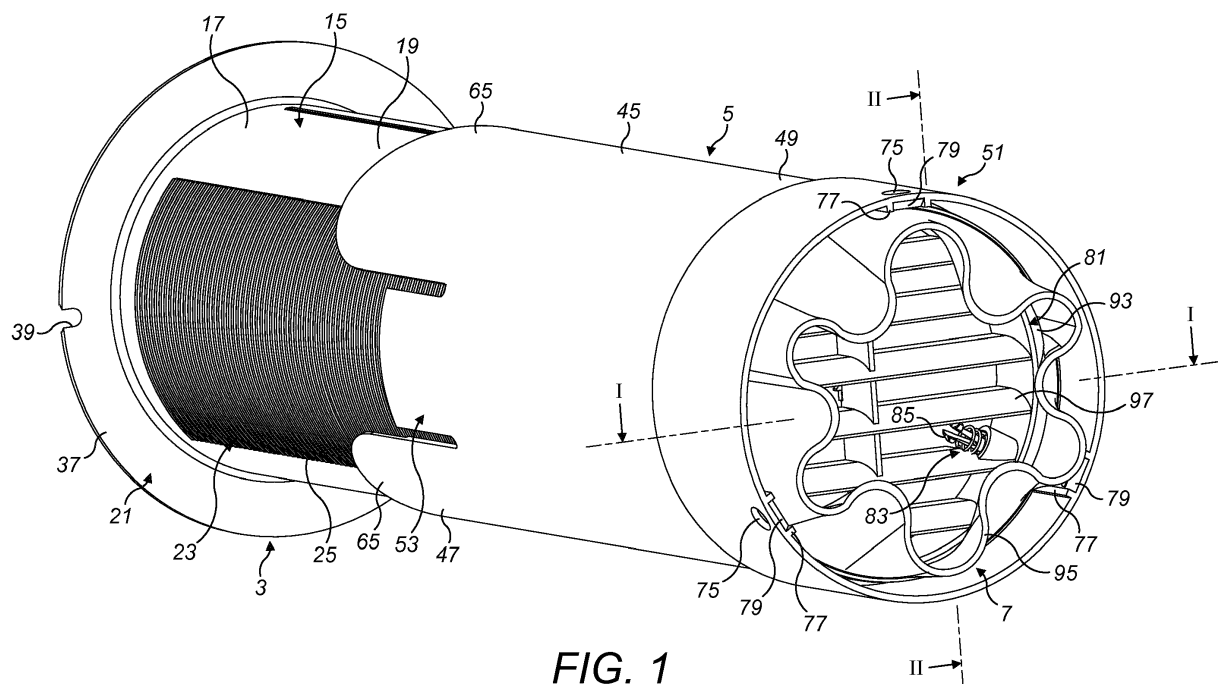


FIG. 1

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Description

[0001] The present invention relates to an air vent for ventilating an enclosed space within a building structure to an external environment, such as to the atmospheric environment external of a building structure, and in particular which allows for installation of the vent from within the building structure.

[0002] Various vents exist for ventilating building structures, and which allow for installation from within the building structure. One such vent is disclosed in GB-A-2467109, where the outer, peripheral sealing flange of the external cover tapers rearwardly, such that on installing the vent, by pushing through a channel, the sealing flange is deflected inwardly by the internal surface of the channel.

[0003] These existing vents suffer from a number of drawbacks, however, and it is an aim of the present invention to provide an improved vent.

[0004] In one aspect the present invention provides an air vent for providing ventilation through a bore in a building structure, the air vent comprising a first body, which is located to a first, internal side of the building structure, a second body, which is located to a second, external side of the building structure and is coupled to the first body to provide a duct which extends through the building structure, and a cover unit, which is movably disposed within the second body between a first non-deployed position and a deployed position.

[0005] Preferred embodiments of the present invention will now be described hereinbelow with reference to the accompanying drawings, in which:

Figure 1 illustrates a perspective view from one, outer end of an air vent in accordance with a preferred embodiment of the present invention, with the cover unit in the withdrawn, non-deployed position;

Figure 2 illustrates a perspective view from the other, inner end of the vent of Figure 1, with the cover unit in the non-deployed position;

Figure 3 illustrates a perspective view from the one end of the vent of Figure 1, with the cover unit in the deployed position, with the cover unit in the deployed position;

Figure 4 illustrates an exploded side view of the vent of Figure 1;

Figure 5 illustrates a fragmentary, horizontal longitudinal sectional view (along section I-I in Figure 1) of the first body of the vent of Figure 1;

Figure 6 illustrates a horizontal longitudinal sectional view (along section I-I in Figure 1) of the second body of the vent of Figure 1;

Figure 7 illustrates a vertical longitudinal sectional view (along section II-II in Figure 1) of the vent of Figure 1, with the cover unit in the non-deployed position;

Figure 8 illustrates a vertical longitudinal sectional view in enlarged scale of detail A in Figure 7;

Figure 9 illustrates a vertical longitudinal sectional view (along section II-II in Figure 1) of the vent of Figure 1, with the cover unit in the deployed position;

Figure 10 illustrates a vertical longitudinal sectional view in enlarged scale of detail B in Figure 9;

Figures 11(a) to (f) illustrate the operative steps in fitting the air vent of Figure 1 to a wall structure; and

Figure 12 illustrates packaging for the air vent of Figure 1 which incorporates a pusher tool in accordance with one embodiment of the present invention.

[0006] The air vent comprises a first body 3, which is located to an internal side of a building structure, a second body 5, which is located to an external side of the building structure and is coupled to the first body 3 to provide a continuous duct which extends through the building structure, and a cover unit 7 which is movably disposed within the second body 5 between a first non-deployed position, as illustrated in Figure 1, and a deployed position, as illustrated in Figure 2.

[0007] In this embodiment the building structure is a cavity wall W, which comprises an inner leaf L1, an outer leaf L2 and a cavity C between the inner and outer leaves L1, L2, as illustrated in Figures 11(a) to (f), with the vent being adapted to be inserted through a bore B formed in the wall W.

[0008] The first body 3 comprises a tubular member 15 having inner and outer ends 17, 19, in this embodiment having circular section, which extends into the bore B of the wall W, and a fixing member 21 at the inner end 17 of the tubular member 15, which provides for fixing of the first body 3 to the wall W.

[0009] The tubular member 15 includes at least one engagement section 23 which provides for engagement with a counterpart engagement section 53 on the second body 5, as will be described in more detail hereinbelow.

[0010] In this embodiment the at least one engagement section 23 extends around only part of the periphery of the tubular member 15, whereby the first and second bodies 3, 5, when in a first angular relation, provide for interengagement of the engagement sections 23, 53, and, when in a second angular relation, provide for disengagement of the engagement sections 23, 53, such that the first and second bodies 3, 5 can be freely moved axially in relation to one another.

[0011] In this embodiment the tubular member 15 includes first and second engagement sections 23 which

extend around only part of the periphery of the tubular member 15, here in first and second segments which are arranged in spaced annular relation. In this embodiment the first and second engagement sections 23 are arranged in opposite, symmetrical relation, here each extending over a 90 degree arc of the peripheral surface of the tubular member 15.

[0012] In this embodiment the at least one engagement section 23 comprises a plurality of engagement elements 25 which are arranged in spaced relation along the axial length of the tubular member 15 and provide for engagement with counterpart engagement elements 53 on the second body 5, as will be described in more detail hereinbelow.

[0013] In this embodiment, as illustrated in Figure 5, the engagement elements 21 each comprise a tooth or detent, here having a first, tapered forward surface 31, which allows the counterpart engagement elements 53 of the second body 5 to pass relatively easily thereover when the first and second bodies 3, 5 are moved in axial relation to collapse the same, and a second, locking surface 33, against which the counterpart engagement elements 53 of the second body 5 are locked to prevent the first body 3 being withdrawn from the second body 5; with such withdrawal requiring rotation of the first body 3 in relation to the second body 5, as described hereinabove.

[0014] In this embodiment the fixing member 21 comprises an outwardly-extending flange 37, which is fixed against an inner surface, here by fixing screws at apertures 39.

[0015] The second body 5 comprises a tubular member 45 having inner and outer ends 47, 49, in this embodiment having circular section, which extends into the bore B of the wall W and slideably receives the first body 3 therewithin, and an attachment member 51 at the outer end 49 of the tubular member 45, which provides for attachment of the vent cover assembly 7.

[0016] The tubular member 45 includes at least one engagement section 53 which provides for engagement with the at least one engagement section 23 on the first body 3, in order to allow the first and second bodies 3, 5 to be locked in axial relation.

[0017] In this embodiment the at least one engagement section 53 extends around only part of the periphery of the tubular member 45, whereby the first and second bodies 3, 5, when in a first angular relation, provide for interengagement of the engagement sections 23, 53, and, when in a second angular relation, provide for disengagement of the engagement sections 23, 53, such that the body sections 3, 5 can be freely moved axially in relation to one another.

[0018] In this embodiment the tubular member 45 includes first and second engagement sections 53 which extend around only part of the periphery of the tubular member 45, here in first and second segments which are arranged in spaced annular relation. In this embodiment the first and second engagement sections 53 are arranged in opposed, symmetrical relation, here each ex-

tending over a 45 degree arc of the peripheral surface of the tubular member 45.

[0019] In this embodiment the at least one engagement section 53 comprises at least one engagement element 55 which provide for engagement with counterpart engagement elements 25 on the first body 3.

[0020] In this embodiment the at least one engagement section 53 comprises a plurality of engagement elements 55 which are arranged in spaced relation along the axial length of the tubular member 45 and provide for engagement with counterpart engagement elements 25 on the first body 3.

[0021] In this embodiment, as illustrated in Figure 6, the engagement elements 55 each comprise a tooth or detent, here having a first, tapered forward surface 61, which allows the counterpart engagement elements 25 of the first body 3 to pass relatively easily thereover when the first and second bodies 3, 5 are moved in axial relation to collapse the same, and a second, locking surface 63, against which the counterpart engagement elements 25 of the first body 3 are locked to prevent the first body 3 being withdrawn from the second body 5; with such withdrawal requiring rotation of the first body 3 in relation to the second body 5, as described hereinabove.

[0022] In this embodiment the at least one engagement section 53 is resiliently coupled to a main section of the tubular body 45, here by forming the at least one engagement section 53 as a tab, such as to facilitate sliding of the counterpart engagement elements 25, 55 thereover when the first and second bodies 3, 5 are moved in axial relation to collapse the same.

[0023] In this embodiment the tubular member 45 includes projections 65 at the one, inner end 47 thereof which can be cut in accordance with the width of the wall W, such that the length of the second body 5 can be made shorter than the width of the wall W but such that the one, inner end of the second body 5 extends into the inner leaf L1 across the cavity C,

[0024] In this embodiment the attachment member 51 defines a recess 71 in which the vent cover assembly 7 is slideably disposed between a first, withdrawn or non-deployed position, as illustrated in Figure 1, and a second, deployed position, as illustrated in Figure 2.

[0025] In this embodiment the attachment member 51 includes a stop 73, here in the form of an annular flange, against which the vent cover assembly 7 is disposed in the withdrawn or non-deployed position.

[0026] In this embodiment the attachment member 51 includes at least one aperture 75 therein, which receives and through which extends the locking element 85 of at least one locking member 83 of the cover unit 7 when the cover unit 7 is moved to the deployed position.

[0027] In this embodiment the attachment member 51 includes at least one guide 77, here in the form of a path or track, which receives the at least one locking member 83 of the cover unit 7 and acts to guide the locking element 85 of the at least one locking member 83 to the at least one aperture 75.

[0028] In this embodiment the attachment member 51 includes at least one detent 79 which is located outwardly of the at least one aperture 75, and is configured to prevent the locking element 85 of the at least one locking member 83 being moved outwardly beyond the at least one aperture 75.

[0029] In this embodiment the attachment member 51 includes a plurality of locking apertures 75 therein, here arranged in spaced annular relation, through which extend the locking elements 85 of a plurality of locking members 83 of the cover unit 7 when the cover unit 7 is moved to the deployed position.

[0030] In this embodiment the attachment member 51 includes a plurality of guides 77, which receive the locking members 83 of the cover unit 7 and act to guide the locking elements 85 of the locking members 83 to the apertures 75.

[0031] In this embodiment the attachment member 51 includes a plurality of detents 77 which are located outwardly of the respective apertures 75.

[0032] The cover unit 7 comprises a body member 81 which is slideably disposed within the attachment member 51 of the second body 5, and at least one locking member 83 which is configured to extend through the at least one aperture 75 in the attachment member 51 when the cover unit 7 is in the deployed position.

[0033] In this embodiment the at least one locking member 83 comprises a locking element 85 which is radially-outwardly biased to the body member 81, such that the locking element 85 is disposed in a radially-inward position when the cover unit 7 is in the non-deployed position, as illustrated in Figures 7 and 8, with the distal end of the locking element 85 being located in the at least one guide 77 in the attachment member 51, and disposed in a radially-outward position when the cover unit 7 is in the deployed position, as illustrated in Figures 9 and 10, with the locking element 85 extending through the at least one aperture 75 in the attachment member 51 and locking the cover unit 7 in the deployed position.

[0034] In this embodiment the body member 81 includes at least one recess 87 at the periphery thereof, and the at least one locking member 83 includes a biasing element 89, here a compression spring, which is disposed within the at least one recess 87 and acts to bias the locking element 85 radially outwardly, such as to cause the locking element 85 to extend through the respective aperture 75 in the attachment member 51 when the cover unit 7 is in the deployed position.

[0035] In this embodiment the cover unit 7 includes a plurality of locking members 83, which are configured to extend through respective ones of the plurality of the apertures 75 in the attachment member 51 of the second body 5, such as to lock the cover unit 7 in the deployed position.

[0036] The cover unit 7 further comprises an annular seal 91 which is configured to provide a weathertight seal about the periphery of the bore B formed in the wall W.

[0037] In this embodiment the seal 91 comprises a sup-

port element 93 which is fixed to the body member 81, and a seal element 95, which is configurable between a withdrawn or non-deployed configuration, as illustrated in Figures 7 and 8, in which the seal element 95 is disposed radially inwardly of the attachment member 51 of the second body 5, and a deployed configuration, as illustrated in Figures 9 and 10, in which the seal element 95 extends radially outwardly of the attachment member 51 of the second body 5, such that the seal element 95 is engageable with an outer surface of the wall W about the bore B formed in the wall W.

[0038] In this embodiment the seal element 95 is formed of a resilient material and defines a frusto-conical section which tapers outwardly and rearwardly from a forward edge thereof when in the deployed configuration, as illustrated in Figures 9 and 10, and is folded forwardly and inwardly when in the non-deployed configuration, as illustrated in Figures 7 and 8.

[0039] In this embodiment the seal member 91 is formed of a rubber or elastomer, here a thermoplastic elastomer.

[0040] In this embodiment the body member 81 provides a grille 97, here a slatted grille, through which passes an air flow.

[0041] Fitting of the air vent in a wall W, here a cavity wall, will be described hereinbelow with reference to Figures 11(a) to (e).

[0042] In a first step, as illustrated in Figure 11(a), a bore B of predetermined diameter is formed in the wall W, here extending through the inner and outer leaves L1, L2.

[0043] The operative then measures the thickness of the wall W in order to ensure that the length of the second body 5, when fitted, is such that the proximal end 47 of the second body 5 will be located within the inner leaf L1. If the second body 5 needs to be shortened, the projections 65 at the proximal end 47 of the second body 5 are cut accordingly.

[0044] Subsequently, as illustrated in Figure 11(b), a holding tool 101 is attached to the cover unit 7, and the air vent, with the cover unit 7 in the withdrawn or non-deployed position and the first engagement sections 23, 53 of the first and second bodies 3, 5 disengaged, is inserted into the bore B in the wall W, such that the attachment member 51 at the distal end 49 of the second body 5 extends beyond the outer surface of the wall W. In this position, the apertures 75 in the attachment member 51 are located externally of the wall W.

[0045] In this embodiment the holding tool 101 is a line, such as a string line.

[0046] Then, as illustrated in Figure 11(c), using a pusher tool 103, the cover unit 7 is moved from the withdrawn position to the deployed position, in which the locking elements 85 of the locking members 83 are biased to extend through the apertures 75 in the attachment member 51 and the seal element 95 of the seal member 91 adopts the deployed position, providing a frusto-conical element which is outwardly and rearwardly flared.

[0047] In this embodiment the pusher tool 103 is a rod, here formed by part of the packaging 201 in which the air vent is supplied.

[0048] In one embodiment, as illustrated in Figure 12, the packaging 201 is configured such that part of the packaging 201, here part of the lid 203, is detachable along a separation line 204, and pre-configured with fold lines 205 to form the pusher tool 103 by folding.

[0049] In this embodiment the packaging 201 is cardboard packaging.

[0050] In one embodiment the holding and pusher tools 101, 103 could be provided by a single tool which provides a rod and an engagement element at the distal end.

[0051] Then, as illustrated in Figure 11(d), the holding tool 101 is pulled rearwardly in order to draw the cover unit 7 and the body members 3, 5 attached thereto rearwardly or inwardly. As will be seen, the locking elements 85, which project radially outwardly of the attachment member 51 engage the outer surface of the wall W when the cover unit 7 is drawn rearwardly, thereby fixing the cover unit 7 in relation to the wall W, and, in this position, the seal element 95 of the seal member 91 engages the outer surface of the wall W, such as to provide a weathertight seal around the aperture as defined by the bore B in the wall W.

[0052] Subsequently, as illustrated in Figure 11(e), while retaining the holding tool 101, the first body 3 is rotated in relation to the second body 5 such that the first engagement sections 23, 53 of the first and second bodies 3, 5 are engaged, and moved axially into the bore B in the wall W until the flange 37 as provided by the stop 21 engages the inner surface of the wall W. In this position, the air vent is held in position by engagement of the flange 37 against the inner wall and the locking elements 85 against the outer surface of the wall W, and the bodies 3, 5 are held in relative position by the respective engagement sections 23, 53 thereof, which cannot be released until the first body 3 is rotated in relation to the second body 5.

[0053] In this embodiment, as illustrated in Figure 11(f), the first body 3 is fixed to the wall using fixings 107 which pass through the apertures 39 in the flange 37.

[0054] Finally, it will be understood that the present invention has been described in its preferred embodiments and can be modified in many different ways without departing from the scope of the invention as defined by the appended claims.

Claims

1. An air vent for providing ventilation through a bore in a building structure, the air vent comprising a first body, which is located to a first, internal side of the building structure, a second body, which is located to a second, external side of the building structure and is coupled to the first body to provide a duct which extends through the building structure, and a

cover unit, which is movably disposed within the second body between a first non-deployed position and a deployed position.

2. The air vent of claim 1, wherein the first and second bodies are arranged in axial sliding relation and each include at least one engagement section which, when inter-engaged, prevent the first and second bodies from being axially extended, optionally the at least one engagement section on each of the first and second bodies extends around only part of the peripheral surface thereof, whereby the first and second bodies, when in a first angular relation, provide for interengagement of the engagement sections, and, when in a second angular relation, provide for dis-engagement of the engagement sections, such that the body sections can be axially extended or collapsed in relation to one another, optionally the first body includes first and second engagement sections which are arranged as first and second segments in spaced annular relation, optionally the first and second segments are arranged in opposite, symmetrical relation, each optionally extending over less than a 120 degree arc of the peripheral surface, optionally the second body includes first and second engagement sections which are arranged as first and second segments in spaced annular relation, optionally the first and second segments are arranged in opposite, symmetrical relation, each optionally extending over less than a 60 degree arc of the peripheral surface, optionally the at least one engagement section on the first body comprises a plurality of engagement elements which are arranged in spaced axial relation and the at least one engagement section on the second body comprises at least one engagement element which engages with a respective one of the engagement elements on the first body, optionally the engagement elements on the first body include a first, tapered forward surface, which allows the at least one engagement element on the second body to pass thereover when the first and second bodies are moved in axial relation to collapse the same, and a second, locking surface, against which the at least one engagement element on the second body is locked to prevent the first body being withdrawn from the second body.

3. The air vent of claim 1 or 2, wherein the at least one engagement section of at least one of the first and second bodies is resiliently coupled so as to facilitate sliding of the counterpart engagement sections thereover when the first and second bodies are moved in axial relation to collapse the same.

4. The air vent of any of claims 1 to 3, wherein the first body comprises a tubular member having first and second ends, which extends into the bore of the wall, optionally the first body further comprises a fixing

member at the first, inner end of the tubular member, which provides for engagement to the first side of the building structure, optionally the fixing member comprises an outwardly-extending flange which can be fixed to the first side of the building structure.

5. The air vent of any of claims 1 to 4, wherein the second body comprises a tubular member having first and second ends, which extends into the bore of the wall, optionally the tubular member of the second body includes projections at the first, inner end thereof which can be cut in accordance with a width of the wall.
6. The air vent of claim 5, wherein the second body further comprises an attachment member at the second, outer end of the tubular member thereof, which provides for attachment of the cover unit, optionally the attachment member defines a recess in which the cover unit is slideably disposed between the first, withdrawn or non-deployed position and the second, deployed position, optionally the attachment member includes a stop for engagement with the cover unit when in the withdrawn or non-deployed position.
7. The air vent of any of claims 1 to 6, wherein the attachment member includes at least one aperture or recess, and the cover unit comprises a body member which is slideably disposed to the second body, and at least one locking member which includes a locking element which is configured to engage the at least one aperture or recess in the attachment member when the cover unit is in the deployed position so as to lock the cover unit in the deployed position to the attachment member, optionally the at least one aperture or recess is through aperture such that the locking element of the at least one locking member extends radially outwardly through the through aperture when the cover unit is in the deployed position.
8. The air vent of claim 7, wherein the locking element of the at least one locking member is radially-outwardly biased, such that the locking element is disposed in a radially-inward position when the cover unit is in the non-deployed position, and disposed in a radially-outward position when the cover unit is in the deployed position.
9. The air vent of claim 8, wherein the body member includes at least one recess at a periphery thereof, and the at least one locking member includes a biasing element which is disposed within the at least one recess and acts to bias the locking element radially outwardly.
10. The air vent of any of claims 7 to 9, wherein the attachment member includes at least one guide, optionally in the form of a path or track, which receives

the one locking member of the cover unit and acts to guide the locking element of the at least one locking member to the at least one aperture or recess.

11. The air vent of any of claims 7 to 10, wherein the attachment member includes at least one stop which is located outwardly of the at least one aperture recess, and is configured to prevent the locking element of the at least one locking member being moved outwardly beyond the at least one aperture or recess.
12. The air vent of any of claims 7 to 11, wherein the attachment member includes a plurality of apertures or recesses, and the cover unit comprises a plurality of locking members, the locking elements of the locking members being configured to engage respective ones of the apertures or recesses, optionally the attachment member includes a plurality of guides, which receive respective ones of the locking members and act to guide the locking elements of the locking members to the apertures to the apertures or recesses, optionally the attachment member includes a plurality of stops which are located outwardly of the respective apertures or recesses.
13. The air vent of any of claims 7 to 12, wherein the cover unit comprises a body member which is slideably disposed within the attachment member and supports the at least one locking member.
14. The air vent of any of claims 7 to 13, wherein the cover unit further comprises an annular seal member which is attached to the body member and configured to provide for a weathertight seal about the periphery of the bore in the wall when the cover unit is in the deployed position, optionally the seal member comprises a support element which is fixed to the body member, and a seal element which is configurable between a withdrawn or non-deployed configuration, in which the seal element is disposed radially inwardly of the attachment member, and a deployed configuration, in which the seal element extends radially outwardly of the attachment member, such that the seal element is engageable with an outer surface of the wall about the bore in the wall, optionally the seal element is formed of a resilient material and defines a frusto-conical section which tapers outwardly and rearwardly from a forward edge thereof when in the deployed configuration, and is folded forwardly and inwardly when in the non-deployed configuration, optionally the seal member is formed of a rubber or elastomer, optionally a thermoplastic elastomer, optionally the body member provides a grille, optionally a slatted grille, through which in use passes an air flow.
15. The air vent of any of claims 1 to 14, wherein the building structure is a wall structure, optionally the

wall structure is a cavity wall, which comprises an inner leaf, an outer leaf and a cavity between the inner and outer leaves.

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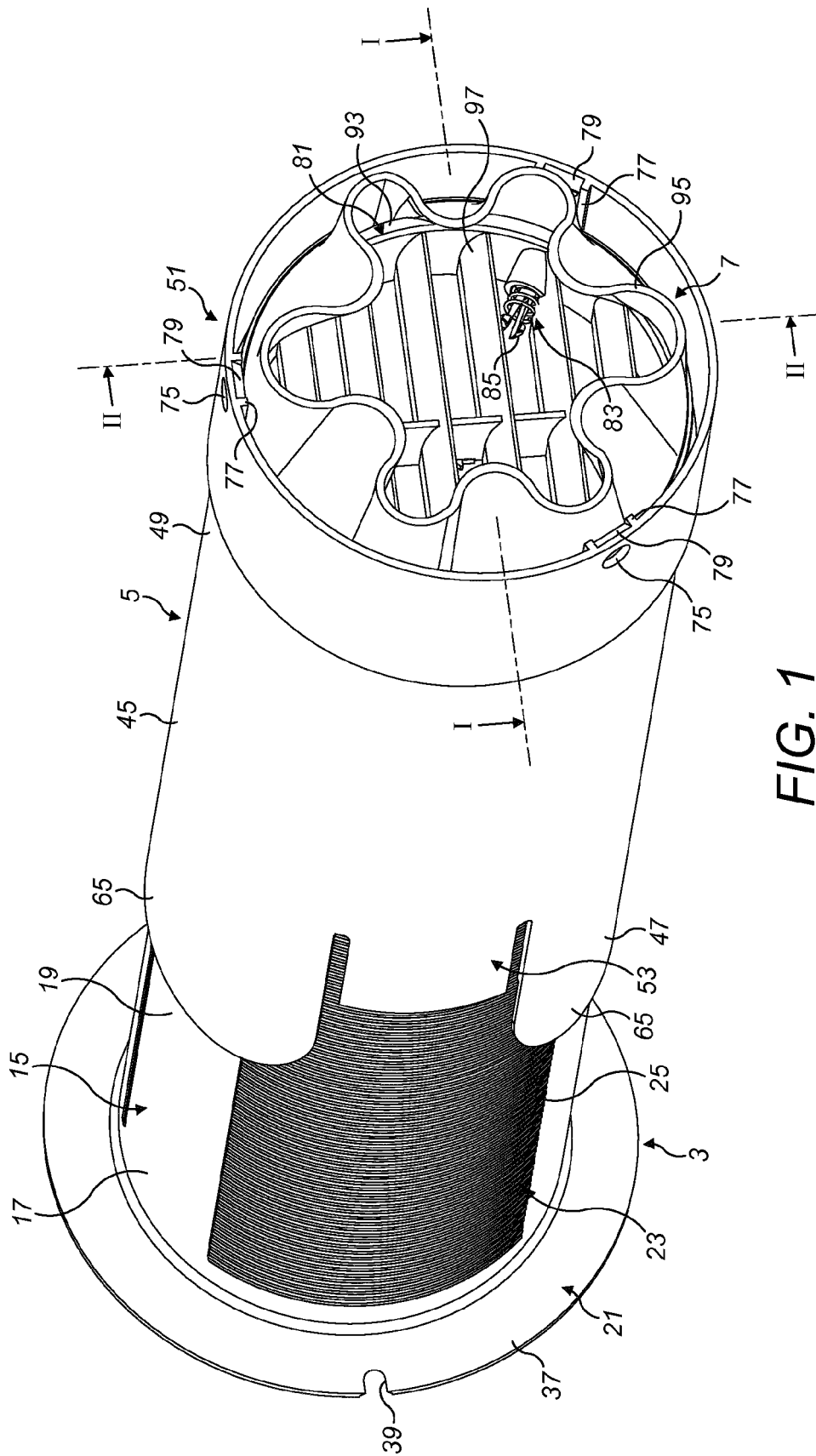


FIG. 1

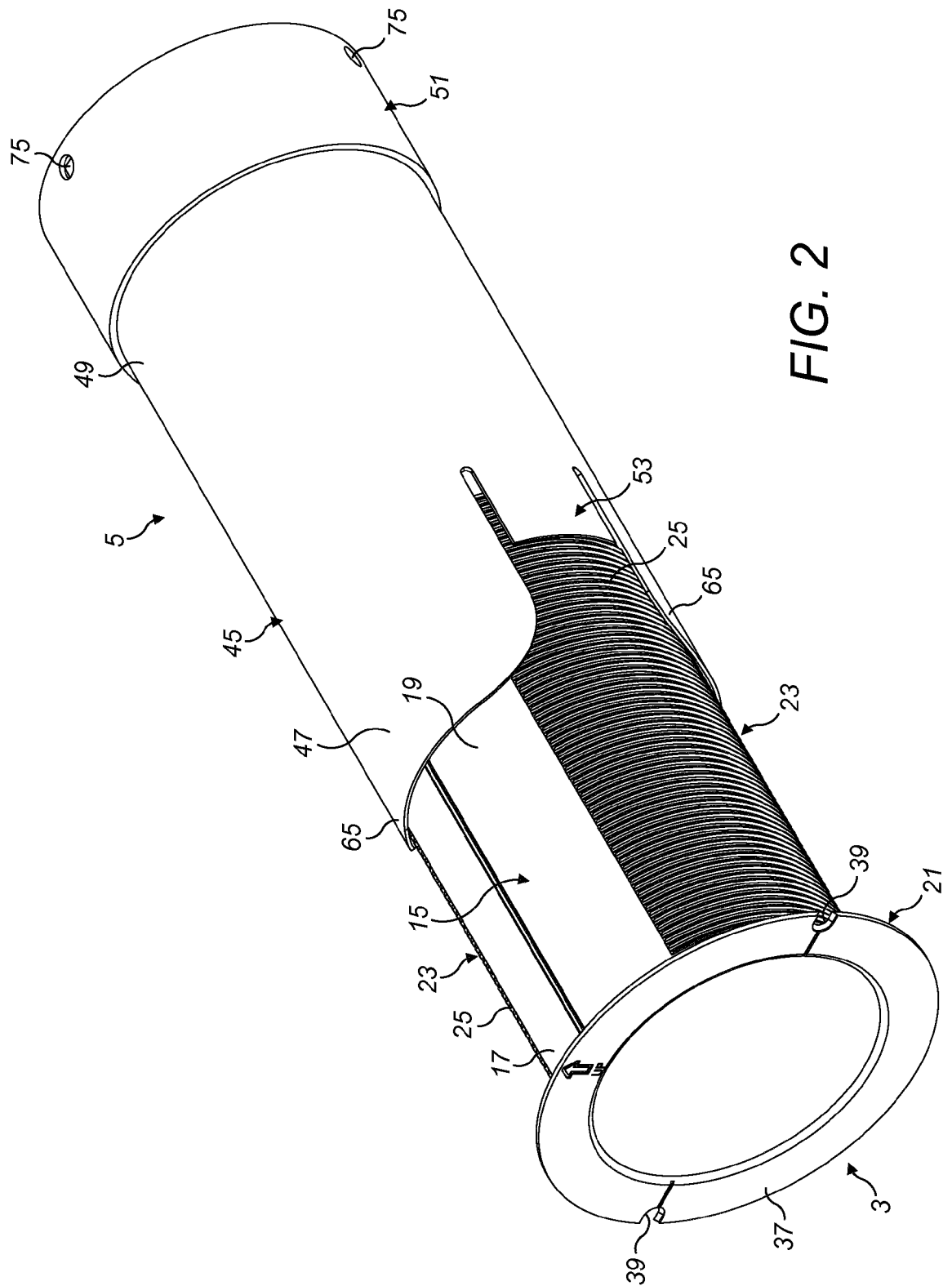
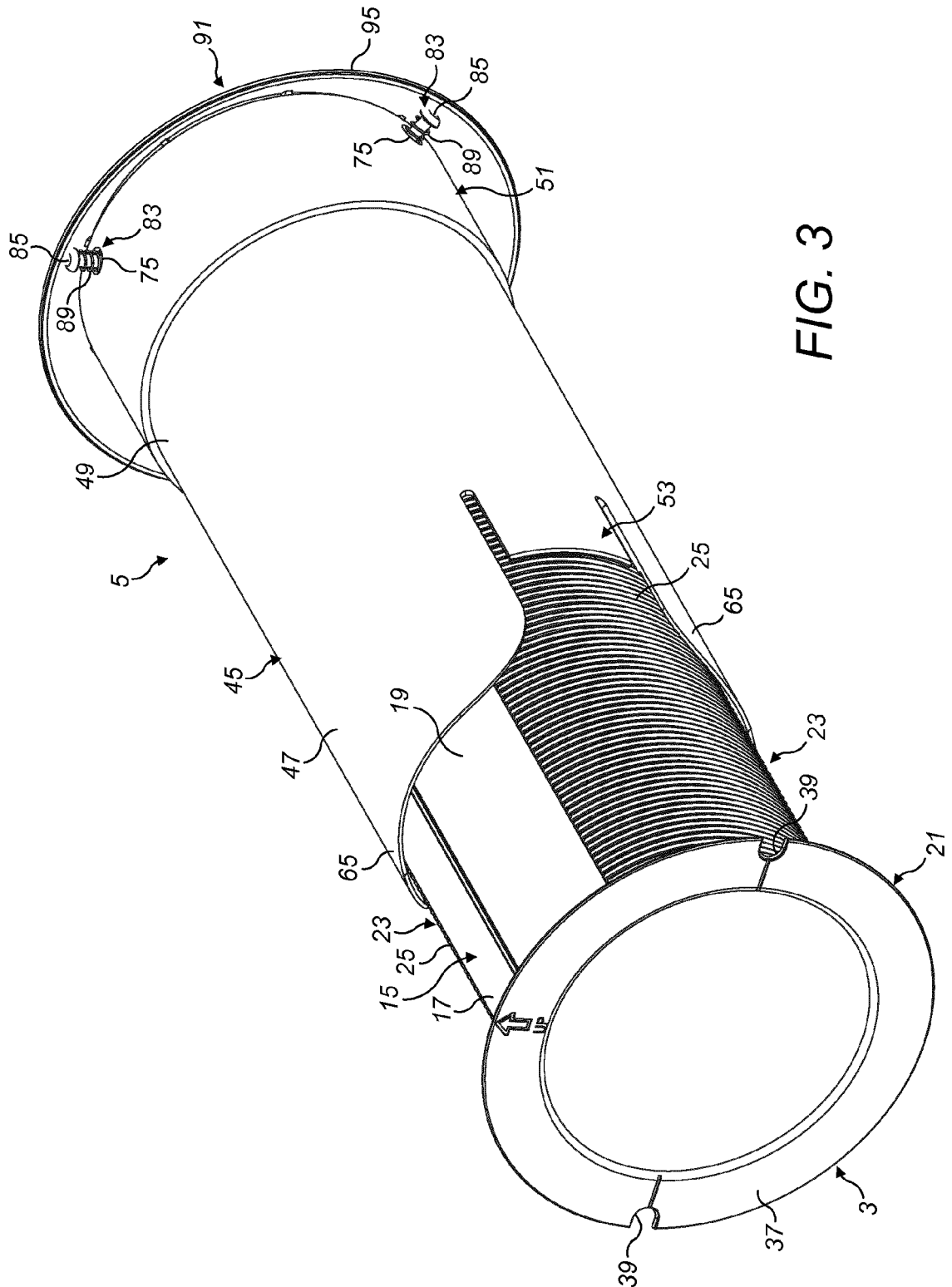


FIG. 2



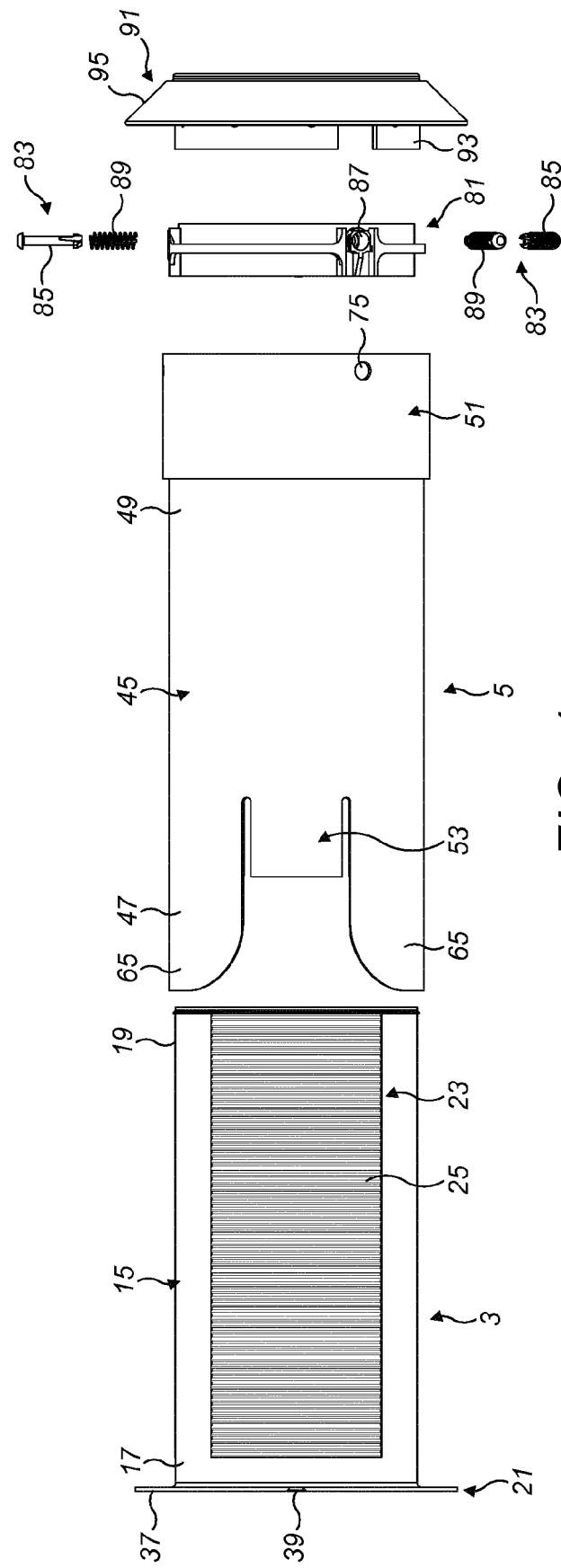


FIG. 4

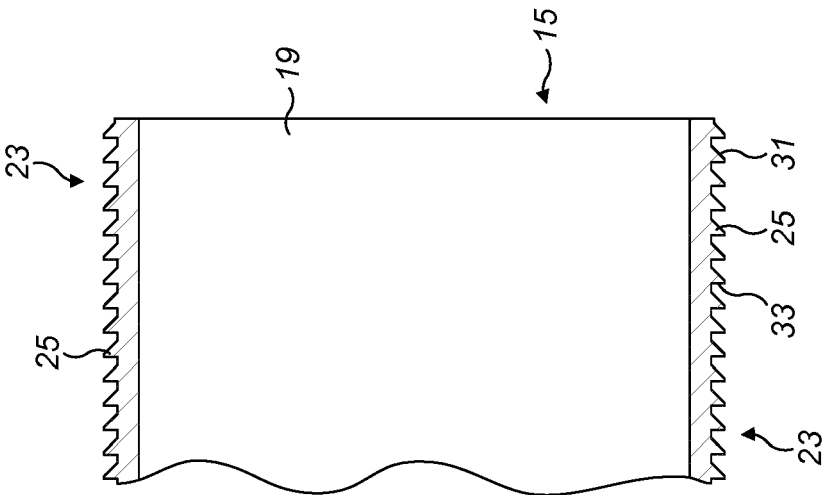


FIG. 5

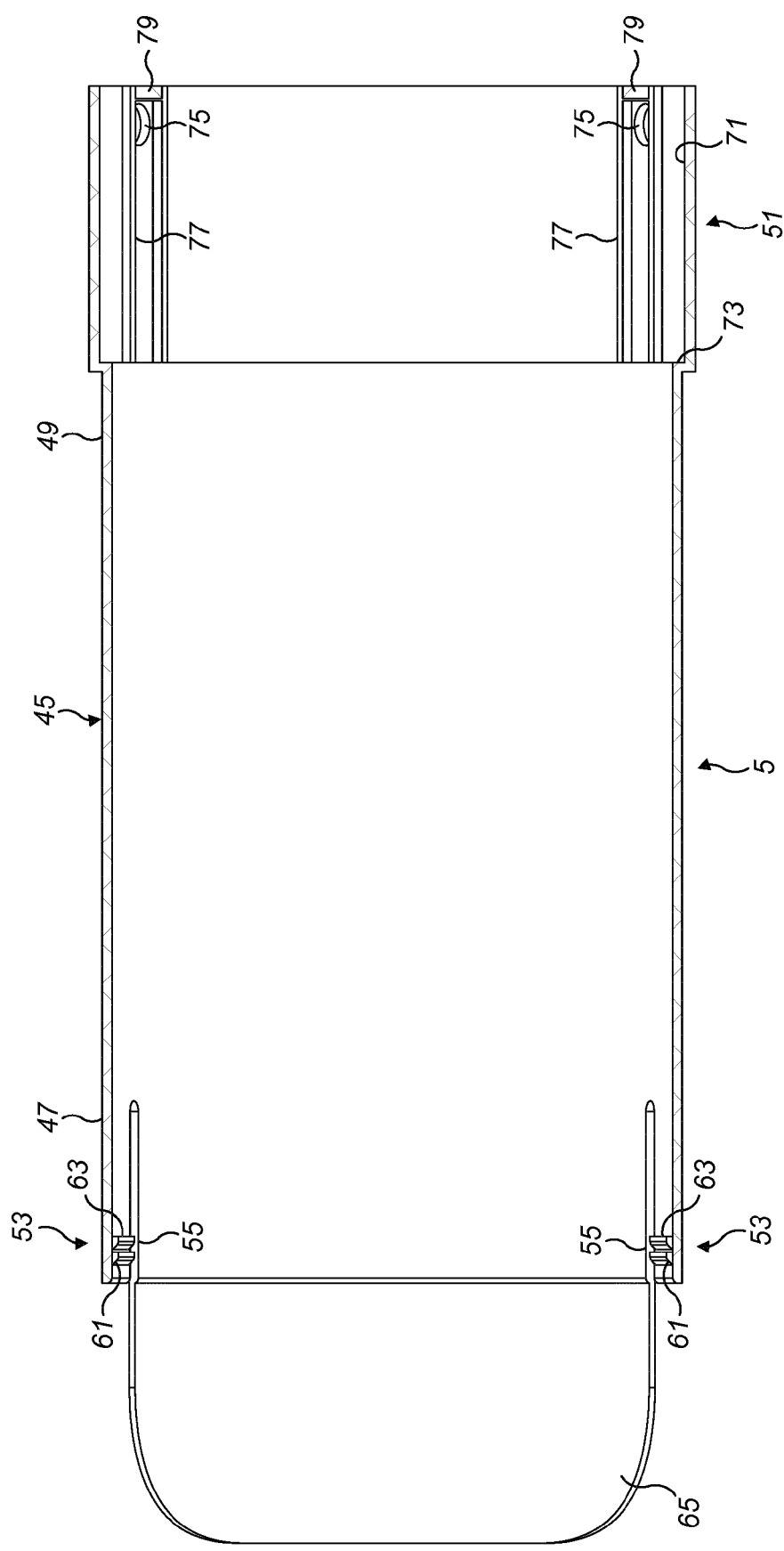
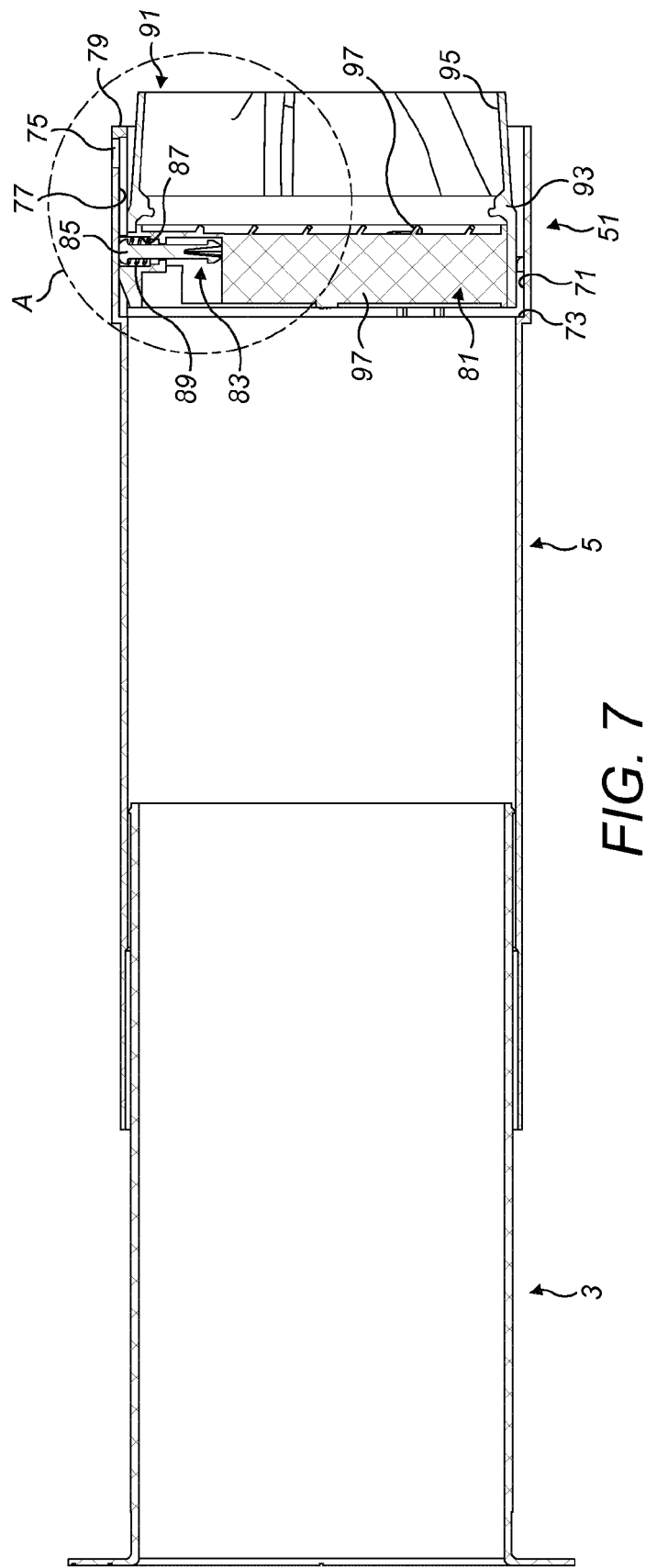


FIG. 6



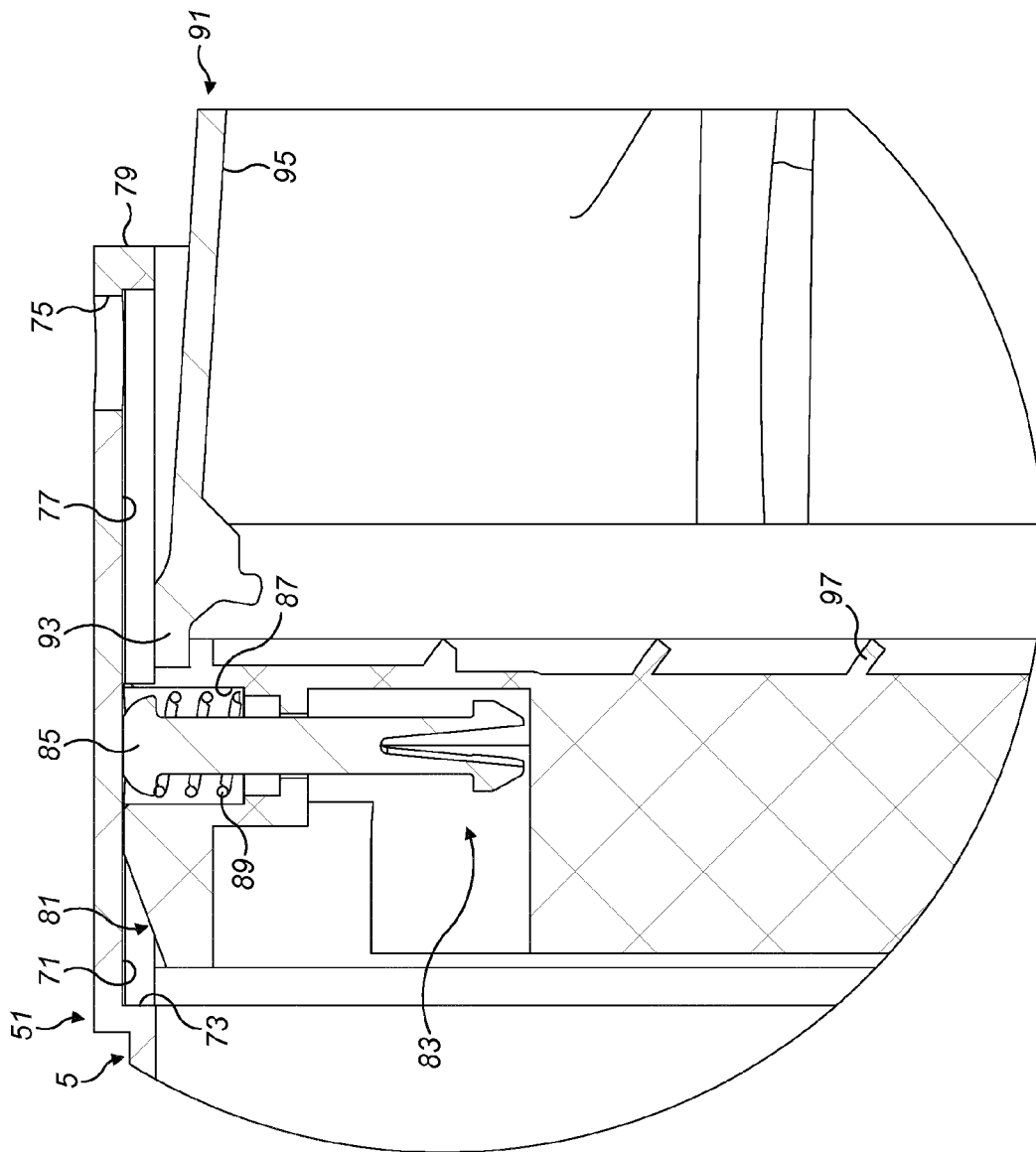
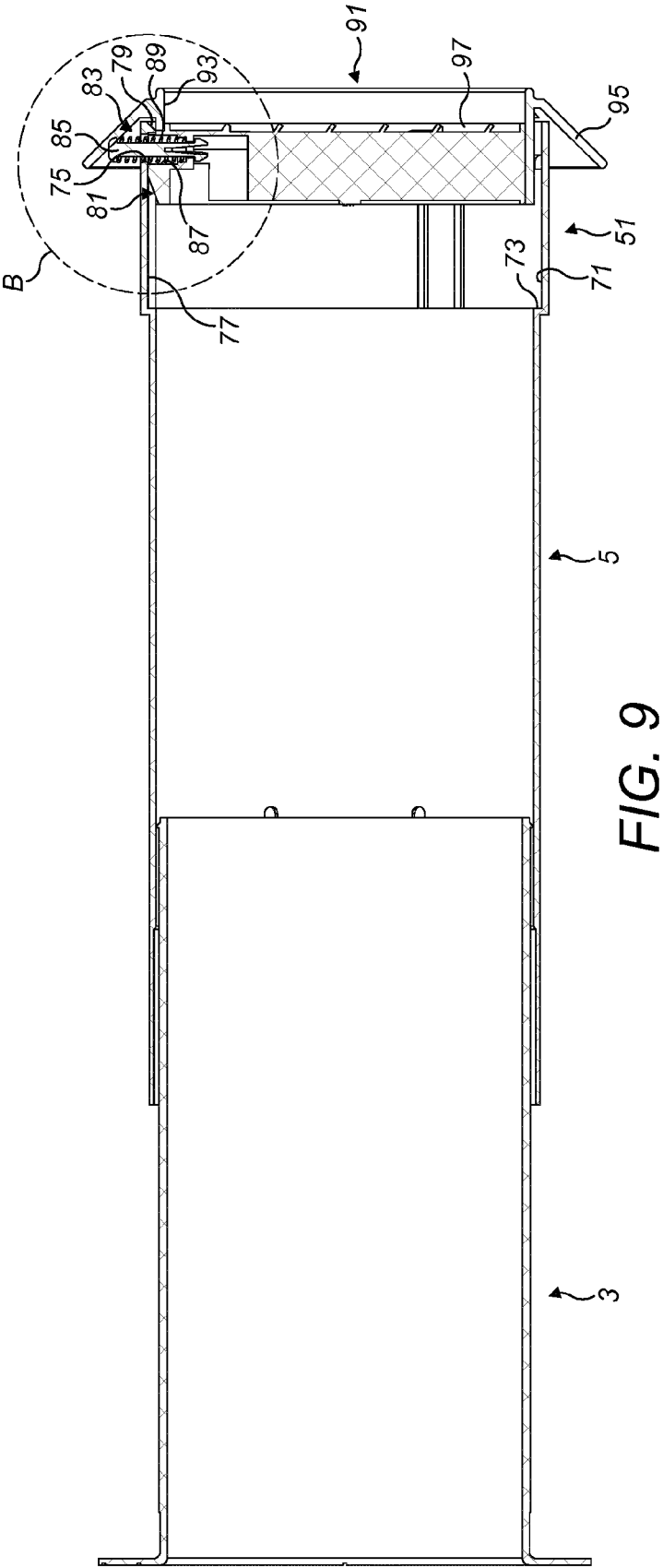


FIG. 8



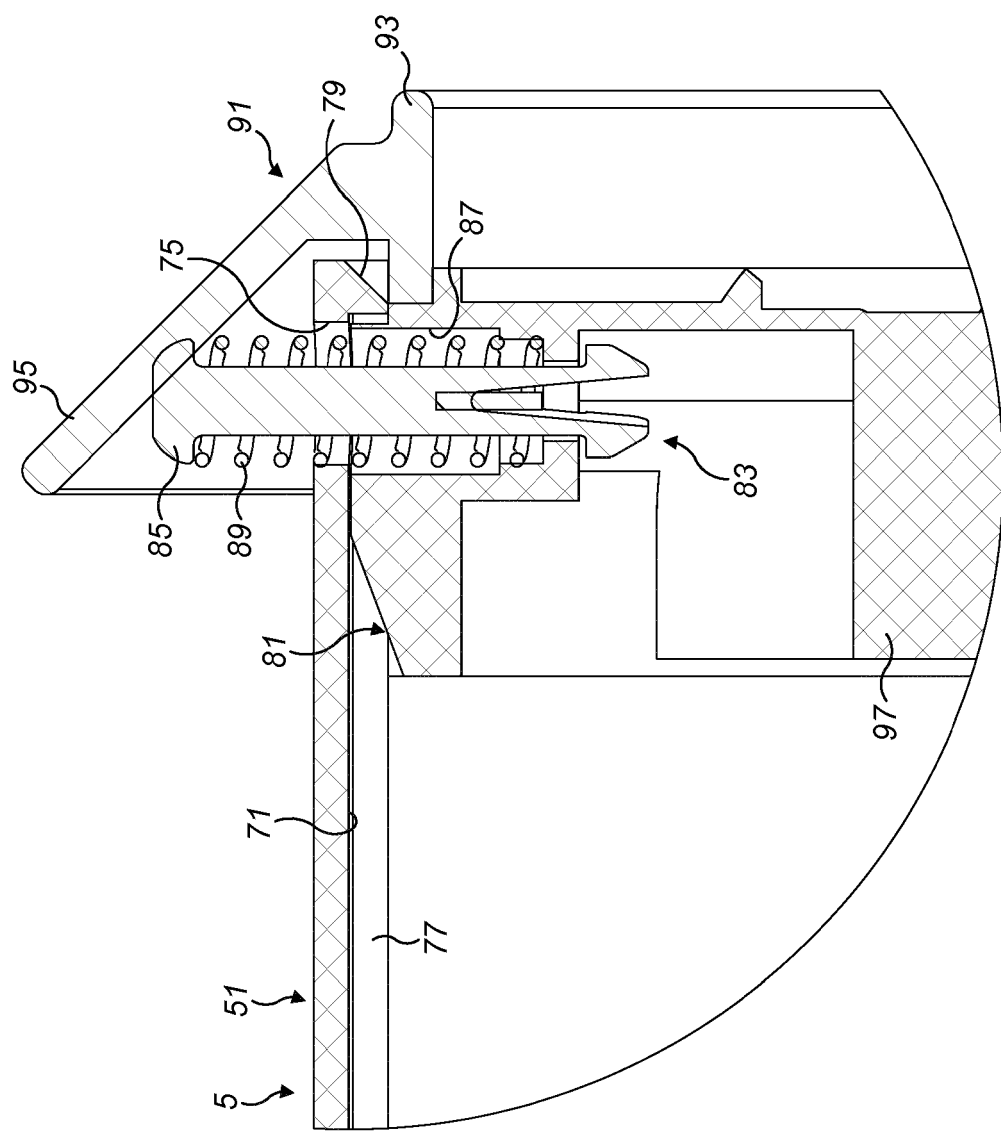


FIG. 10

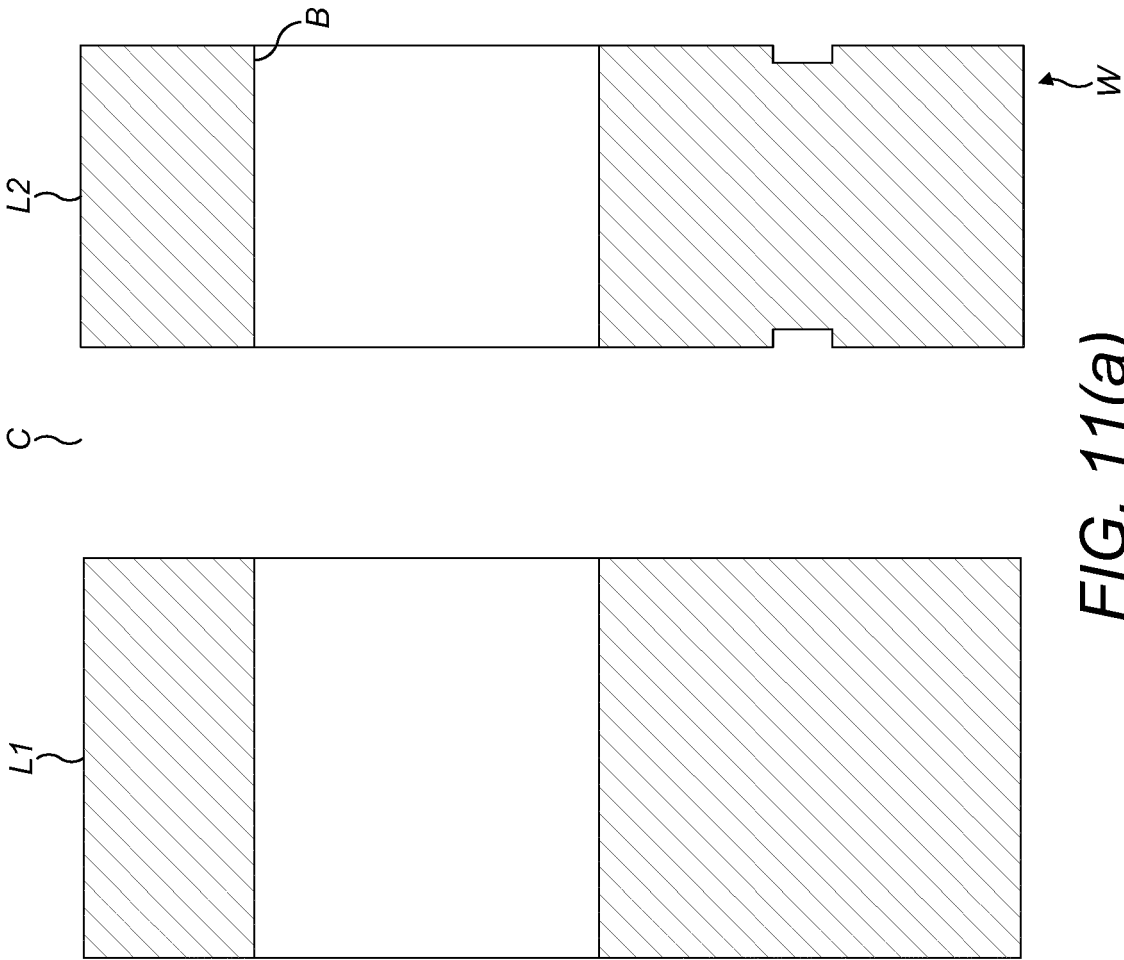


FIG. 11(a)

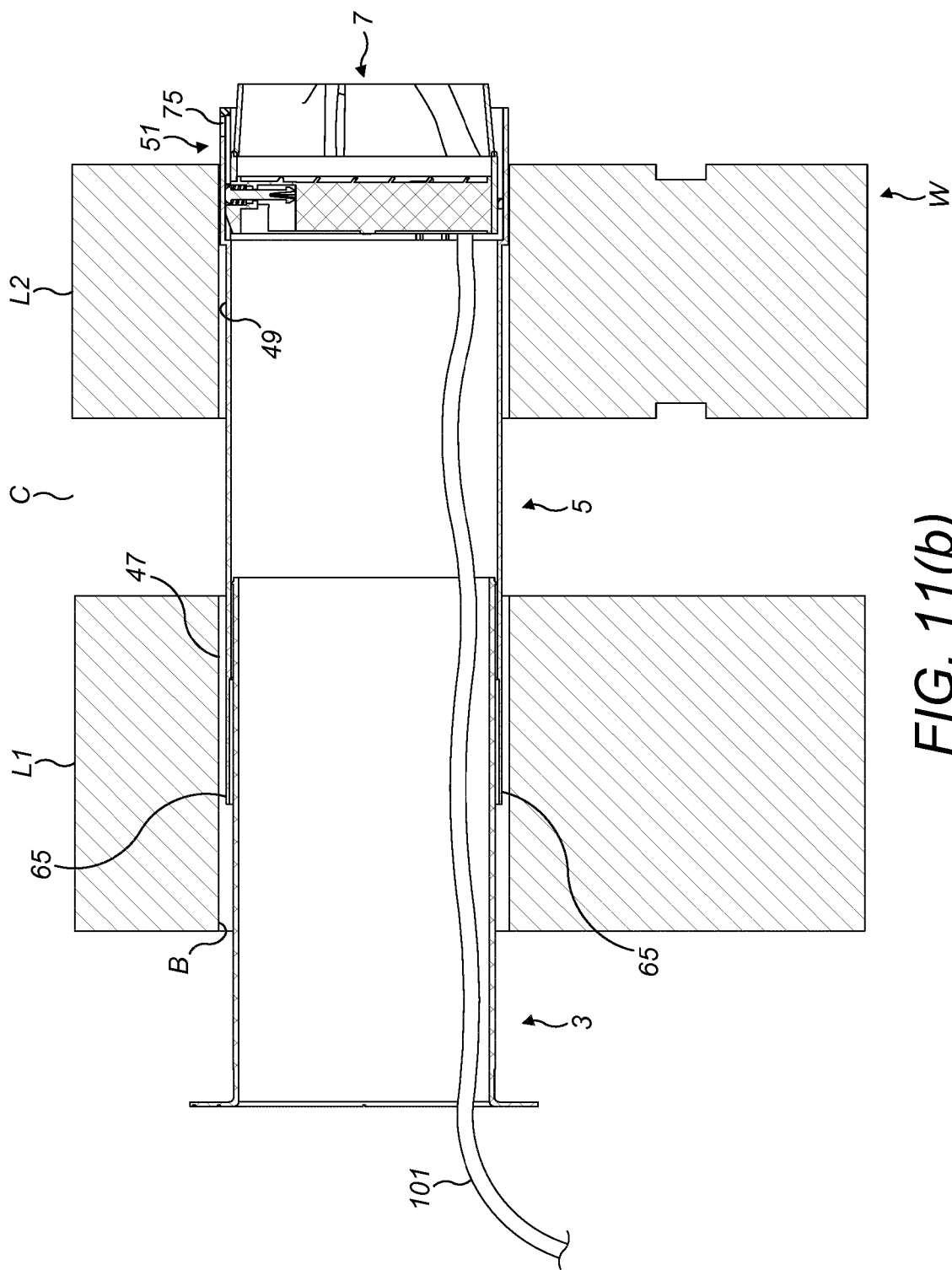


FIG. 11(b)

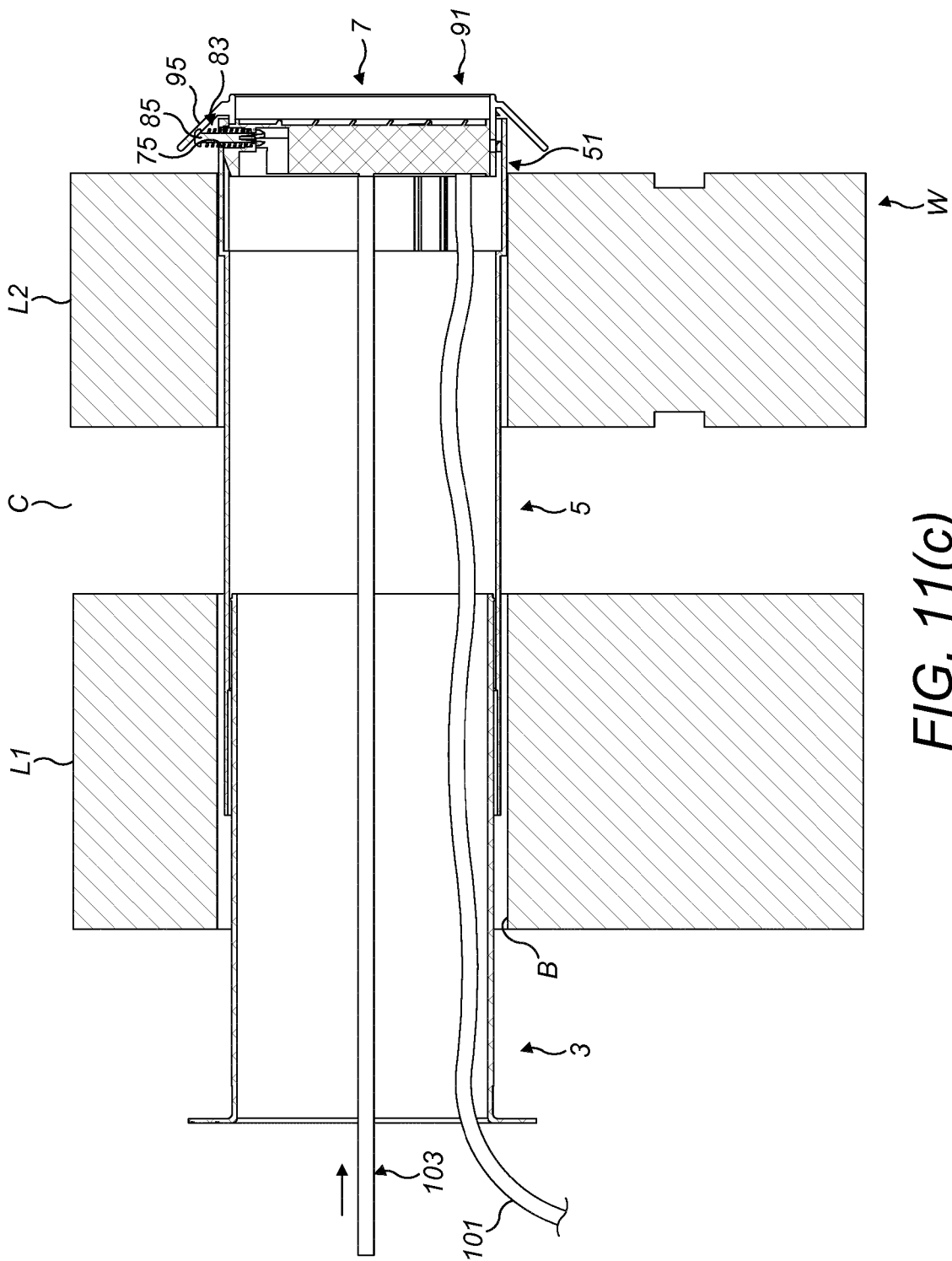


FIG. 11(c)

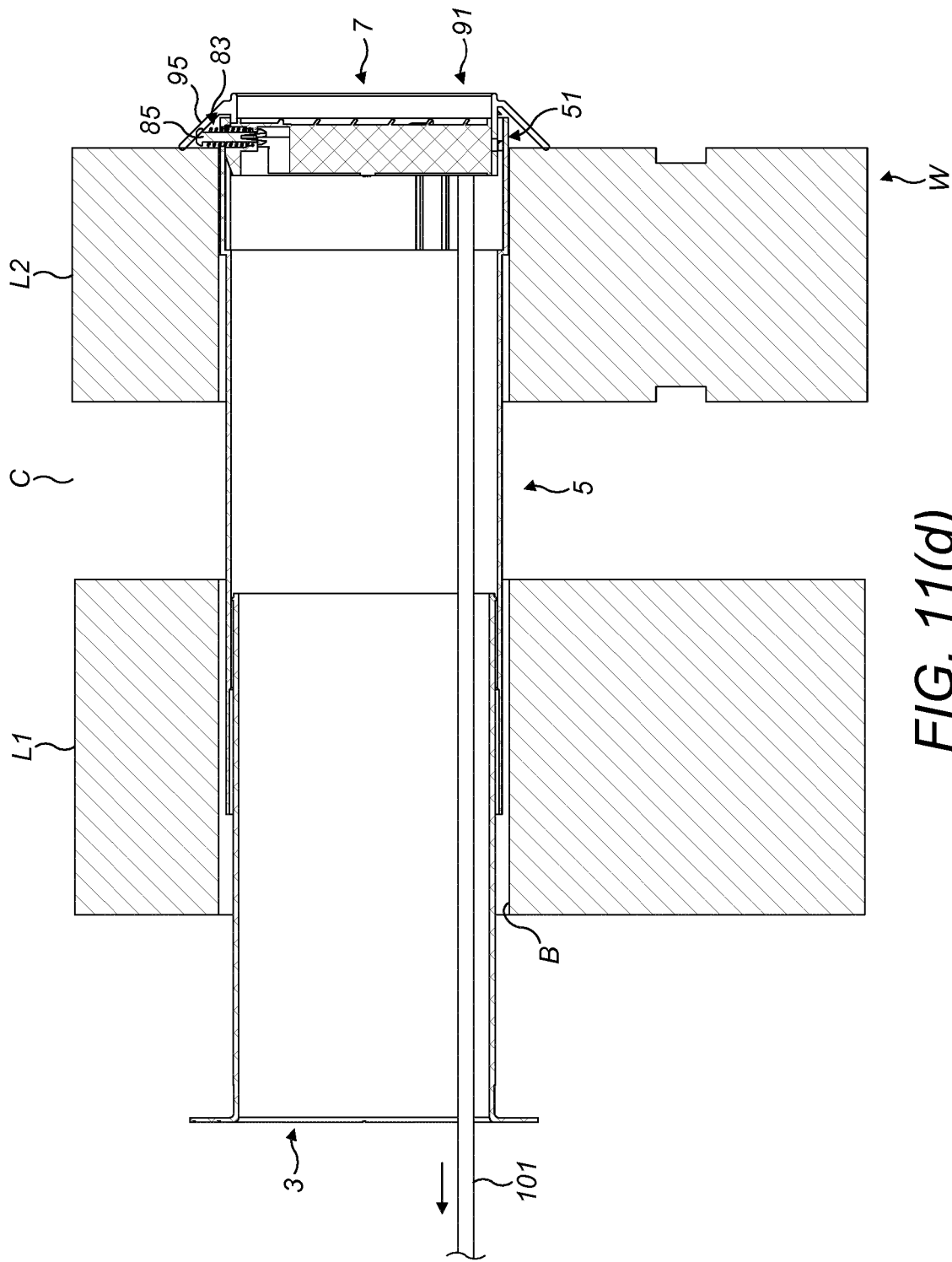


FIG. 11(d)

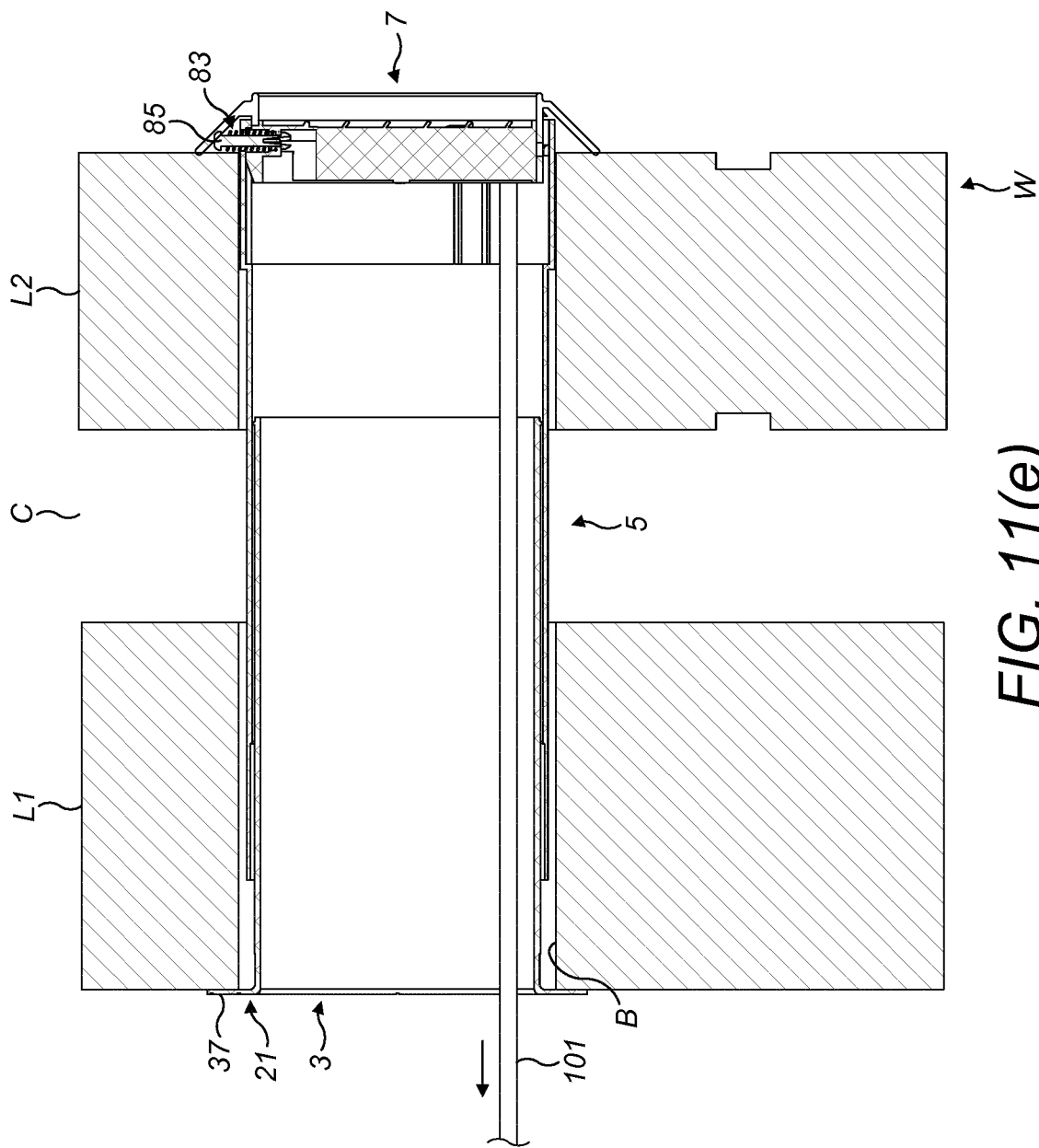


FIG. 11(e)

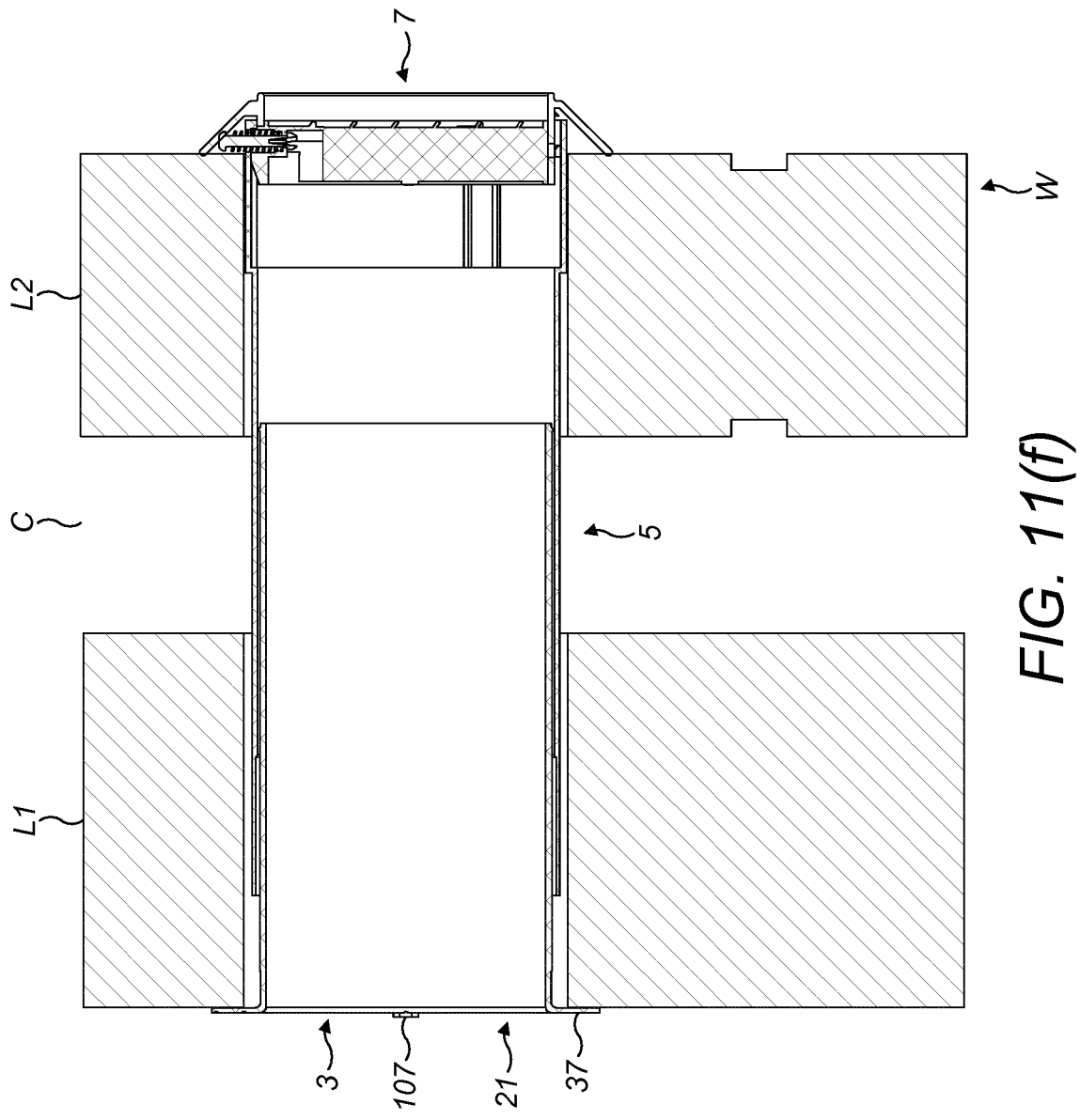


FIG. 11(f)

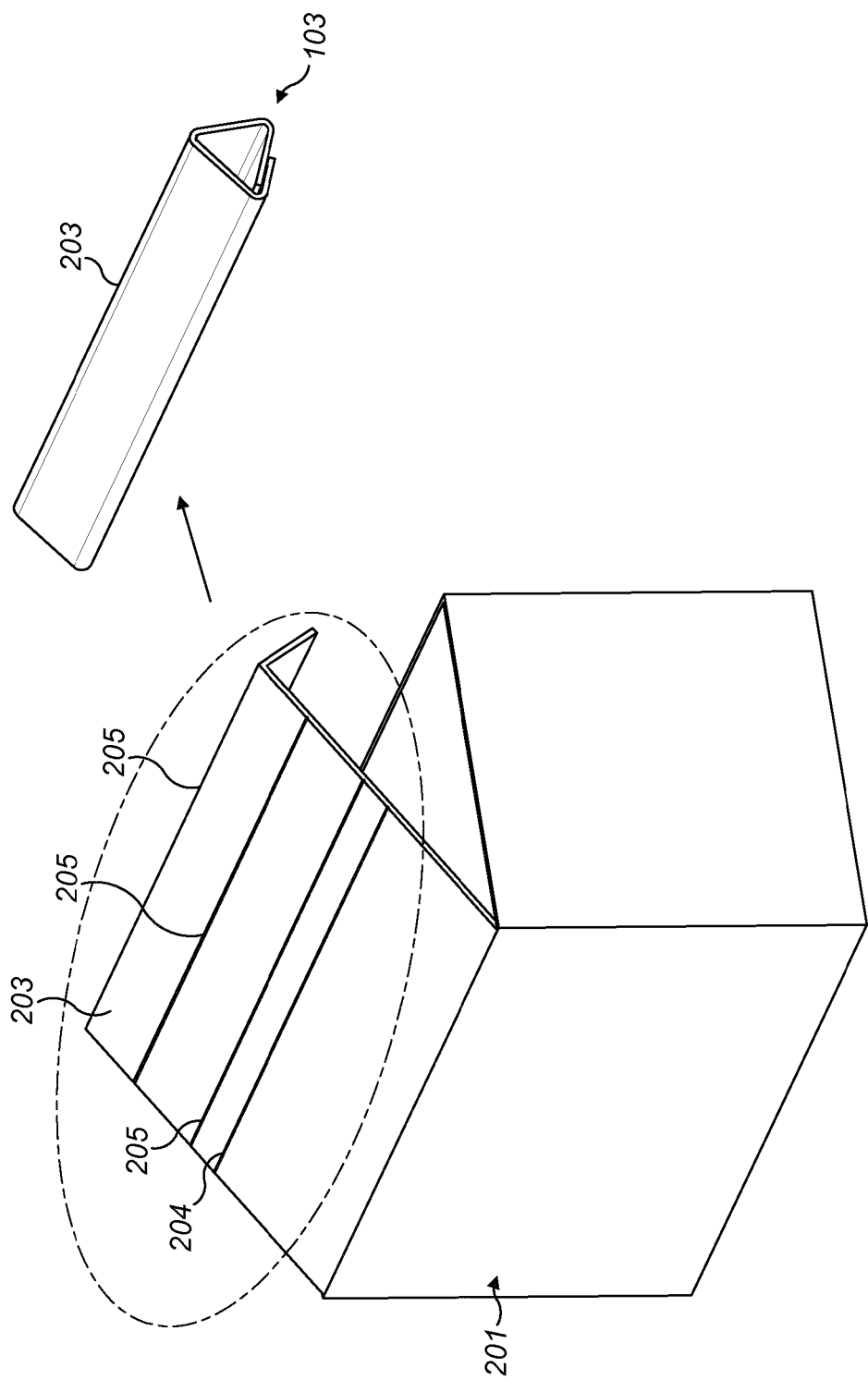


FIG. 12



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 0741

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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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