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(54) **ABSORBER TILE ELEMENT AND TILE SYSTEM**

(57) The present invention relates to an absorber tile element (102a-f, 202a) including an anchor element (106a-f) associated with one surface (107a-b, 107e-f; 108a-b, 108e-f; 209a) of the absorber tile element (102a-f, 202a). The anchor element (106a-f, 206a) comprises a head portion (110a-b, 110e-f) and a threaded portion (112a-b, 112e-f). The threaded portion (112a-b, 112e-f) being threaded into the absorber tile element such that the head portion (110a-b, 110e-f) becomes recessed in the absorber tile element (102a-f, 202a). The anchor element (106a-f, 206a) includes a wire lock (114a-b, 114e-f) arranged in the anchor element (106a-f, 206a) and having an access port (118a-b, 118e-f) accessible from a top side (116a-b, 116e-f) of the head portion (110a-b, 110e-f). A tile system including absorber tile element (102a-f, 202a) is also provided.

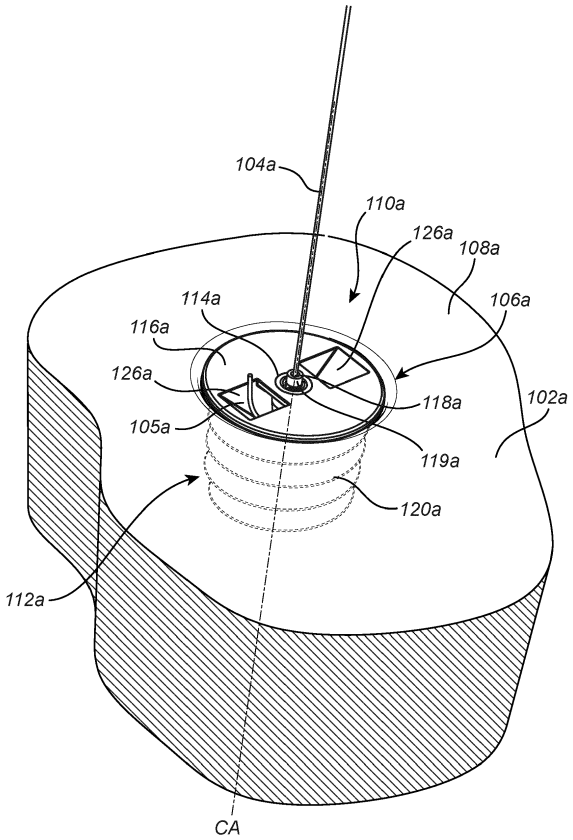


Fig. 2a

EP 4 112 836 A1

Description

Filed of the Invention

[0001] The present invention generally relates to an absorber tile element and a tile system.

Background of the Invention

[0002] A tile system in a room or in another accommodation may serve a variety of purposes. One purpose of having a tile system such as a suspended ceiling system may be to conceal an underside of a space, such as another room, which is located above the room. Another purpose may be to provide improved noise absorption and/or noise attenuation in and outside of the room. Tile systems for rooms or similar typically also include sound absorbing baffles in form of generally vertically suspended tiles.

[0003] In case of a suspended ceiling system, the resulting plenum space located between the suspended ceiling and a main ceiling of the room may further be utilized to accommodate e.g. wiring, piping, as well as devices related to heating, ventilation and air condition. Typically, a suspended ceiling consists of a plurality of ceiling tiles which may be suspended from the main ceiling or structural ceiling. The ceiling tiles may be suspended from the main ceiling using wires or lines which are attached to the main ceiling and to the ceiling tiles such that the ceiling tiles become suspended below the main ceiling, thereby forming a suspended ceiling. The ceiling tiles may also be suspended using a profile framework or similar. Also, baffles may be suspended using various kinds of elements.

[0004] In order to suspend the tiles of a suspended ceiling system, the ceiling tiles may be provided with a number of fasteners which in turn may be connected to the wires or lines used to suspend the ceiling tiles. The fasteners are commonly fixed to the ceiling tiles using different techniques, such as being glued onto or being screwed into the ceiling tiles. Similarly, baffles are commonly provided with a number of fasteners. According to common practice, the fasteners include some form of eye or hook which is used to connect to wires, lines or similar used to suspend the tiles.

[0005] The fasteners must provide a reliable connection to the tiles and at the same time offer a simple connection to the tiles.

[0006] The fasteners are commonly attached to the tiles at the construction site prior to installing the tiles. This means that a plurality of fasteners typically has to be connected or fixed to each tile. This work is time-consuming. Also, the length of the wires or lines used must be correctly adjusted to suspend the tiles. This work is time-consuming. The time-consuming work implies high costs due to e.g. personnel expenses.

[0007] Further, there is an imminent risk of positioning the fasteners in the wrong position as the installation is often conducted under tight time constraints. Even minor wrongful positioning of the fasteners typically result in severe aesthetic problems since even the slightest misalignment or variation of the tiles is easily noticeable.

[0008] Furthermore, there is a risk of wrongful adjustment of the wires or lines. Minor wrongful adjustment of the lines or wires typically also result in aesthetic problems since even small height variations of the tiles is easily noticeable.

[0009] It has been suggested to install the fasteners to the tiles off-site to reduce the work labor needed during installation of tiles. It has however proven difficult to achieve desired results as the fasteners are prone to damaging the tiles during e.g. handling, transportation and storage.

[0010] It has been suggested to supply wires or lines of certain lengths having pre-mounted hooks. It has however proven difficult to achieve desired results as the conditions at the installation site tends to vary thus requiring at site adjustments of the wires or lines used.

Summary of the invention

[0011] In view of the above, it is an object of the present invention is to provide an improved absorber tile element and an improved tile system.

[0012] Another object is to provide such an absorber tile element and tile system which are less time consuming to install.

[0013] Another object is to provide such an absorber tile element and tile system which ensure correct positioning of the anchor elements in relation to the absorber tile element, which in turn ensure a correct positioning of the absorber tile element in relation to the main ceiling or wall.

[0014] Another object is to provide such an absorber tile element and tile system which ensure easy height adjustment at the installation site.

[0015] Another object is to provide such an absorber tile element and tile system which reduces the risk of damaging the absorber tile elements during handling, transport and storage.

[0016] It is also an object to provide a cost-effective absorber tile element and tile system.

[0017] To achieve at least one of the above objects and also other objects that will be evident from the following description, an absorber tile element having the features defined in claim 1 is provided according to the present inventive concept. A tile system including an an absorber tile element is provided according to claim 14. Preferred variations to the inventive concept will be evident from the dependent claims.

[0018] More specifically, according to a first aspect, there is provided an absorber tile element comprising compressed fiber material and having a first major surface, an opposing second major surface, and at least one side edge surface extending between the first major surface and the second major surface, an anchor element

associated with one of the first major surface and the second major surface or one of the at least one side edge surfaces of the absorber tile element, wherein the anchor element comprises a head portion and a threaded portion, the threaded portion being threaded into the absorber tile element from the surface associated with the anchor element such that the head portion becomes recessed in the absorber tile element, wherein the anchor element comprises a wire lock arranged in the anchor element and having an access port accessible from a top side of the head portion.

[0019] Hereby an improved absorber tile element is provided.

[0020] The absorber tile element comprises an anchor element associated with a surface thereof.

[0021] The absorber tile element comprises compressed fiber material and having a first major surface, an opposing second major surface and at least one side edge surface extending between the first major surface and the second major surface. In other words, the absorber tile element has typically a front side in form of the first major surface, a back side in form of the second major surface and at least one side edge surface. In case of a vertically suspended baffle, the major surfaces are however typically extending vertically and consequently each facing the interior of e.g. a room.

[0022] It should be noted that within the context of this application the term "absorber tile element" may be any type of element which is being suspendable from a structural ceiling or a wall to e.g. form part of or constitute a suspended ceiling or a set of baffles. The element may be free hanging in the sense that it does not contact any neighboring elements or does not have any neighboring elements. The element may also be suspendable such that is contacts neighboring elements. For natural reasons the same type of elements may be suspended as free hanging elements or as elements being in contact with neighboring elements. Further, the element may exhibit different shapes and may be made of different materials or material combinations. Furthermore, the element may be a decorative element and/or an element serving a technical purpose such as sound absorption, fire protection or concealing of piping or wiring.

[0023] The anchor element is associated with one of the first major surface and the second major surface or one of the at least one side edge surfaces of the absorber tile element. In practice, a plurality of anchor elements is typically used to suspend an absorber tile element. Four anchor elements are commonly used to suspend e.g. a ceiling tile, although any number of anchor elements may be used to advantage. The anchor element comprises a head portion and a threaded portion. The head portion and the threaded portion may be integrally formed or formed as separate parts being joined to form the anchor element. The head portion and the threaded portion may partially overlap, such that the thread of the threaded portion extends onto the head portion. The anchor element may be casted, molded or 3-D printed to give a few non-limiting examples. The anchor element may comprise metal and/or plastics. The anchor element may be made from a single metal or from a metal alloy. The anchor element may be made of a plastic material or of a mixture of plastic materials. The anchor element may be fiber reinforced.

[0024] The threaded portion of the anchor element is threaded into the absorber tile element from the first major surface, the second major surface, or one of the at least one side edge surface, such that the head portion becomes recessed in the absorber tile element. In other words, the head portion of the anchor element will not protrude above the first major surface, the second major surface, or one of the at least one side edge surface of the ceiling tile, or it will only protrude slightly above the first major surface, the second major surface, or one of the at least one side edge surface of the ceiling tile. For instance, the head portion may include a relatively speaking thin flange which may be arranged to contact the surface of the absorber tile element into which the anchor element is screwed. In this case, the flange may protrude slightly above the surface of the absorber tile element. For instance, the wire lock may include a release member which may extend slightly beyond the top side of the head portion. In this case, the release member may protrude slightly above the surface of the absorber tile element. This means in turn that no significant portion of the anchor element will protrude above the surface of the absorber tile element.

[0025] The anchor element comprises a wire lock.

[0026] It should be noted that within the context of this application the term "wire lock" may be any type of element which is capable of locking a wire, line or similar from being moved in at least on direction. In other words, the wire lock will prevent or counteract the wire or line at hand at least from being extracted from the wire lock without releasing the wire lock. The wire lock may consequently be a one-way wire lock or a two-way wire lock. The wire lock may be a so-called quick fit wire lock operable without any tools. The wire lock may allow insertion of a wire without the use of any tools or any release operation. The wire lock may include screws or similar for locking a line, wire. The wire lock may be made of any suitable material including plastics and metals. The wire lock may include a plurality of materials. The wire lock may include a plurality of parts or elements.

[0027] The wire lock is arranged in the anchor element. Hence, the wire lock is at least partially enclosed and joined with the anchor element. Portions of the wire lock may protrude from the anchor element. The wire lock may be housed within the anchor element.

[0028] The wire lock has an access port accessible from a top side of the head portion.

[0029] It should be noted that within the context of this application the term "access port" may be any type of port, opening, hole or similar through which a wire, line or similar may be inserted in the wire lock.

[0030] The access port is accessible from a top side

of the head portion such that a wire, line or similar may be inserted in the wire lock from a top side of the of the head portion of the anchor element.

[0031] By the above arrangement of the anchor element including the wire lock, significant advantages are achieved. The anchor element may be pre-mounted or pre-attached to the absorber tile element at hand, with a significantly reduced risk of damaging the tile during handling, transport, storage etc. This is particularly true when a plurality of tiles is stored and stacked. This because the anchor element is recessed in the respective tiles, meaning that there are no significantly protruding portions which are otherwise prone to damaging the tile itself or other tiles e.g. being stacked on top of the tile concerned. Also, the height of a stack of tiles may be significantly reduced since the tiles may be stacked directly on each other since there are no protruding portions of the anchor elements or portions protruding to a limited extent.

[0032] Further, since there are no protruding portions or portions protruding to a limited extent of the anchor element, a reduced installation height or thickness is enabled. This may be a significant advantage in situations where e.g. a suspended ceiling is to be located close to a major ceiling or where a baffle is to occupy as little space as possible.

[0033] Furthermore, the fact that the anchor elements of the absorber tile element may be pre-mounted brings about a significantly reduced risk of mounting the anchor elements in an undesired or wrongful position. Further, the installation time may be reduced as compared to when anchor elements are mounted on-site, bringing about a reduced installation cost.

[0034] Moreover, the fact that the anchor elements of the absorber tile element includes a wire lock may significantly reduce the work labor when installing the absorber tile element. By this arrangement, a wire, a line, a cable, a cord, a thread, a string, a chain, a rope or similar may easily be coupled to or de-coupled from the anchor element of the absorber tile element. The wire lock of the anchor element may consequently simplify installation and reduce installation time, bringing about a reduced installation cost.

[0035] The wire lock may define an internal wire lock channel terminating in the access port at a first end and in an outlet port at a second end, and the anchor element may define an internal anchor element channel, the anchor element channel adjoining the outlet port, and being configured to guide a suspension wire through the anchor element, which suspension wire has been passed through the wire lock and introduced into the anchor element channel, which is advantageous in that the suspension wire may be guided through and out of the anchor element in a controlled manner. Moreover, the suspension wire may be made to exit the anchor element in a desired location, and hence in desired direction, through the anchor element channel. Hence, the suspension wire need not be cut to a certain length where it terminates within the anchor element, which brings about a significantly reduced installation time. Further, a more flexible mounting may be achieved in which a mounting location, e.g. a mounting height, may easily be adjusted. By using a suspension wire having a superfluous length portion, the length of the suspension wire may easily be extended even after installation.

[0036] The anchor element channel may be configured to guide the suspension wire through the anchor element such that the suspension wire is deflected in a direction towards the top side of the head portion, which is advantageous in that the suspension wire may be made to exit the anchor element on the same side as the suspension wire enters the anchor element through the access port of the wire lock. Hence, the suspension wire may be made to exit the anchor element in a concealed way, typically on a back side of the absorber tile element not being visible form a room in which the absorber tile element is installed.

[0037] The anchor element channel may be configured to deflect the suspension wire with a bending radius in the range of 3-40 mm, preferably 5-20 mm, which is advantageous in that the suspension wire may be bent in a controlled manner with a bending radius having a reduced risk of damaging the suspension wire or making the suspension wire get stuck.

[0038] The anchor element channel may be configured to guide the suspension wire through the anchor element such that the suspension wire is guided in a direction towards a bottom side of the threaded portion which is advantageous in that the suspension wire may be made to exit the anchor element on an opposite side as the suspension wire enters the anchor element through the access port of the wire lock. Hence, the suspension wire may be made to exit the anchor element at a bottom side of the threaded portion and further though the absorber tile element. In other words, the suspension wire may be made to exit the absorber tile element typically on a front side thereof being visible form a room in which the absorber tile element is installed. By this arrangement a further absorber tile element or another object may be suspended below the absorber tile element. In other words, a single suspension element for instance in form of a wire, may be used to suspend two or more tiles below each other.

[0039] The anchor element channel may extend along a central axis of the anchor element, which is advantageous in that the suspension wire may be guided straight through the anchor element in a symmetric manner. By this arrangement the wire may not be defected, resulting in that any misalignment related to loading the wire may be counteracted. Moreover, a further absorber tile element or another object may be suspended below the absorber tile element while in principle not affecting the anchor element.

[0040] The head portion and the threaded portion may partially overlap in a direction along a central axis of the anchor element, which is advantageous in that the an-

chor element may be tailored to suit specific needs or desires. For instance, the thread of the threaded portion may continue onto the head portion enabling more thread to engage the absorber tile element, hence making the coupling between the anchor element and the absorber tile element stronger. Correspondingly, the head portion may extend into the threaded portion to give room for e.g. an anchor element channel having a certain bending radius.

[0041] The head portion may be provided with at least one mounting tool recess accessible by a mounting tool from a top side of the head portion, which is advantageous in that a mounting tool, used for screwing the anchor element in to or out of the absorber tile element, may be engaging the at least one mounting tool recess. The at least one mounting tool recess may for instance include a grove, a plurality of grooves, such as two, a hole, a plurality of holes, such as two, a hexagonal recess, a square recess, a hexalobular recess to give a few non-limiting examples. Any type of suitable mounting tool recess may be used to advantage.

[0042] The head portion may comprise a wire lock holding member supporting the wire lock, which is advantageous in that wire locks of different sizes and shapes may be fitted to the anchor element by tailoring the wire lock holding member. Further, the technique used to fasten the wire lock to the wire lock holding member may be varied by tailoring the wire lock holding member. Similarly, the way wire lock holding member is fastened to the head portion may also be tailored. The fastening of the wire lock to the wire lock holding member and/or the fastening of the wire lock holding member to the head portion may include threading, snap locking, gluing, soldering, inserting of a lock pin and crimping to give a few non-limiting examples. Also, the material of the head portion and the wire lock holding member may vary. Suitable materials include plastics and metals. The head portion and the wire lock holding member may be formed as separate parts or may be integrally formed.

[0043] The wire lock may be housed within the anchor element, which is advantageous in that the wire lock may not protrude beyond the anchor element.

[0044] The wire lock may comprise a biased release member protruding beyond a top surface of the head portion and being provided with the access port, which is advantageous in that the suspension wire may easily be inserted and adjusted. Further, the since the release member is biased, e.g. spring loaded, the release member may be pushed back into the wire lock for instance when stacking absorber tile elements on top of each other.

[0045] The compressed fiber material may comprise fiber selected form the group consisting of mineral fiber, wood fiber, textile fiber, polymer fiber and metal fiber.

[0046] The anchor element may have an extension in the interval of 10-150 mm, preferably 15-100 mm, along a central axis thereof, which is advantageous in that a secure connection to the absorber tile element may be provided.

[0047] The anchor element may have an extension in the interval of 10-100 mm, preferably 15-60 mm, in a direction transverse to a central axis thereof, which is advantageous in that a secure connection to the absorber tile element may be provided.

[0048] The threaded portion of the anchor element may comprise threads having a pitch in the interval of 4-10 mm, preferably 5-7 mm, which is advantageous in that a secure connection to the absorber tile element may be provided.

[0049] According to another aspect of the invention, there is provided an absorber tile element according to the first aspect and a suspension wire releasably coupled to the wire lock for suspension of the absorber tile element. In general, features of this aspect of the invention provide similar advantages as discussed above in relation to the previous aspect of the invention. Consequently, said advantages will not be repeated in order to avoid undue repetition.

[0050] The suspension wire may have a diameter in the range of 0,5-3 mm, preferably 0,7-1,2 mm, which is advantageous in that a strong, yet flexible suspension may be achieved. Suspension wires with the specified diameters are generally flexible enough to be guided through the above discussed wire lock channel and anchor element channel.

[0051] The details and advantages of this aspect of the invention are largely analogous to those of the first aspect of the invention, wherein reference is made to the above.

[0052] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the [element, device, component, means, step, etc]" are to be interpreted openly as referring to at least one instance of said element, device, component, means, step, etc., unless explicitly stated otherwise.

Brief Description of the Drawings

[0053] The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of preferred variants of the present inventive concept, with reference to the appended drawings, where the same reference numerals will be used for similar elements, wherein:

Fig. 1 conceptually illustrates a tile system in form of a suspended ceiling system.

Fig. 2a is a perspective detail view of an anchor element of the suspended ceiling system of Fig. 1

Fig. 2b is a cross sectional view of the anchor element of Fig. 2a.

Fig. 3a is a perspective detail view of another anchor element of the suspended ceiling system of Fig. 1.

Fig. 3b is a cross sectional view of the anchor ele-

ment of Fig. 3a.

Fig. 4 is a cross sectional detail view of the suspended ceiling system of Fig. 1.

Fig. 5 is a perspective view of a suspended baffle.

Detailed Description

[0054] The present inventive concept will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred variants of the inventive concept are shown. This inventive concept may, however, be embodied in many different forms and should not be construed as limited to the variants set forth herein; rather, these variants are provided for thoroughness and completeness, and fully convey the scope of the inventive concept to the skilled person. Like reference numerals refer to like elements throughout the description.

[0055] Initially a tile system in form of a suspended ceiling system 100, including absorber tile elements, will be described with reference to Figs. 1-4. Followingly a baffle system 200 will be described with reference to Fig. 5.

[0056] Fig. 1 is a schematic perspective view of conceptually depicting a tile system 100 including in form of a suspended ceiling system 100. For reasons of simplicity there are six planar absorber tile elements or objects in form of ceiling tiles 102a-f illustrated in Fig. 1. It is however to be understood that any number of absorber tile elements, e.g. ceiling tiles, may be used according to the present inventive concept. Each ceiling tile 102a-f has a first major surface intended to face an interior of a room and an opposing second major surface. Further, each ceiling tile 102a-e has four side edge surfaces 109a-e extending between the respective first and second major surfaces. However, ceiling tile 102f has a single side edge surface 109f circumferencing the ceiling tile 102f at an outer periphery thereof and extending between the first and second major surfaces.

[0057] Fig 1. Illustrates how the ceiling tiles 102a-f, forming a suspended ceiling, are suspended from a structural ceiling of a building, not shown.

[0058] Each ceiling tile 102a-f is suspended by means of suspension elements 104a-f, 104x in form of wires. Other relevant examples of suspension elements are a line, a cable, a cord, a thread, a rod, a string, a chain, a rope or a combination thereof. The ceiling tiles 102a-d are suspended using four suspension elements 104a-d each. Ceiling tile 102e is suspended using five suspension elements 104e, whereas ceiling tile 102f is suspended using three suspension elements 104f. Each suspension elements 104a-f are attached to the ceiling tiles in corresponding attachment points. Each attachment point includes an anchor element 106a-f.

[0059] Ceiling tile 102f is suspended below ceiling tile 102e, in the sense that ceiling tile 102f is located further below the structural ceiling and partially under ceiling tile 102e. Ceiling tiles 102e and 102f share one suspension element 104x, which is used for suspending both ceiling tile 102e and ceiling tile 102f. The depicted suspension element 104x is a wire like suspension elements 104a-f.

[0060] The ceiling tiles 102a-f comprises compressed fiber material. Suitable examples of compressed fiber material are mineral fiber material, such as glass wool, mineral wool and stone wool. Other examples of suitable compressed fiber material are wood fiber, textile fiber, polymer fiber and metal fiber. However other materials are also conceivable without departing from the scope of the inventive concept. Ceiling tiles comprising the exemplified materials are known to exhibit acoustic properties such as sound absorbing properties.

[0061] As can be seen in Fig. 1, the ceiling tiles 102a-f are of different sizes and different shapes. Ceiling tiles 102a-d are all of a square shape and are of the same size. Ceiling tile 102e on the other hand is larger compared to ceiling tiles 102a-d. Also, ceiling tile 102e is in the form of a square. Ceiling tile 102f on the other hand is exhibiting a circular shape. As is evident, the size of and shape of the ceiling tiles 102a-f may be altered into any size and shape without departing from the scope of the present inventive concept. Also, the arrangement in terms of how the respective ceiling tiles 102a-f are suspended with respect to each other and the room in which they are present may be altered to suit the needs presently at hand. For instance, the ceiling tiles 102a-f may be arranged at different heights and/or may be inclined relative each other.

[0062] In Fig. 1 the ceiling tiles 102a-f are illustrated as being free hanging, meaning that the respective ceiling tiles 102a-f are not in contact with each other. It is however possible to arrange the ceiling tiles 102a-f such that the respective ceiling tiles 102a-f are in contact with neighboring ceiling tiles or some of the neighboring ceiling tiles.

[0063] Further, the ceiling tiles 102a-f may be provided with a layer, not shown, on the side facing the interior of the room in which the ceiling tiles 102a-f are suspended. The layer may in turn be provided with decorative elements such a paint, a print, a sticker or similar. In other words, the appearance of the ceiling tiles 102a-f may be altered to suit the needs of a particular installation.

[0064] It will now be described in greater detail, with reference to Fig 2a and 2b, how suspension element 104a is used to suspend ceiling tile 102a by being connected to the ceiling tile 102a by means of anchor element 106a. Also, the design of the anchor element 106a will be described in greater detail. Although the below description will be made with reference to ceiling tile 102a, suspension element 104a and anchor element 106a, the below description is equally valid for any of the ceiling tiles 102a-f, any of the suspension elements 104a-f and any of the anchor elements 106a-f.

[0065] In Figs. 2a and 2b it is depicted how anchor element 106a is screwed into ceiling tile 102a, at the second major surface 108a thereof. The first major surface 107a is facing the interior of the room in which the ceiling

tile 102a is suspended. The anchor element 106a is screwed into the ceiling tile 102a such that the anchor element 106a becomes completely recessed in the ceiling tile 102a. As is depicted, the second major surface 108a is deflected at the location of the anchor element 106a, such that the anchor element 106a becomes recessed in the ceiling tile 102a.

[0066] The depicted anchor element 106a of Figs. 2a and 2b comprises a head portion 110a and a threaded portion 112a. The head portion 110a is located above the threaded portion 112a.

[0067] The threaded portion 112a includes a thread 120a.

[0068] In the depicted anchor element 106a the head portion 110a and the threaded portion 112a partially overlap in a direction along a central axis CA of the anchor element 106a. In other words, the thread 120a of the threaded portion 112a extends onto the head portion 110a.

[0069] The thread of the depicted anchor element 106a is conical in the sense that its radius increases towards the head portion 110a. The depicted thread 120a has a radius of 10 mm at its starting point and a radius of 16.6 mm at its end point, i.e. where the thread 120a terminates at the head portion 110a. The pitch of the thread 120a is 6 mm. This means that the separation between consecutive turns of the thread 120a is 6 mm. Examples of feasible pitches are between 4 and 10 mm. The periphery of the thread 120a is preferably relatively speaking sharp so as to cut through the material of the ceiling tile 102a, thereby facilitating its insertion into the ceiling tile 102a. Also, the conical design of the thread 120a facilitates its insertion into the material of the ceiling tile 102a.

[0070] In the depicted anchor element 106a the head portion 110a and the threaded portion 112a are integrally formed by being molded. Suitable materials for the anchor element 106a include polymers, fiber reinforced polymers and metals to give a few non-limiting examples. However other materials are also conceivable without departing from the scope of the inventive concept. Anchor elements 106a comprising the exemplified materials are known to exhibit desirable material properties. The head portion of the depicted anchor element 106a has a diameter of 37 mm. However, diameters in the range of 10-100 mm are generally feasible depending e.g. on the thickness and weight of the ceiling tile 102a to be suspended.

[0071] The depicted anchor element 106a of Figs. 2a and 2b comprises a wire lock 114a arranged in the anchor element 106a. The wire lock 114a has an access port 118a accessible from a top side 116a of the head portion 110a. The depicted wire lock 114a is of a one-way type meaning that suspension element 104a may be inserted and fed through the access port 118a without having to release the wire lock 114a. However, the suspension element 104a is prevented from being pulled back and out of the wire lock 114a without releasing the wire lock 114a.

[0072] The depicted wire lock 114a comprises a biased release member 119a. The release member 119a of the depicted wire lock 114a is protruding beyond the top surface 116a of the head portion 110a. The release member 119a is provided with the access port 118a. The release member 119a may be pushed back in order to release the suspension element 104a or suspension wire 104a. The release member 119a may be pushed back such that it becomes flush with the top surface 116a of the head portion 110a. This implies that absorber tile elements 102a may be stacked on top of each other with a reduced risk that the anchor elements 106a of the absorber tile elements 102a damages neighboring absorber tile elements 102a. Hence, the anchor element 106a is suitable for being pre-mounted to absorber tile elements 102a.

[0073] The depicted wire lock 114a is threaded into the anchor element 106a. For that reason, the wire lock 114a is provided with an external thread and the head portion 110a of the anchor element 106a is provided with a cavity having an internal corresponding thread.

[0074] Different types of wire locks 114a may be used. Wire locks 114a locking the wire in both directions may be used to advantage. For instance, wire locks 114a utilizing screws to lock the wire 104a may be used.

[0075] As is seen in Figs. 2a and 2b, in particular in Fig. 2b, the wire lock 114a defines an internal wire lock channel 115a terminating in the access port 118a at a first end and in an outlet port 117a at a second end. The anchor element 106a defines an internal anchor element channel 105a. In the depicted wire lock 114a the anchor element channel 105a is adjoining the outlet port 117a. The anchor element channel 105a is configured to guide a suspension wire 104a through the anchor element 106a. Hence, the anchor element channel 105a is configured to guide a suspension wire 104a which has been passed through the wire lock 114a and introduced into the anchor element channel 105a through the anchor element 106a. This means that a suspension wire 104a may be passed into the access port 118a, through the internal wire lock channel 115a, into and through the anchor element channel 105a and finally out of the anchor element 106a, as can be seen in Fig. 2b.

[0076] As is seen in Figs. 2a and 2b, in particular in Fig. 2b, the anchor element channel 105a of the depicted anchor element 106a is configured to guide the suspension wire 104a through the anchor element 106a such that the suspension wire 104a is deflected in a direction towards the top side 116a of the head portion 110a. Hence, the anchor element channel 105a will deflect and bend a suspension wire 104a being fed therethrough such that the suspension wire 104a exits the anchor element channel 105a in a direction out of the top side or top surface 116a of the head portion 110a. The anchor element channel 105a will typically deflect the suspension wire 104a with a bending radius in the range of 5-20 mm. A bending radius range of 5-20 mm allows for that a suspension wire 104a having a desired thickness may be used in the sense that the suspension wire 104a is

bent and deflected easily when being fed and guided through the anchor element channel 105a. However, any bending radius in the range of 3-40 mm may be used to advantage.

[0077] The depicted suspension wire 104a of Figs. 2a and 2b typically has a diameter in the range of 0,5-3 mm. Preferably a diameter of 0,7-1,2 mm is chosen since a diameter within this range allows for a desired strength while still providing a wire flexible enough to easily be fed and guided through the anchor element channel 105a. A diameter in the range of 0,5-3 mm may be used to advantage for any of the suspension elements 104a-f, 104x of Fig. 1.

[0078] As is seen in Figs. 2a and 2b the head portion 110a of the depicted anchor element 106a is provided with mounting tool recesses 126a. More specifically, the head portion 110a is provided with two mounting tool recesses 126a. Any number of mounting tool recesses 126a may be used to advantage. By providing at least one mounting tool recess 126a accessible by a mounting tool from a top side 116a of the head portion 110a, mounting of the anchor element 106a to the absorber tile element 102a may be significantly simplified since a tool may be used to screw the anchor element 106a into the absorber tile element 102a. A tool having two protrusions may conveniently be inserted into the two mounting tool recesses 126a where the tool may engage the head portion 110a of the anchor element 102a, thus enabling a simplified turning of the anchor element 102a.

[0079] The depicted anchor element 106a has a length, i.e. an extension along the central axis CA of the anchor element 106a, of 32.5 mm. Typical feasible lengths are between 10-150 mm, depending e.g. on the thickness of the ceiling tiles to be suspended.

[0080] It will now be described in greater detail, with reference to Fig 3a and 3b, how suspension element 104b is used to suspend ceiling tile 102b by being connected to the ceiling tile 102b by means of anchor element 106b. The design of the anchor element 106b which is different from the anchor element 106a of Figs. 2a and 2b will be described in greater detail. Although the below description will be made with reference to ceiling tile 102b, suspension element 104b and anchor element 106b, the below description is equally valid for any of the ceiling tiles 102a-f, any of the suspension elements 104a-f and any of the anchor elements 106a-f.

[0081] In Figs. 3a and 3b it is depicted how anchor element 106b is screwed into ceiling tile 102b, at the second major surface 108b thereof. The anchor element 106b is screwed into the ceiling tile 102b such that the anchor element 106b becomes recessed in the ceiling tile 102b. As is depicted, the second major surface 108b is flat, i.e. not deflected, at the location of the anchor element 106b. Hence, a top portion of the anchor element 106b protrudes slightly above the second major surface 108b.

[0082] The depicted anchor element 106b of Figs. 3a and 3b comprises a head portion 110b and a threaded portion 112b, like the anchor element 106a of Figs. 2a and 2b.

[0083] The head portion 110b is located above the threaded portion 112b. In the depicted anchor element 106b the head portion 110b and the threaded portion 112b are integrally formed by being molded. The head portion of the depicted anchor element 106b has a diameter of 37 mm. However, diameters in the range of 10-100 mm are generally feasible depending e.g. on the thickness and weight of the ceiling tile to be suspended, as discussed above.

[0084] The length of the anchor element 106b is similar to the length of the anchor element 106a of Figs. 2a and 2b, as described above.

[0085] The threaded portion 112b includes a thread 120b. The thread 120b is similar to the thread 120a of Figs. 2a and 2b described above, why the thread 120b will not be described in greater detail to avoid undue repetition.

[0086] In the depicted anchor element 106b of Figs. 3a and 3b, the head portion 110b comprises a wire lock holding member 124b supporting the wire lock 114b. The depicted wire lock holding member 124b is a socket which is attached to the head portion 110b. Hence, the wire lock holding member 124b is formed separately from the head portion 110b and the threaded portion 112b of the anchor element 106b, and subsequently fastened to the head portion 110b. The depicted wire lock holding member 124b is includes the anchor element channel 105b. The wire lock holding member 124b may include the anchor element channel 105b or may not include the anchor element channel 105b. The wire lock 114b is in turn press fitted into the wire lock holding member 124b. Different designs, sizes and fastening techniques of the wire lock holding member 124b may be used to advantage. Other fastening techniques include soldering, welding or gluing to give a few non-limiting examples.

[0087] In the depicted anchor element 106b of Figs. 3a and 3b, a biased release member 119b is located below the top surface 116b of the head portion 110b. Hence, the complete wire lock 114b is located below the top surface 116b of the head portion 110b such that the wire lock 114b is housed within the anchor element 106b.

[0088] The depicted wire lock 114b of Figs. 3a and 3b defines an internal wire lock channel 115b like the wire lock 114a of Figs. 2a and 2b. The internal wire lock channel 115b will consequently not be described in greater detail to avoid undue repetition.

[0089] Similarly, the anchor element 106b of Figs. 3a and 3b defines an anchor element channel 105b like the anchor element 106a of Figs. 2a and 2b. The anchor element channel 105b will consequently not be described in greater detail to avoid undue repetition.

[0090] As is seen in Figs. 3a and 3b the head portion 110b of the depicted anchor element 106b is provided with a mounting tool recess 126b. More specifically, the head portion 110a is provided with a mounting tool recess 126b in form of a hexagonal recess. Hence, a hex-key

may be used to screw the anchor element 106b into the absorber tile element 102b.

[0091] Now referring to Fig. 4, here it is conceptually depicted in greater detail how ceiling tiles 102e and 102f are suspended using the common suspension element 104x, and respective anchor elements 106e and 106f.

[0092] Anchor element 106f used for suspending ceiling tile 102f is of the same type as anchor element 102a described above in relation to Figs. 2a and 2b. Hence, anchor element 102f will not be described in greater detail to avoid undue repetition.

[0093] Anchor element 106e used for suspending ceiling tile 102e is similar to anchor element 102a described above in relation to Figs. 2a and 2b. The anchor element channel 105e of anchor element 106e is formed differently as compared to the anchor element channels 105a and 105f. However, the wire lock channels 115e and 115f are both formed as the wire lock channel 115a of Figs. 2a and 2b.

[0094] More specifically, the anchor element channel 105e of anchor element 106e is a straight anchor element channel 105e. The anchor element channel 105e extends along a central axis CA of the anchor element 106e.

[0095] Anchor element channel 105e is configured to guide the suspension wire 104x through the anchor element 106e such that the suspension wire is guided in a direction towards a bottom side 113e of the threaded portion 112e. Hence, when suspension wire 104x is guided through the anchor element 106e the suspension wire 104x will exit the anchor element 106e at the bottom thereof. The suspension wire 104x may as is depicted in in Fig. 4 penetrate the absorber tile element 102e and exit the absorber tile element 102e at its first major surface 107e i.e. the surface facing the interior of the room in which the ceiling tile 102e is suspended. From there the suspension wire 104x may continue to another anchor element, like anchor element 106f in Fig. 4.

[0096] By this arrangement, ceiling tile 102e is suspended above ceiling tile 102f using the common suspension element 104x, as described above. It is to be understood that three or more ceiling tiles may be suspended after each other in a vertical direction using a common suspension element 104x as described above.

[0097] Now referring to Fig. 5, here is conceptually depicted a tile system 200 in form of a baffle system 200. For reasons of simplicity there is a single planar tile in form a baffle 202a illustrated in Fig. 5. It is however to be understood that any number of baffles 202a may be used according to the present inventive concept. The baffle 202a has a first major surface 207a and an opposing second major surface. Further, the baffle 202a has four side edge surfaces 209a extending between the respective first 207a and second major surfaces.

[0098] The baffle 202a, comprises compressed fiber material. Suitable examples of compressed fiber material are mineral fiber material, such as glass wool, mineral wool and stone wool. Other examples of suitable compressed fiber material are wood fiber, textile fiber, polymer fiber and metal fiber. However other materials are also conceivable without departing from the scope of the inventive concept. Ceiling tiles comprising the exemplified materials are known to exhibit acoustic properties such as sound absorbing properties.

[0099] The baffle 202a is suspended by means of two suspension elements 204a in form of wires. Other relevant examples of suspension elements are a line, a cable, a cord, a thread, a rod, a string, a chain, a rope or a combination thereof. Each suspension element 204a is attached to the baffle 202a in corresponding attachment points. Each attachment point includes an anchor element 206a. The anchor elements 206a are of the type described above in conjunction with Figs. 2a and 2b. Accordingly, the anchor elements 206a will not be described in detail below to avoid undue repetition.

[0100] The anchor elements 206a are screwed into one of the side edge surfaces 209a of the baffle 202a. By screwing the anchor elements 206a into one of the side edge surfaces 209a the baffle 202a may be vertically suspended as illustrated in Fig. 5.

[0101] As is understood, the respective types of anchor elements 106a-f described above may be interchanged with each other to suit specific installation needs. Hence, a suspended ceiling may include a plurality of types of anchor elements 106a-f. Similarly, a suspended ceiling may include a single type of anchor elements 106a-f. The anchor elements 106a-f described may advantageously be used to fasten or suspend vertically arranged panels or tiles, such as sound absorbing baffles 202a, as described above. Also, a tile system 100, 200 may include different types of tiles, such as ceiling tiles 102a-f and baffles 202a. In other words, a single tile system 100, 200 may for instance include a number of ceiling tiles 102a-f and a number of baffles 202a to give an example.

[0102] It will be appreciated that the present inventive concept is not limited to the variants shown. Several modifications and variations are thus conceivable within the scope of the invention which thus is defined by the appended claims.

Claims

1. An absorber tile element (102a-f, 202a) comprising compressed fiber material and having a first major surface (107a-b, 107e-f, 207a), an opposing second major surface (108a-b, 108e-f), and at least one side edge surface (109a-f, 209a) extending between the first major surface (107a-b, 107e-f, 207a) and the second major surface (108a-b, 108e-f, 208a),
an anchor element (106a-f) associated with one of the first major surface (107a-b, 107e-f, 207a) and the second major surface (108a-b, 108e-f, 208a) or one of the at least one side edge surfaces (109a-f, 209a) of the absorber tile element (102a-f, 202a),
wherein the anchor element (106a-f, 206a) comprises a head portion (110a-b, 110e-f) and a threaded

portion (112a-b, 112e-f),

the threaded portion (112a-b, 112e-f) being threaded into the absorber tile element (102a-f) from the surface (107a-b, 107e-f; 108a-b, 108e-f; 209a) associated with the anchor element (106a-f, 206a) such that the head portion (110a-b, 110e-f) becomes recessed in the absorber tile element (102a-f, 202a), **characterized in that,**

the anchor element (106a-f, 206a) comprises a wire lock (114a-b, 114e-f) arranged in the anchor element (106a-f, 206a) and having an access port (118a-b, 118e-f) accessible from a top side (116a-b, 116e-f) of the head portion (110a-b, 110e-f).

2. The absorber tile element (102a-f, 202a) according to claim 1, wherein the wire lock (114a-b, 114e-f) defines an internal wire lock channel (115a-b) terminating in the access port (118a-b, 118e-f) at a first end and in an outlet port (117a-b) at a second end, and wherein the anchor element (106a-f, 206a) defines an internal anchor element channel (105a-b, 105e-f),

the anchor element channel (105a-b, 105e-f) adjoining the outlet port (117a-b), and being configured to guide a suspension wire (104a-104f, 104x, 204a) through the anchor element (106a-f, 206a), which suspension wire (104a-104f, 104x, 204a) has been passed through the wire lock (114a-b, 114e-f) and introduced into the anchor element channel (105a-b, 105e-f).

3. The absorber tile element (102a-f, 202a) according to claim 2, wherein the anchor element channel (105a-b, 105f) is configured to guide the suspension wire (104a-104f, 104x, 204a) through the anchor element (106a-f) such that the suspension wire (104a-104f, 104x, 204a) is deflected in a direction towards the top side (116a-b, 116e-f) of the head portion (110a-b, 110e-f).

4. The absorber tile element (102a-f, 202a) according to claim 3, wherein the anchor element channel (105a-b, 105f) is configured to deflect the suspension wire (104a-104f, 104x, 204a) with a bending radius in the range of 3-40 mm.

5. The absorber tile element (102a-f, 202a) according to claim 2, wherein the anchor element channel (105e) is configured to guide the suspension wire (104x) through the anchor element (106e) such that the suspension wire (104x) is guided in a direction towards a bottom side (113e) of the threaded portion (112e).

6. The absorber tile element (102a-f, 202a) according to claim 5, wherein the anchor element channel (105e) extends along a central axis (CA) of the anchor element (106a, 106c-f, 206a).

7. The absorber tile element (102a-f, 202a) according to any one of the preceding claims, wherein the head portion (110a-b, 110e-f) and the threaded portion (112a-b, 112e-f) partially overlap in a direction along a central axis (CA) of the anchor element (106a, 106c-f, 206a).

8. The absorber tile element (102a-f, 202a) according to any one of the preceding claims, wherein the head portion (110a-b, 110e-f) is provided at least one mounting tool recess (126a, 126b) accessible by a mounting tool from a top side (116a-b, 116e-f) of the head portion (110a-b, 110e-f).

9. The absorber tile element (102a-f, 202a) according to any one of the preceding claims, wherein the head portion comprises a wire lock holding member (124b) supporting the wire lock (114b).

10. The absorber tile element (102a-f, 202a) according to any one of the preceding claims, wherein the wire lock (114b) is housed within the anchor element (106b).

11. The absorber tile element (102a-f, 202a) according to any one of claims 1-9, wherein the wire lock (114a-b, 114e-f) comprises a biased release member (119a, 119e-f) protruding beyond a top surface (116a, 116e-f) of the head portion (110a, 110e-f) and being provided with the access port (118a, 118e-f).

12. The absorber tile element (102a-f, 202a) according to any one of the preceding claims, wherein the compressed fiber material comprising fiber selected form the group consisting of mineral fiber, wood fiber, textile fiber, polymer fiber and metal fiber.

13. The absorber tile element (102a-f, 202a) according to claim 1, wherein the anchor element (106a-f, 206a) has an extension in the interval of 10-150 mm, preferably 15-100 mm, along a central axis (CA) thereof, wherein the anchor element (106a-f, 206a) has an extension in the interval of 10-100 mm, preferably 15-60 mm, in a direction transverse to the central axis (CA), and wherein the threaded portion (112a-b, 112e-f) of the anchor element (106a-f, 206a) comprises threads (120a-b, 120e-f) having a pitch in the interval of 4-10 mm, preferably 5-7 mm.

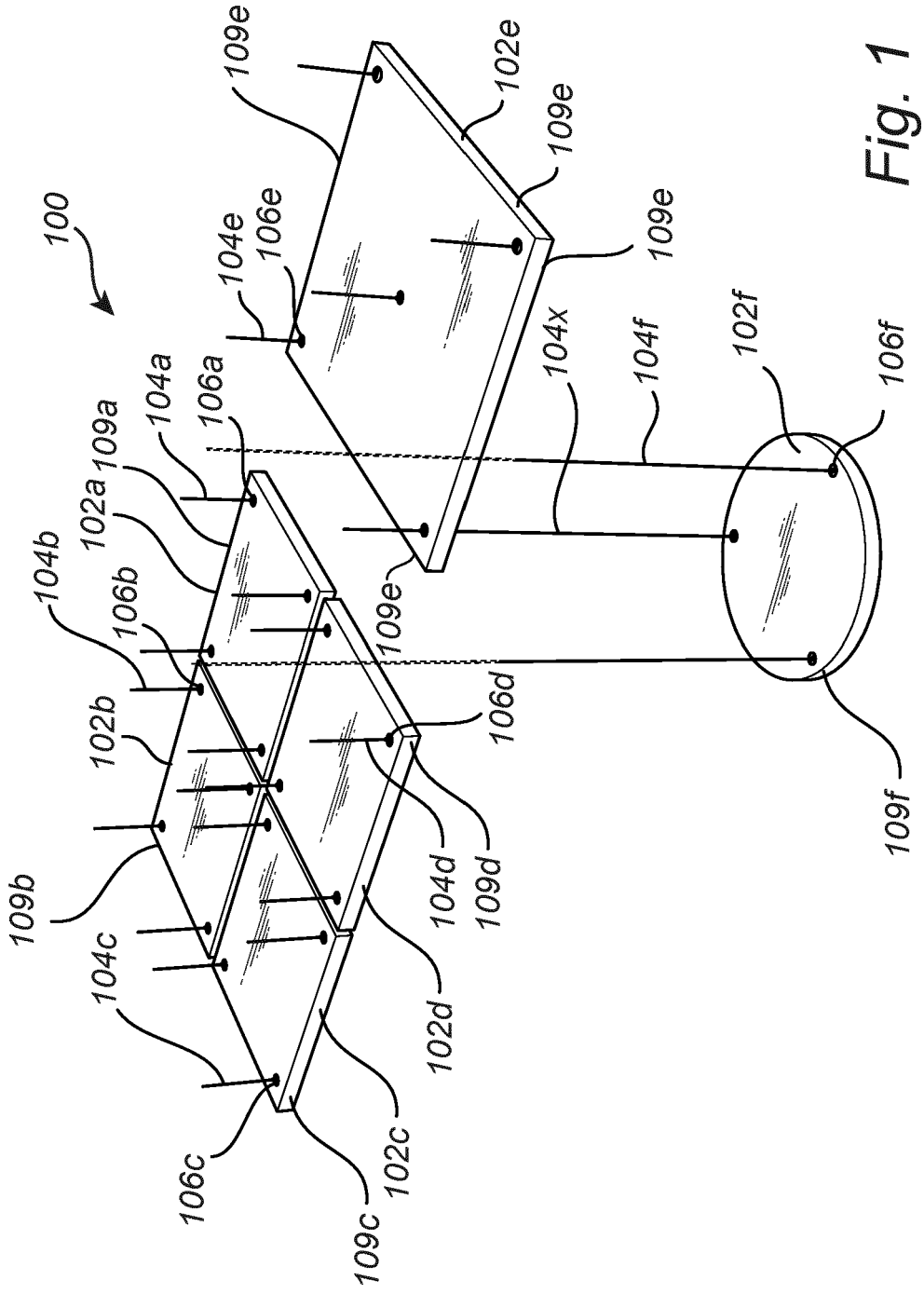
14. A tile system (100, 200) comprising:

an absorber tile element (102a-f, 202a) according to any one of claims 1-13, and

a suspension wire (104a-104f, 104x, 204a) re-

leasably coupled to the wire lock for suspension of the absorber tile element (102a-f, 202a).

15. The tile system (100, 200) according to claim 14, wherein the suspension wire (104a-104f, 104x, 204a) has a diameter in the range of 0,5-3 mm, preferably 0,7-1,2 mm.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102e
109e
104e
106e
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104x
104f
102f
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109a
102a
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104c
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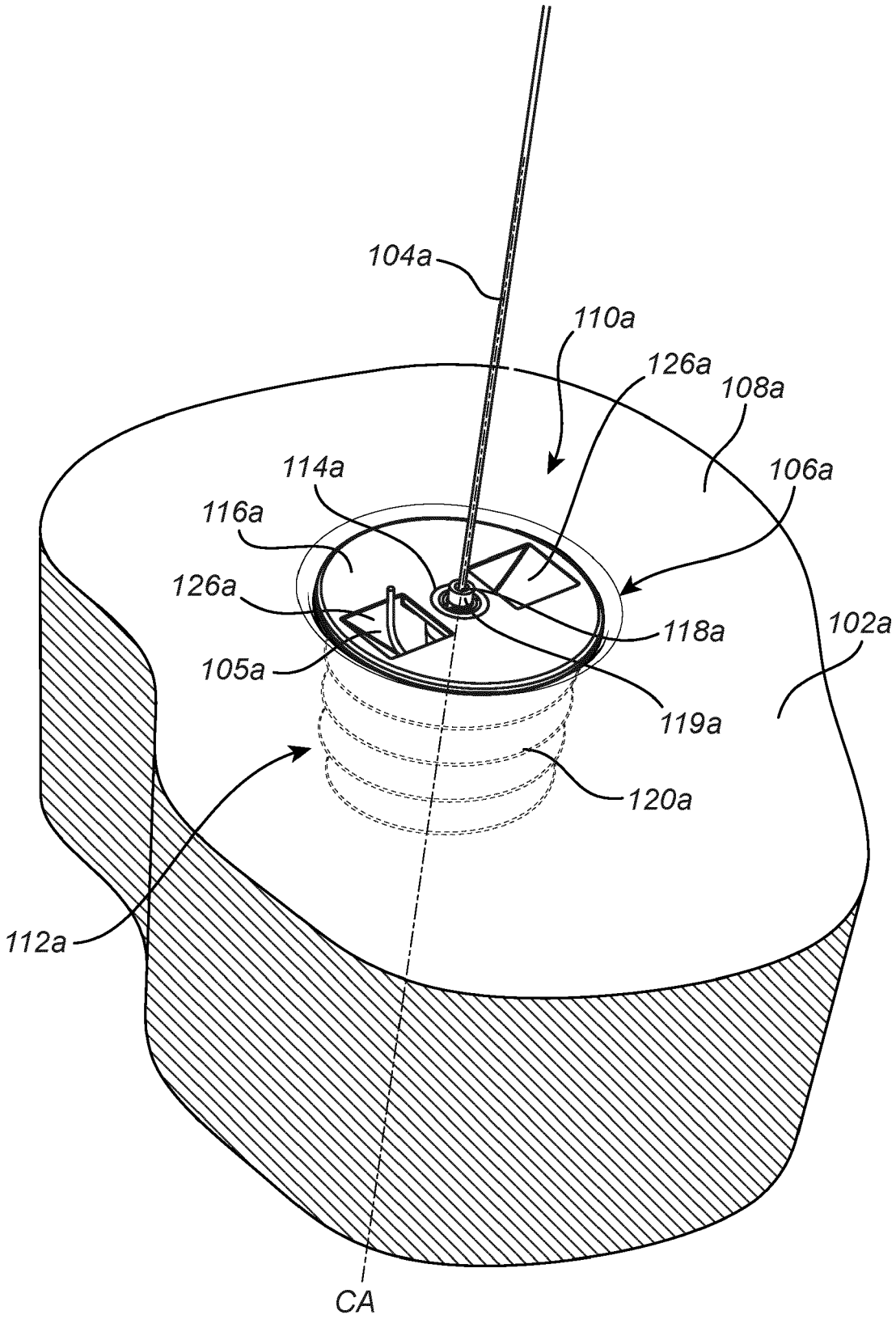
106c
102c
109c
109f

Fig. 1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126a
118a
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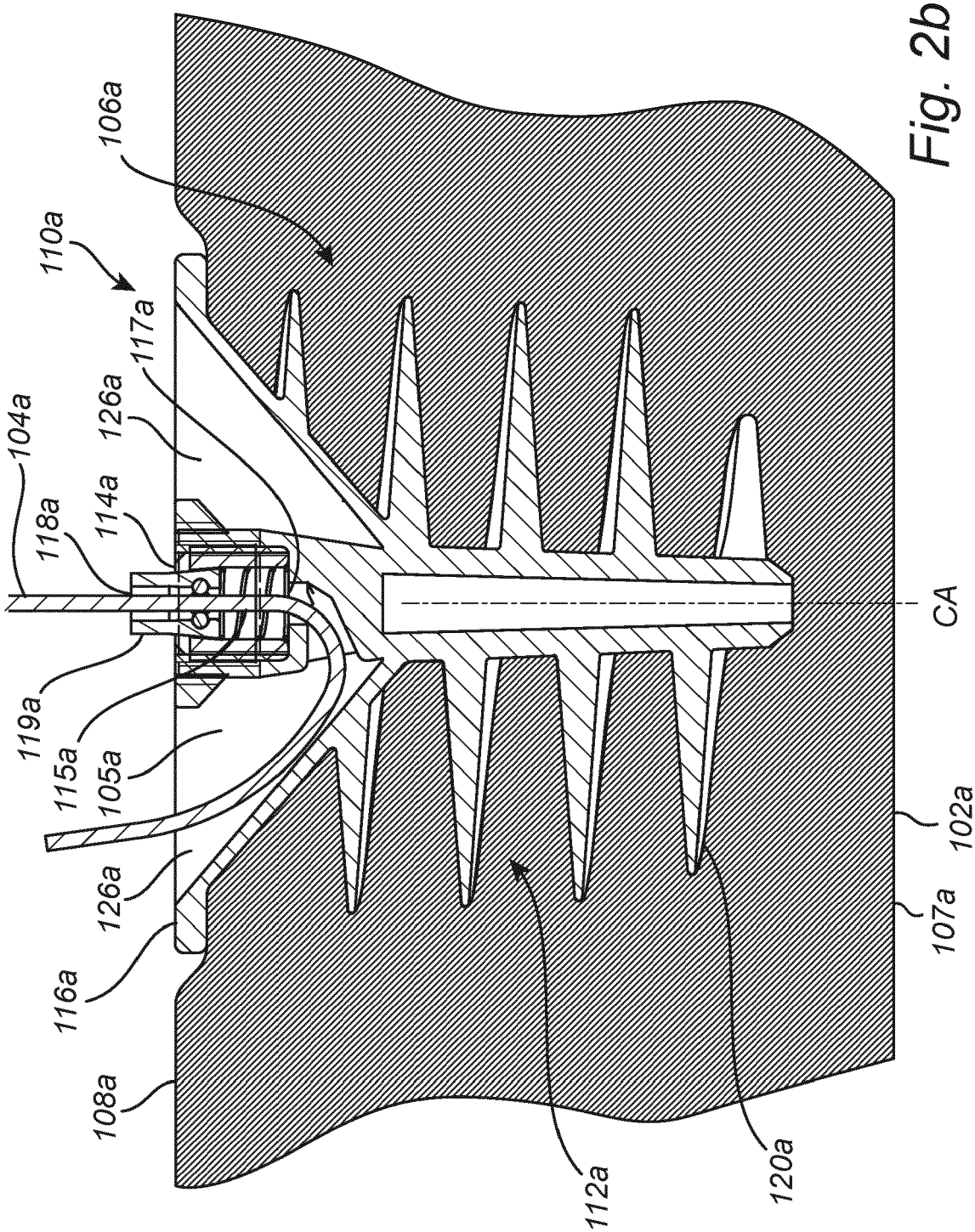
105a
119a
120a
112a
CA

Fig. 2a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117a
126a
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105a
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116a
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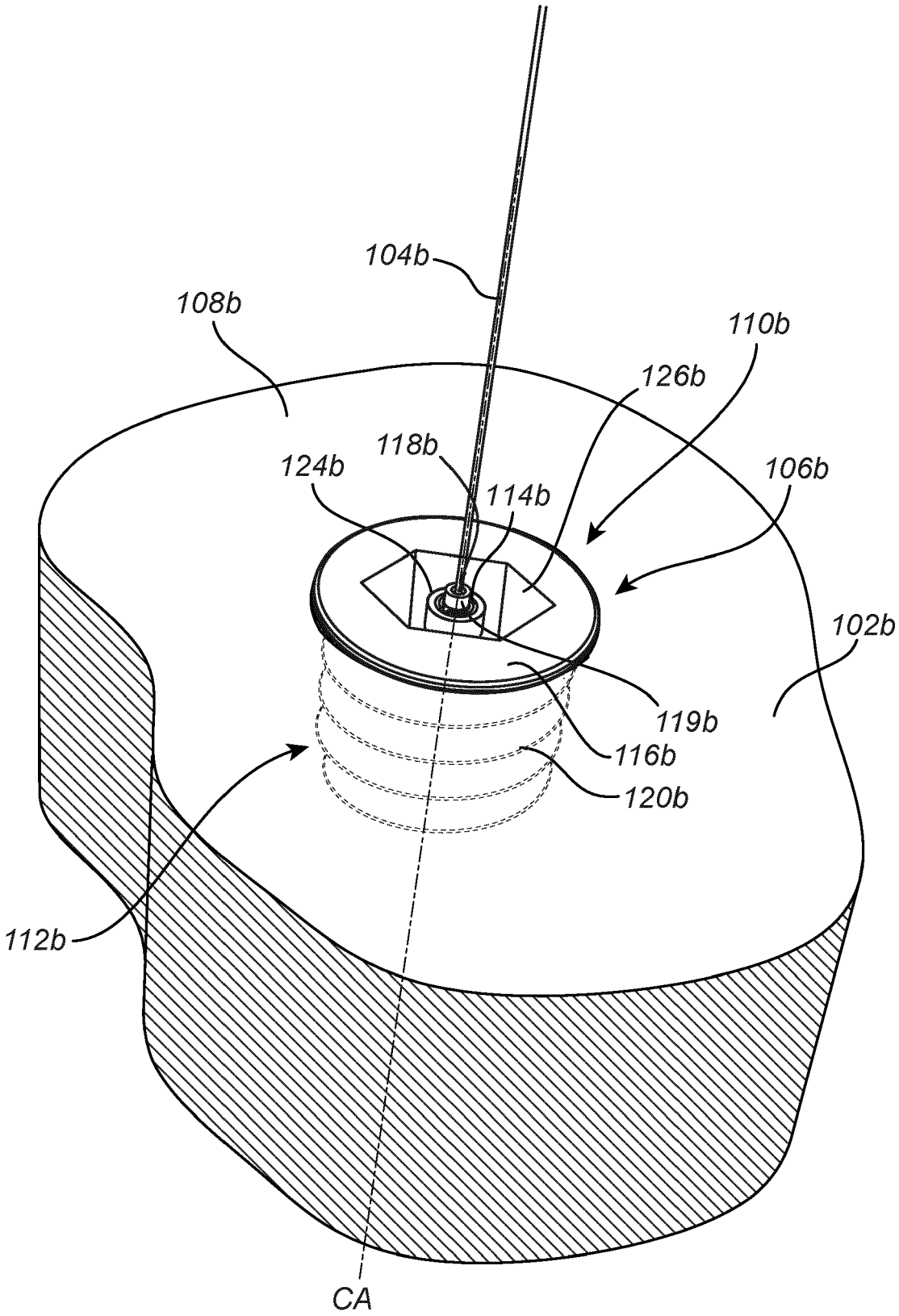
CA
102a
107a

Fig. 2b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106b
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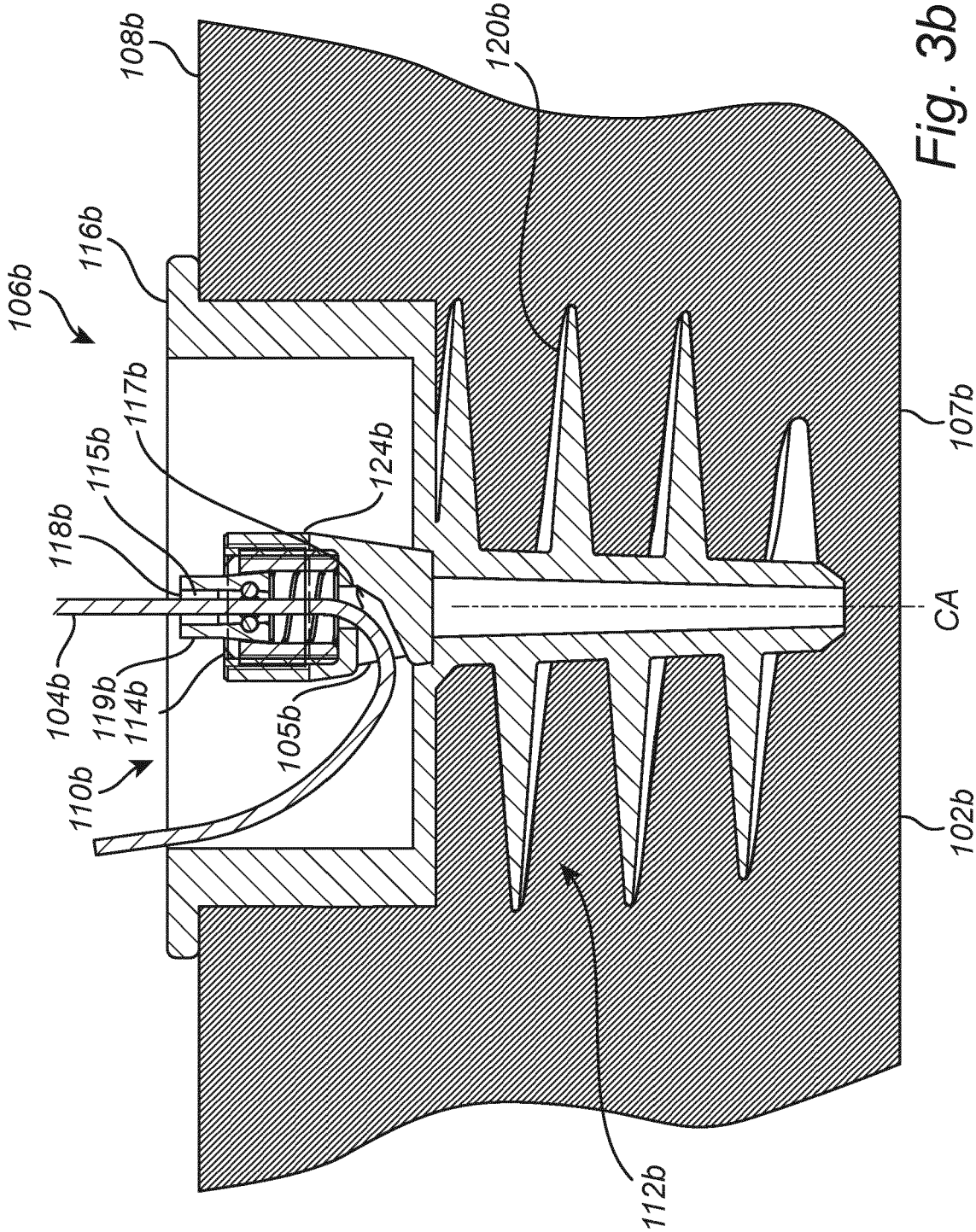
119b
116b
120b
112b
CA

Fig. 3a


108b
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116b
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115b
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107b
CA
104b
119b
114b
105b
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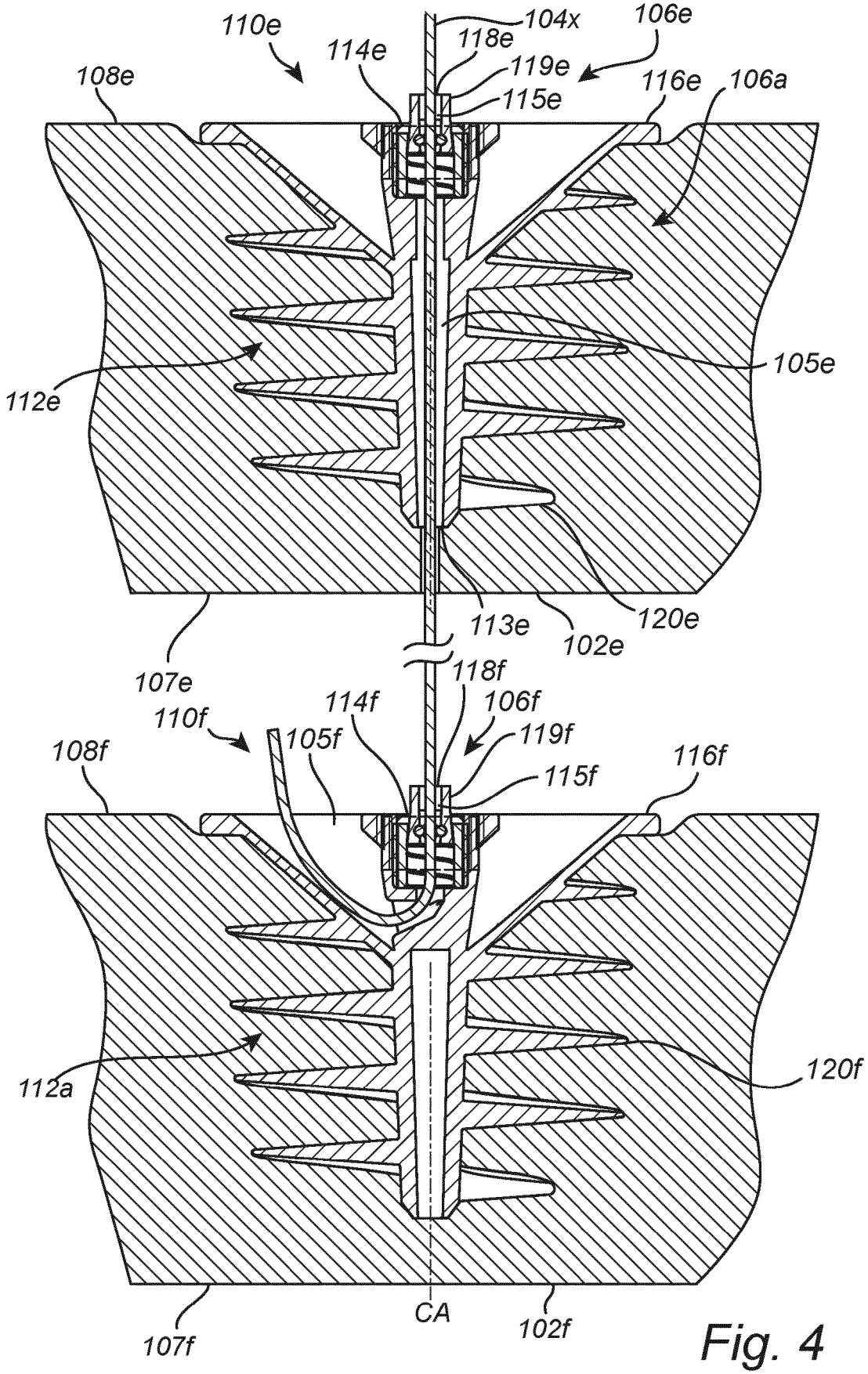
102b
112b

Fig. 3b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120e
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107e
118f
114f
106f
110f
105f
119f
108f
115f
116f
112a
120f
CA
107f
102f

Fig. 4

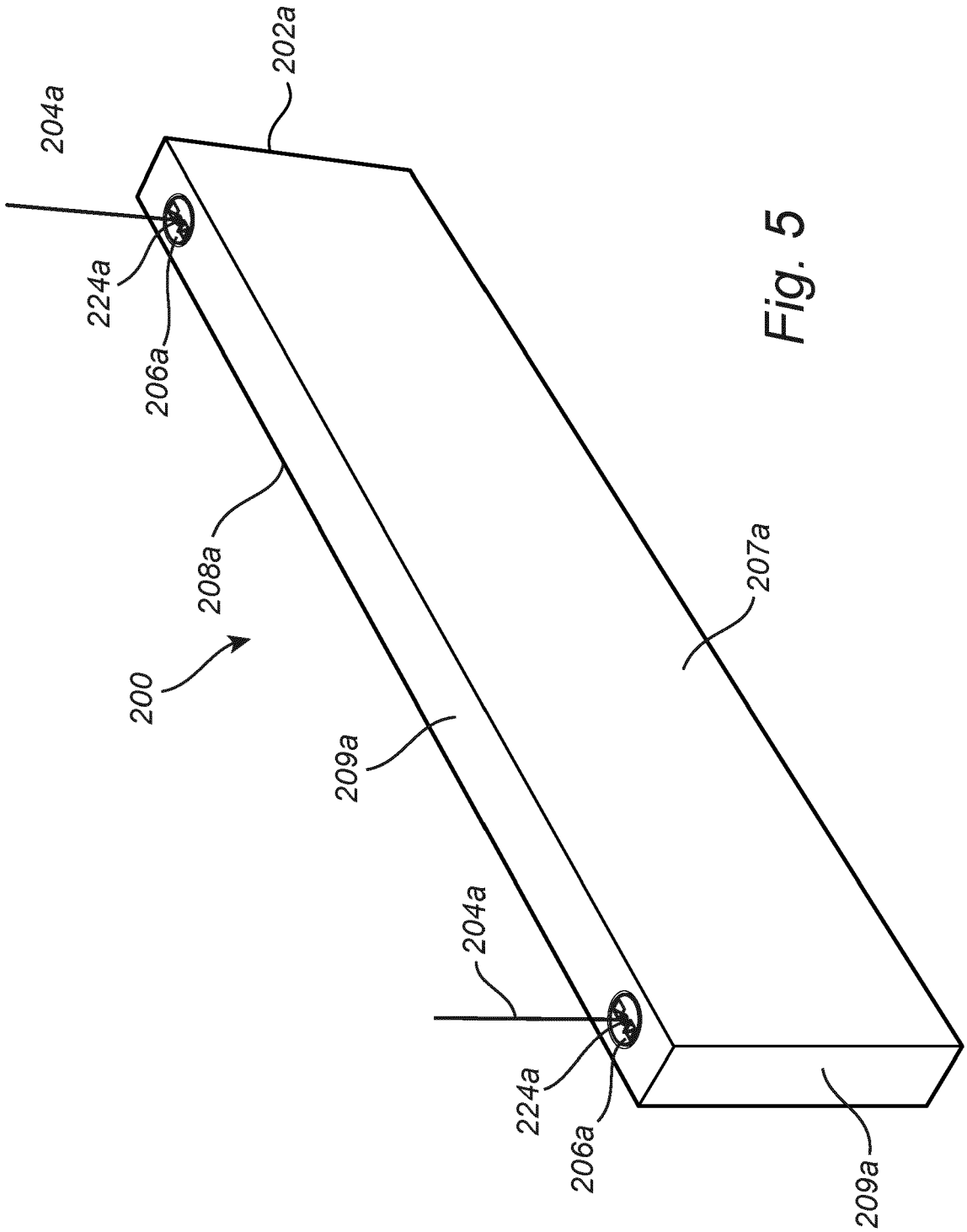

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 3117

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 3 584 382 A1 (SAINT GOBAIN ECOPHON AB [SE]) 25 December 2019 (2019-12-25) * figures 1-6 * * paragraph [0053] * * paragraph [0033] - paragraph [0035] * * paragraph [0064] *	1-15	INV. E04B9/20 E04B9/22 E04B9/36
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	E04B

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 December 2021	Petrinja, Etiel

CATEGORY OF CITED DOCUMENTS

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10-12-2021

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