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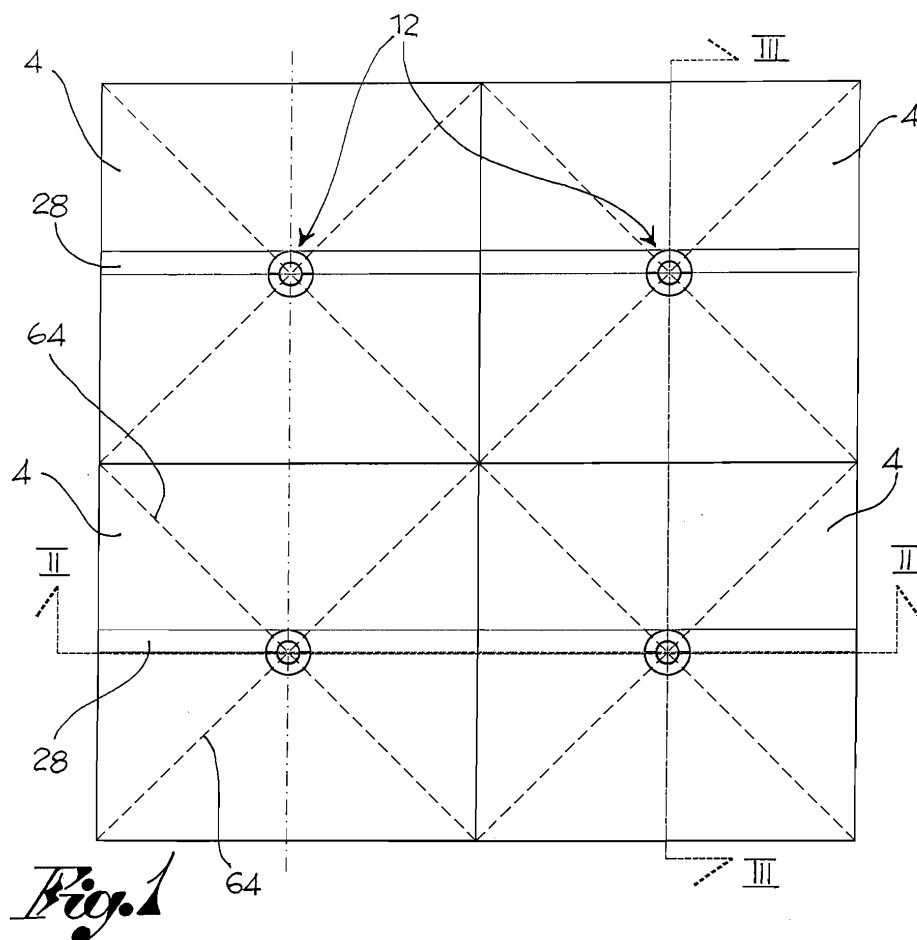
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(54) **Covering panel for rooves, roof structure and method for laying thereof**

(57) A covering panel (4) for rooves, suited to allowing the laying of a roof structure in a safe and fast manner. The panel (4) comprises a connector element (12) for

fixing the panel (4) directly to the concrete slab (16); the connector element (12) is also suited to allowing the fixing of a gib (28) for the laying of the roof tiles.



Description

[0001] The following invention relates to a covering panel for rooves, a roof structure and method for laying thereof.

[0002] To make roofing structures of the prior art, gibs applied directly on to the roof's concrete slab are usually used. Preferably, between the gibs and the concrete slab a layer of heat insulation material is inserted.

[0003] The solutions of the prior art envisage the gibs being bonded to the concrete slab by screws passing through the gib, the insulation layer (if present), said screws also partially penetrating the concrete slab.

[0004] The solutions of the prior art present certain drawbacks.

[0005] In fact, the screws used are very long and therefore present poor flexional stiffness; therefore they do not always guarantee a solid anchorage of the gibs.

[0006] Furthermore, the screws do not guarantee a solid anchorage of the insulating material panels either, since the screws have a relatively thin shaft that tends to chip the panels along the edge of the interface with the screws.

[0007] Besides, the operation of inserting screws with a considerable length by workers is a somewhat complicated and slow operation.

[0008] The aim of this invention is to make a panel that resolves the cited drawbacks of the prior art.

[0009] Such drawbacks and limitations are resolved by a covering panel in agreement with claim 1, by a roof structure according to claim 13 and a method of laying thereof in accordance with claim 16.

[0010] Other embodiments of the panel according to the invention are described in the following claims.

[0011] Further characteristics and advantages of this invention will be further evident in the description that follows of its preferred and non-limiting embodiments of the finding, wherein:

[0012] figure 1 illustrates a plan view of a roof comprising covering panels according to one embodiment of the present invention;

[0013] figure 2 illustrates a section view of the roof of figure 1, along the II-II section line of figure 1;

[0014] figure 3 represents a section view of the roof of figure 1, along the III-III section line of figure 1;

[0015] figure 4 illustrates a section view of the enlarged detail IV of figure 2;

[0016] figure 5 illustrates a section view of the enlarged detail V of figure 3;

[0017] figure 6 illustrates a plan view of a detail of a covering panel according to the present invention;

[0018] figure 7 illustrates a lateral view of the detail of figure 6, from the side of the arrow VII of figure 6;

[0019] figure 8 illustrates a lateral view of the detail of figure 6, from the side of the arrow VIII of figure 6.

[0020] The elements or parts of elements in common between the embodiments described below will be indicated with the same numbers.

[0021] With reference to the aforesaid figures, 4 indicates a covering panel for rooves, comprising a panel body 8 in heat insulation material and a connector element 12 suited to fixing the panel 4 to an associable concrete slab 16.

[0022] Advantageously, the connector element 12 comprises first fixing means 20 suited to allowing the fixing of the panel 4 to the concrete slab 16 and second fixing means 24 suited to allowing the fixing of an associable tile-holder gib 28.

[0023] The first and second fixing means 20,24 are mechanically separate from one another.

[0024] In other words, the first and second fixing means 20,24 are separate from each other and arranged on separate portions of the connector element so as to allow independent connections of the panel 4 to the concrete slab 16 and of the panel 4 to the gib 28.

[0025] For example, the first and second fixing elements 20,24 are threaded means of connection.

[0026] According to one embodiment, the connector element 12 comprises a socket body 32 fitted with a base for fixing 36 to the concrete slab 16, said base being fitted with the first fixing means 20.

[0027] Preferably, the socket body 32 is hollow, to allow the passage of the first fixing means 20, and is at least partly filled with the heat insulation material.

[0028] The fixing base 36 for example takes the form of a plate and preferably presents a fixing hole 40 suited to allowing the passage of the first fixing means 20 for the anchorage of the panel 4 to the concrete slab 16. For example, the first fixing means 20 comprise an expanding anchor or screw.

[0029] According to one embodiment, the connector element 12 comprises a support element 44 for an associable gib 28 suited to supporting roof tiles, said support element 44 being fitted with second fixing means 24.

[0030] For example, the socket body 32 presents a cylindrical configuration with a symmetrical X-X axis.

[0031] According to one embodiment, the support element 44 comprises a collar 48, substantially coaxial to said socket body 32.

[0032] The collar 48 forms an undercut 50 for blocking the panel body 8 between the concrete slab 16 and the connector element 12.

[0033] Preferably, the support element 44 comprises at least one fixing plate 52 suited to allowing the anchorage of an associable gib 28 by means of the second fixing means 24.

[0034] For example, the fixing plate 52 extends perpendicularly to said collar 48 so as to directly face a lateral edge or cut of the associable gib 28.

[0035] Preferably, the connector element 12 comprises a pair of fixing plates 52 diametrically opposite one another, arranged in correspondence with a central point of the socket body 32.

[0036] Preferably the fixing plates 52 are fitted with hole 60 for the passage of screws or anchors blocking the gib 28.

[0037] According to one embodiment, the connector element is made of metal or a polymer material.

[0038] According to one embodiment variant, the support element 44 comprises at least one hole, suited to allowing the connection of an individual safety device for a worker laying the roof.

[0039] Preferably, the panel 4 is square and the connector element 12 is arranged in the centre of this panel 4 or in correspondence with the intersection of the square's diagonals.

[0040] The present invention also relates to a roof structure comprising the covering panels described above.

[0041] Preferably, the structure comprises a plurality of covering panels 4 and gibs 28 arranged parallel to one another and to the pitch lines, so as to be anchored to connector elements of adjacent panels.

[0042] Preferably, in the roof structure the connector elements 12 of the covering panels are oriented so as to arrange the fixing plate 52 downhill from the pitch thrust due to the gradient of the roof. It is thus possible to rest the shear gibs 28 against the fixing plates 52 and the gib 28 fixing operation is facilitated as they are kept in position by the fixing plates 52 during the operations of inserting the second fixing means 24.

[0043] Preferably, the space 72 between the connector elements 12, along the slope line, of two adjacent covering panels 4, and is a whole multiple of the distance between the straight and curved tile holder gibs 28. In this way, it is possible to precisely track the connector elements during laying of the roofing.

[0044] The method of laying a panel according to the invention for the creation of a roof will now be described.

[0045] In particular, the method of laying comprises the phases of arranging on the roof's concrete slab a plurality of covering panels, of fixing each connector element 12 of the relative panel to the concrete slab 16 beneath by means of the first fixing means 20.

[0046] Then, having covered the roof with the panels 4, the various tile-holder gibs 28 are lain on said connector elements. Preferably, the stage of laying the tile holder gibs 28, comprises the stage of resting the gibs 28 on the support elements 12 so that the connector elements 12 make a support that opposes the pitch thrust before performing the anchorage of the gibs 28 to the panels 4.

[0047] Then one proceeds with the anchorage of the gibs by means of the second fixing means 24, mechanically separate from the first fixing means 20.

[0048] Preferably the second fixing means 4 are inserted in a direction substantially perpendicular to the first screw means 20; in other words, the second fixing means are inserted perpendicularly to the lateral edge of the gibs 28.

[0049] According to one embodiment of this invention, the method for laying comprises the stage of filling the connector elements with heat insulation material, so as to guarantee continuity to the heat insulation state of the panel body.

[0050] As can be illustrated by the description, the panel according to the invention makes it possible to overcome the drawbacks presented in the prior art.

[0051] In particular, the panel makes it possible to make the roofing structure in a significantly faster way than the prior art.

[0052] In fact, the operation of anchoring the individual panel to the concrete slab involves making a hole on the concrete slab on to which the first screw means having a reduced length are fixed. In fact said first screw means must pass through the fixing base and can penetrate directly into the concrete slab without having to also pass through the gibs and/or the layer of insulation material. The first screw means are therefore rapid to insert and present a greater flexional stiffness. In other words, one guarantees an extremely stiff anchorage of the panel on to the concrete slab.

[0053] Besides, the connector element presents a greater contact surface with the insulation material panel so as not to ruin it in correspondence with the interface edge. In other words, the socket absorbs the pitch thrust and creates a lesser carving effect than the solutions of the prior art due to the greater curving of the socket body in relation to the thin shaft of the screw.

[0054] Furthermore, the connector element also constitutes a rest and support for the gib so that the insulation layer is not subject to any action of compression. In fact, the collar of the socket body, in addition to forming a retainer for the panel body, bound between the concrete slab and the collar, also forms a support for the gib.

[0055] Besides, the fixing of the gibs is considerably simplified as it is possible to insert second screw means of a limited dimension directly onto the edge or cut of the gib. Also the second screw means are shorter than the solutions of the prior art and are therefore easier to insert. Furthermore, said second screw means are squat bodies and therefore guarantee a greater stiffness of connection between the gib and the connector element.

[0056] Advantageously, the first and second connector means are mechanically separate from one another and can be assembled and dismantled in an independent way from one another.

[0057] The roof laying operation will be safer and more simple as it is possible to first lay and fix the various panels and only subsequently fix the gibs alone, whereas in the prior art the operation of fixing the gibs and any insulating layers takes place simultaneously.

[0058] Besides, the conformation of the connector element makes it possible to create a contact surface for the support of the gib that counters pitch thrust; this facilitates and makes safer fixing by the worker.

[0059] Besides, the fixing element can constitute a comfortable and safe connection for the individual safety of the operator.

[0060] A man skilled in the art, in order to satisfy contingent and specific requirements, will be able to make various modifications and variants to the panels and structures described above, all of which being within the

scope of this invention as defined by the following claims.

Claims

1. Covering panel (4) for rooves, comprising a panel body (8) in a thermal insulation material, a connector element (12) suited to fixing the panel (4) to an associable concrete slab, **characterised in that** the connector element (12) comprises first fixing means (20) suited to allowing the fixing of the panel (4) to the concrete slab (16) and second fixing means (24) suited to allowing the fixing of an associable tile-holder gib (28), the first and second fixing means (20,24) being mechanically separate from one another so as to allow the respective separate fixing independently of one another.
 2. The panel (4) according to claim 1, wherein the connector element (12) comprises a socket body (32) fitted with a base for fixing (36) to the concrete slab (16), said base (36) being fitted with the first fixing means (20), and a support element (44) for an associable gib (28) suited to supporting roof tiles, said support element (44) being fitted with second fixing means (24).
 3. The panel (4) according to claim 1 or 2, wherein the socket body (32) presents a cylindrical conformation with a symmetrical axis (X-X).
 4. The panel (4) according to claim 2 or 3, wherein the fixing base (36) presents a fixing hole (40) suited to allowing the passage of the first fixing means (20) for the anchorage of the panel (4) to the concrete slab (16).
 5. The panel (4) according to claim 1, 2, 3 or 4, wherein the first fixing means (20) comprise an expanding anchor or screw.
 6. The panel (4) according to any of claims 2 to 5, wherein the support element (44) comprises a collar (48), substantially coaxial to said socket body (32).
 7. The panel (4) according to claim 6, wherein said collar (48) forms an undercut (50) for the blocking of the panel body (8) between the concrete slab (16) and the connector element (12).
 8. The panel (4) according to any of claims 2 to 7, wherein the support element (44) comprises at least one fixing plate (52) suited to allowing the anchorage of an associable gib (28) by means of the second fixing means (24), and wherein said fixing plate (52) extends perpendicularly to said collar (48) so as to directly face a lateral edge or cut (56) of the associ-
- able gib (28).
 9. The panel (4) according to any of claims 2 to 8, wherein the support element (44) comprises a pair of fixing plates (52) diametrically opposite one another, arranged in correspondence with the mid-point of the socket body (32), said fixing plates (52) being fitted with holes (60) for the passage of the second fixing means (24) for the fixing of the gib (28).
 10. The panel (4) according to any of the previous claims, wherein said connector element (12) is made of metal or polymeric material.
 11. The panel (4) according to any one of the previous claims, wherein said support element (44) comprises at least one hole, suited to allowing the connection of one individual safety device for a worker.
 12. The panel (4) according to any of claims 2 to 11, wherein said socket body (32) is hollow and is at least partially filled with heat insulation material.
 13. Roof structure comprising at least one covering panel (4) according to any of claims 1 to 12 and at least one gib (28), said gibs (28) being arranged parallel to one another so as to be anchored to the support elements (12) of adjacent panels (4).
 14. The structure according to claim 13, wherein the connector elements (12) of the covering panels (4) are oriented so as to arrange the fixing plates (52) downhill of the pitch thrust caused by the gradient of the roof.
 15. The structure according to claim 13 or 14, wherein the distance (72) between the connector elements (12), along the slope line, of two adjacent covering panels (4) is a whole multiple of the distance between the straight or curved tile holder gibs (28).
 16. Method for laying a roof, comprising the stages of:
 - arranging on the concrete slab (16) of the roof a plurality of covering panels (4) according to any of claims 1 to 12,
 - fixing each connector element (12) of the relative panel (4) to the concrete slab (16) beneath by means of first screw means (20),
 - laying on said connector elements (12) at least one tile holder gib (28) and anchoring the gib by means of second screw means (24), mechanically separate from said first screw means (20).
 17. The method according to claim 16, wherein the stage of laying the tile holder gibs (28) comprises the stage of resting the gibs (28) on said connector means (12) so that the connector means (12) form a support that

counters the pitch thrust before the anchorage of gibs (28) to the panels (4) and wherein the stage of anchoring the gibs (28) comprises the stage of inserting said screw means (24) in a direction substantially perpendicular to the first screw means (20). 5

18. The method according to claim 16 or 17, comprising the stage of filling the connector elements (12) with heat insulation material.

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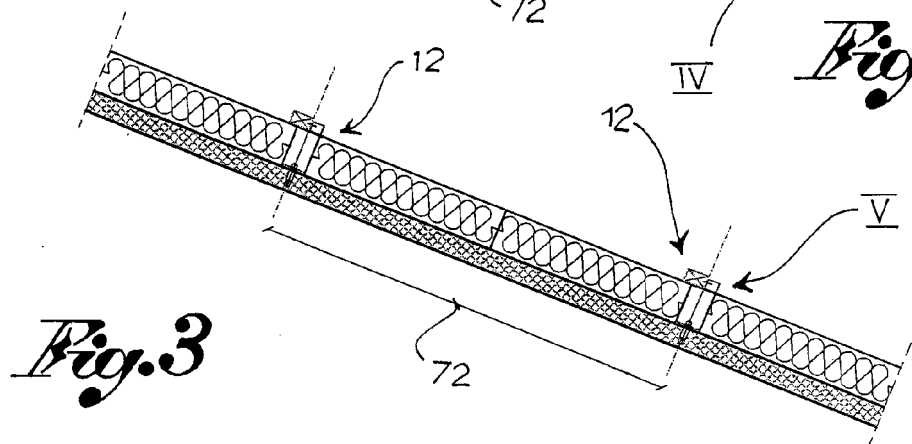
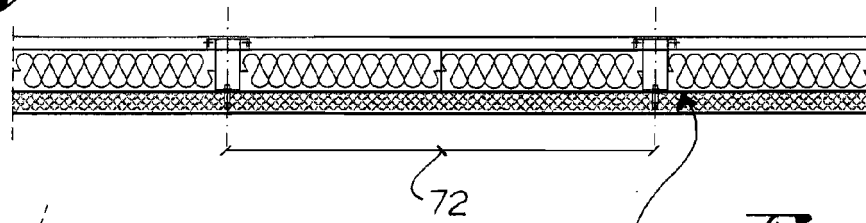
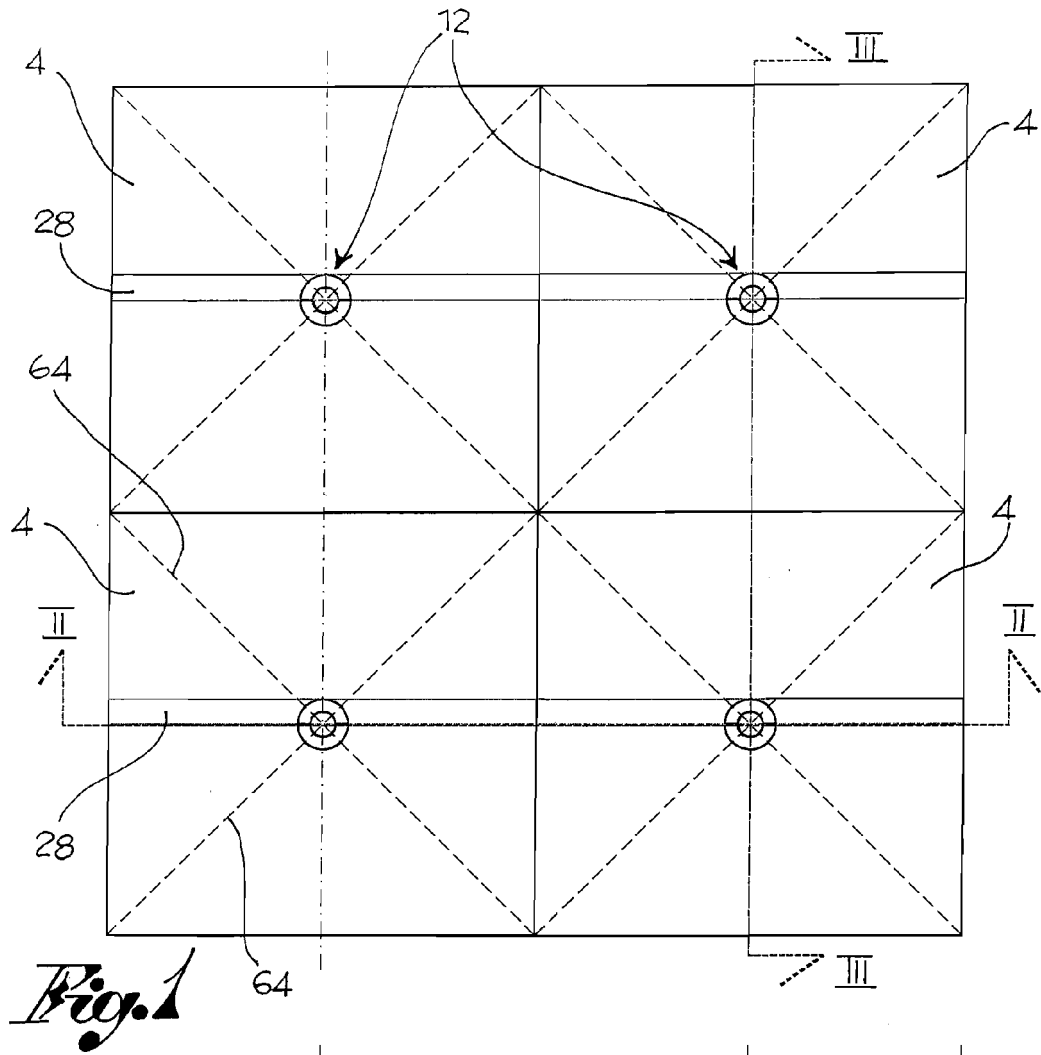
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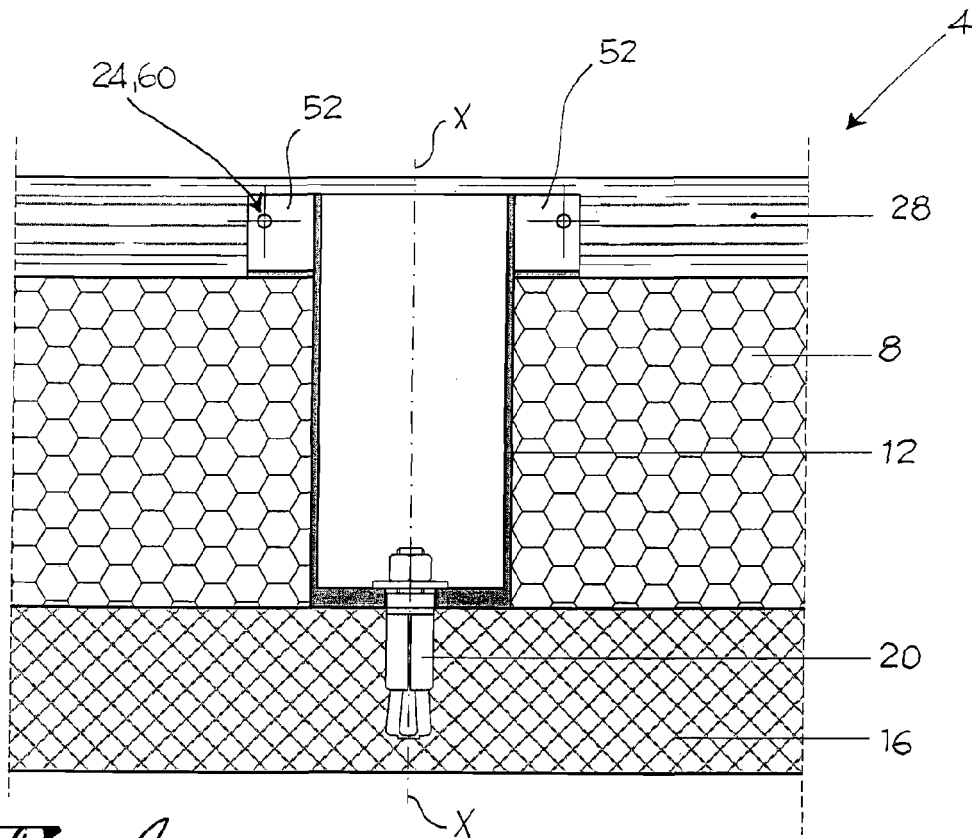


Fig. 4

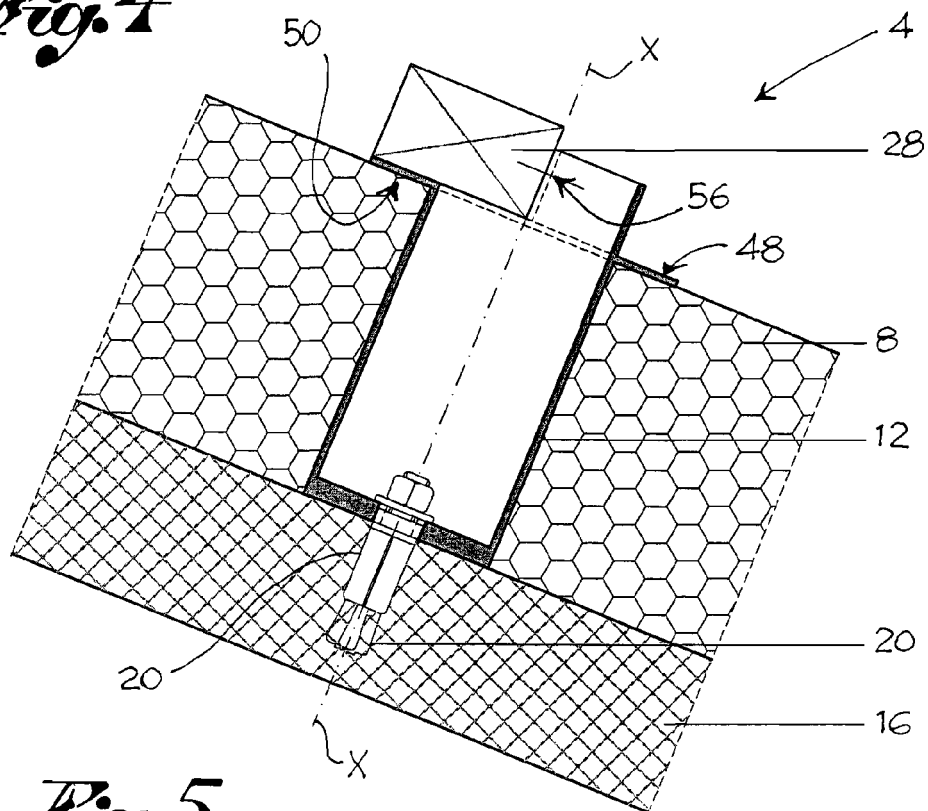


Fig. 5

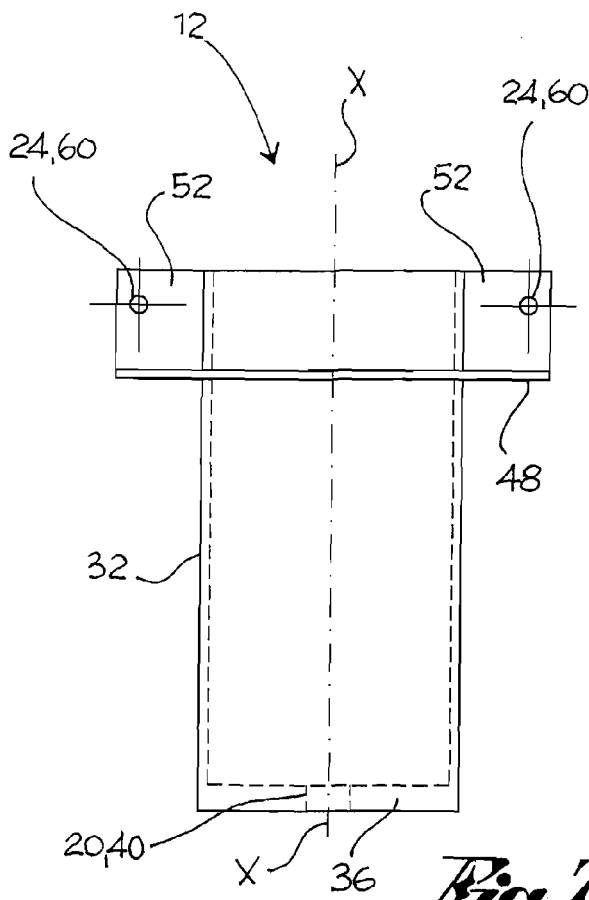


Fig. 7

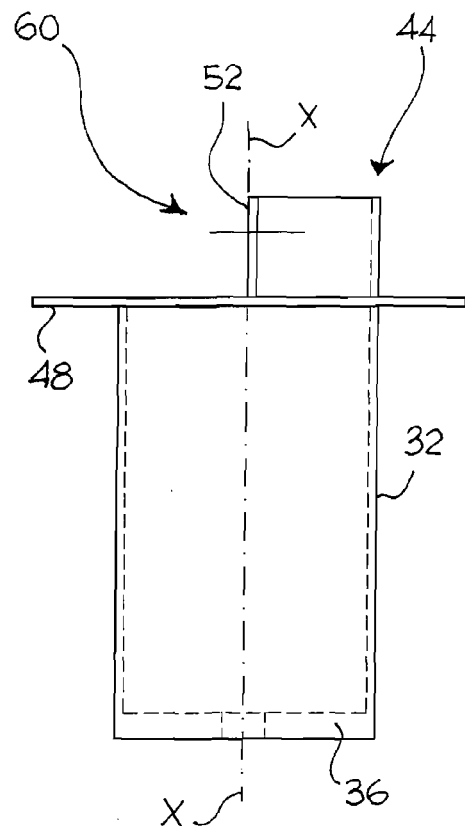


Fig. 8

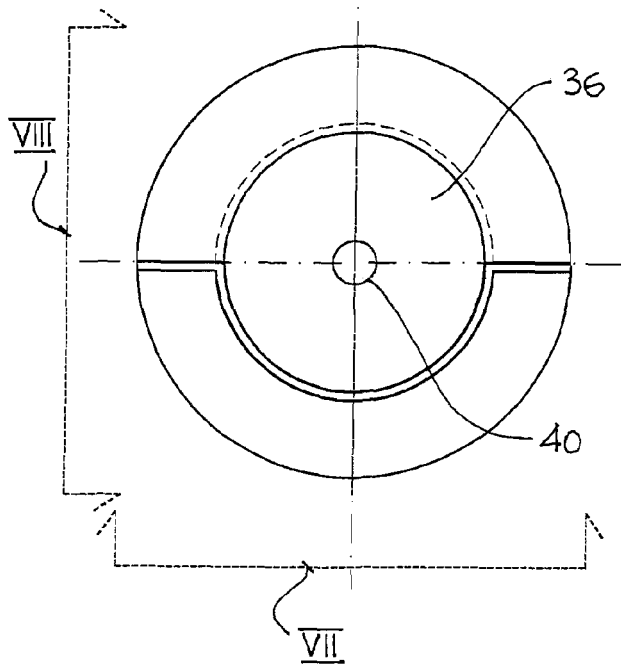


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 4846

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 June 2009	Examiner Bauer, Josef
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 16 4846

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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