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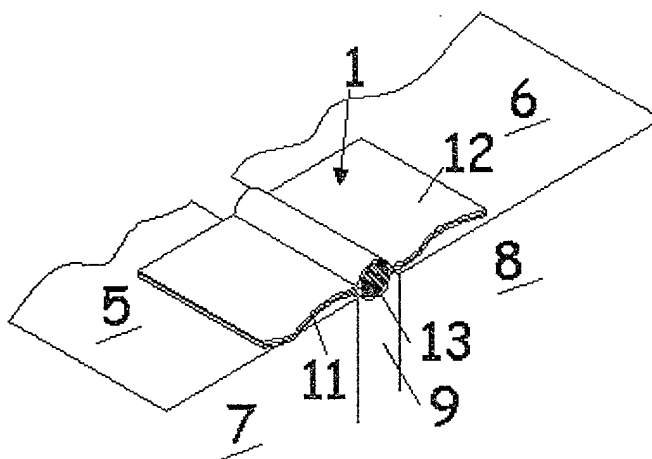
(54) **A preformed bituminous joint for sealing cover and method for manufacturing the same**

(57) A preformed joint for connecting together waterproof coverings that are formed by bituminous membranes, said joint comprising two sheets of overlapped material, at least one of which is deformed, joined to one another at least along the side edges. Both sheets (11,

12) which substantially lie in the same plane or extend in two substantially orthogonal planes, are of bituminous or bitumen-compatible material, and at least an elongated spacing member (13) is inserted between them.

The invention further relates to a method for manufacturing such joints.

Fig. 1



Description

[0001] The present invention concerns in general the sealing of building coverings, such as roofs, terraces, vertical walls and so on, and more particularly the joints or connection members be applied at breaks in continuity between separate sealing coatings.

[0002] For sealing the building covers or coverings extending both horizontally and vertically, there are commonly used bituminous membranes (also called roofing felts), formed by a framework which is impregnated and coated by a bituminous mixture with added polymers. The framework can comprise a continuous yarn or a nonwoven polyester staple fabric and/or a so-called nonwoven glass, or glass fibers. Plastomers can be added to the bituminous mixture such as atactic polypropylene, i.e. having a random structure (so-called APP-bitumen membranes), or elastomers such as block copolymers (so-called membranes of styrol-butadiene SBS bitumen). Due to physical characteristics of the polymer employed, the former are also called bitumen-polymer plastomeric membranes, while the latter are defined as bitumen-polymer elastomeric membranes.

[0003] These membranes require connection members or joints for joining together their different portions, and moreover in large constructions a building covering must often be divided into several parts to compensate their expansions as well as the "displacements" between structural components.

[0004] Although on the one hand the use of joints or connection members solves the above mentioned problem in some parts of the building structure, on the other hand, it causes troubles in other parts of the construction which on the contrary need a continuity, such as for instance where it is mandatory to prevent breakings in the covering that could cause water leaks, typically in roofings and sealing coverings. Under these conditions, the bituminous membrane which generally covers the roofs cannot adjust the "displacements" between physically separated structures and therefore there is considerable the risk that the membrane is torn.

[0005] For instance, just next to interstices in the flooring or at transitions from a horizontal plane to a vertical plane of the surface to be sealed, the bituminous membranes are to be joined together so as to allow a certain expansion or relative displacement without breaking the covering continuity.

[0006] A known solution provides for forming a membrane "reserve" adapted to compensate the expansions, i.e. an additional section between two separate structures forming a sort of channel or eaves along the covering discontinuity. Nevertheless, this solution cannot be considered satisfactory since inert materials such as foliage, stones and the like filling up the additional membrane section often interferes with or prevents its proper operation.

[0007] A further drawback derives from the requirement that the joint must fit to a large number of possible

covering situations such as particular architectural shapes, volumes protruding from the covering, transitions from a horizontal to a vertical covering, and so on.

[0008] In order to properly implement these joints there are presently used preformed joints comprising two overlapping sheets of plastic material that are joined together at least along their side edges. At least one of such sheets is shaped or deformed, typically like a circumference arc for allowing expansions of and displacements between the joined coverings. Nevertheless, the preformed joints of this material are scarcely compatible - particularly in respect of adhesion and expansion - with the bituminous membranes commonly used for sealing building coverings - both horizontally and vertically - and are therefore quite unsatisfactory.

[0009] Therefore, there exists the need of a joint (connection member) between two or more areas of a covering belonging to two or more separate coatings, such a joint being adapted to compensate the relative displacements of the underlying structures and to prevent malfunction of the joints due to inert materials accumulated on the coverings.

[0010] It is therefore an object of the present invention to provide a new and improved joint system that is not affected by the above discussed drawbacks and limitations. These objects are achieved through the present invention which consists of a preformed bituminous joint as claimed in claim 1.

[0011] In accordance with another aspect, the invention consists of a method for manufacturing a bituminous joint as claimed in claim 12. Further advantageous features are recited in the dependent claims.

[0012] The joint according to the present invention overcomes both the laying difficulties and the above mentioned drawbacks since it can be fitted into the expansion areas, and remains always clean thus behaving like the building portions over which it has been laid.

[0013] Since the joint is of a bituminous or bitumen-compatible material, it is compatible with the flat membranes laid over the buildings, and adheres to them and follows their expansions thus increasing the membranes elasticity.

[0014] The joint according to the invention is applied at the spacings between separate building structures, so that after the joint has blended and stuck to the membranes, the resulting proofing can follow the building expansion, and since the proofing is not being subjected to stresses, it does not break.

[0015] The system of the invention provides for a plurality of adapting accessories to impart continuity to the coverings between horizontally-extending and vertically-extending proofings, as well as at corners and recesses of the type commonly used in buildings. A safety member is moreover provided that is positioned above and under the joint for further sealing the contact points between the adapting members and the flat joints.

[0016] The invention will now be disclosed with reference to preferred but non limiting embodiments thereof

with reference to the attached drawings, in which:

Fig. 1 is a schematic perspective view which illustrates a flat or linear joint according to the invention; Fig. 2 is a schematic perspective view which illustrates a corner joint according to the invention; Figs 3, 4a-4d and 5a-5d illustrate some typologies for connecting together the joints in order to achieve a continuous sealing member; Fig. 6a-6d illustrate the joining and sealing modalities, according to the invention, by using two 90° angular joints perpendicularly disposed to one another; and Fig. 7 illustrates another embodiment of the flat joint of Fig. 1.

[0017] With reference now to Figures, Figure 1 shows a joint or connection member 1 according to the invention of flat (also called linear) type, adapted to join or blend two bituminous membranes 5 and 6 applied to the surfaces of two construction portions 7 and 8, respectively, the joint being located along a slot or spacing 9 between said two building portions. The joint comprises two overlapping sections or sheets 11 and 12 of a material that is compatible with the bituminous membranes, or better is made of the same bituminous material of the membranes, which sheets are shaped (pre-formed) at their centres along a longitudinal direction, with an elongated spacing member 13 fitted therebetween. More generally, both sheets 11 and 12 substantially extend in the same plane and have complementary deformations at their intermediate portions, which define a channel 3 in which at least one elongated spacing member 13 is inserted. Alternatively at least one of the sheets has a deformation.

[0018] In the illustrated embodiment, one of the sheets, shown by the reference 11 in Fig. 1, shows a concave deformation or recess, while the other, shown by 12, has a convex deformation or prominence. Preferably, such deformations extend along or near the centre line of the sheets. The sheets are adapted to house the spacing member 13, preferably formed as a rod of foam-material, inside the channel 3 formed when they are sealed to one another along their lateral flat edges. The joint 1 is applied in proximity of spacings between separate building structures, spaces provided for allowing expansion, edges or spaces between two separate building structures 7 and 8 and, after blending with and sticking to the existing flat membranes 5 and 6, such joint provides a sealing covering capable of following the expansions of the building structure. This way, since the covering is not stressed, the same is not prone to breakages. Advantageously, the sheets 11, 12 are made of bituminous membranes provided with a framework, and the foam-material spacing member has a diameter comprised between 20 and 100 mm. Since the bituminous or bitumen-compatible sheets are not bearing components, the provision of one or more spacing members

between them allows for using an excess of material without this latter becoming flabby or flattened, particularly when the temperature increases or the joint is heated.

[0019] In the embodiment illustrated in Fig. 2, both the sheets 11 and 12 of bituminous or bitumen-compatible material lie or extend in two substantially orthogonal planes, so that the joint 2 is formed by two strips 21 and 22 which are perpendicular to one another. The deformed portions housing the spacing member 13 are located along the bending between said two strips. This type of joint is also defined as a 90° linear joint or angular (angle) joint.

[0020] The joint according to the present invention is manufactured either as a single piece having a predetermined length, or in form of a continuous strip wound on a large diameter reel, from which sections of a desired length can be cut. On the other hand, the extension of the discontinuity and/or the sizes of the surfaces to be proofed can require a rather long joint, which is preferably manufactured by "connecting" along a longitudinal direction two of the above disclosed joints.

[0021] Such a connection of two or more joints can be carried out according to two different modalities that will be illustrated hereinbelow for flat joints, with reference to Figures 3 and 7. In the case illustrated in Fig. 3, auxiliary joining straps are used, formed by two sheets 31, 34 of bituminous or bitumen-compatible material, that are deformed along their intermediate portion in a manner corresponding to the outer surface of the joint deformation. The two sheets are separated and respectively located under and over the joining line between the two flat joints 1. The additional straps are then blended with and stuck to the joints by heating them.

[0022] According to another embodiment of the joint, illustrated in Fig. 7, a longitudinal connection is possible between two joints without using additional components. According to this embodiment, the sheets 11 and 12 are not completely overlapped at their ends, and more particularly, at one of said ends, a section of the sheet 12 is missing, so that the corresponding length of the spacing member 13 is uncovered, while at the other end (the structure of which can be seen in Figure 7 although for a different joint) a corresponding section of sheet 11 is missing and the spacing member is not present. It is pointed out that in the manufacturing operation, both sheets 11, 12 are cut at the same length, but are overlapped in an offset manner and with this joint typology, it is possible to connect two adjacent joints through a "male-female" superimposition at their ends.

[0023] This way, an overlapping of the portions of two joints is possible without using additional accessories for sealing.

[0024] By using the joints and the associated joining straps according to the invention, it is possible to realise a large number of different joint assemblies for fitting to several existing structural configurations. Just for illustrative purposes, some possible joint assemblies are

hereunder illustrated with reference to Figures 4-6.

[0025] Figures 4a-4d illustrate the sealing modalities between the coverings of a terrace 24 and that of a vertical wall 25, in accordance with the present invention. Two flat linear joints are used that are disposed in two planes at 90° to each other and further using joining sheets 41, 44 which are simply the joining straps in the 90° embodiment, i.e. (each) extending in two orthogonal planes and provided with a central concave, respectively convex, deformation also extending with two sections at 90°. The assembly is built by firstly applying the sheet 41 over the corner formed by the wall 25 and the terrace 24, then laying the two flat joints 42 and 41, and then covering the junction line by means of the second sheet 44.

[0026] Figures 5a-5d illustrate the sealing modalities according to the invention at the corner formed by a structure 26 protruding from a flat surface 27. Two joints are used, namely a joint 52 of linear flat type and a joint 53 of the 90° type that are positioned over the flat surface. The joint assembly further comprises two sheets 50, 54 forming as many joining straps extending in three planes perpendicular to one another. More particularly, the sheet 50 comprises a flat portion 51 with a central concave deformation and a portion 55, which is adjacent to the former and forms a 90° angle with the edge perpendicular to the flat portion. Over the flat portion 51 of the member 50 there are laid the two adjacent joints 52 and 53 and then the second sheet 54 - having a structure similar to that of the sheet 50, but with convex central deformation - is applied to completes the sealing.

[0027] Figures 6a-6d illustrate the sealing modalities for blending and sticking together two joints of the angular type. The joint assembly comprises a first sheet 61 shaped as a trihedron with three flat perpendicular portions substantially of equal extension, and with a central concave deformation extending along two of the trihedron edges, and a second sheet 64 having a structure similar to that of the sheet 61, but with a convex central deformation extending along two of the trihedron edges. The two right angle joints 62 and 63 are applied over the sheet 61, and then the second sheet 64 with a convex deformation is applied to complete the sealing.

[0028] Preferably, the bituminous membrane having a thickness comprised between 2 to 8 mm is formed by a non woven polyester staple fabric, preferably of continuous spunbonded yarn.

[0029] The spacing member 13 is preferably formed as a single element, nevertheless, it can comprise a plurality of longitudinally distributed spacing members.

[0030] The elongated spacing member is preferably shaped as a rod of foam plastic material having a stiffness or hardness depending on the properties of the membranes and a diameter comprised between 20 and 100 mm.

[0031] In the following there is disclosed a method for manufacturing a preformed bituminous joint according to the invention.

[0032] Two rolls of bituminous membranes of the proper width, (generally between 200 and 1,000 mm) disposed on two loaders facing each other are unrolled to overlap to one another and to form a one-piece member.

[0033] The two membranes are pulled through a matrix and receive at their centres a tubular foam elastic member preferably of cylindrical shape which acts as a spacing member.

[0034] The edges of the two membranes not separated by the tubular member positioned at the membrane centre are heated so that the two contacting surfaces soften and perfectly blend forming a one-piece member when cooled.

[0035] The so manufactured joint can be cut at the proper size or rolled as a bobbin on a large diameter support.

[0036] Although the present invention has been illustrated with reference to preferred embodiments thereof, it is generally subjected to other applications and modifications falling within the invention scope, as it will be evident to the skilled of the art.

Claims

1. A preformed joint for connecting together sealing coverings formed of bituminous membranes, said joint comprising two sheets of material, at least one of which has been deformed, that overlap to one another and are joined together at least at their lateral edges; **characterised in that** both said sheets (11, 12) are of a bituminous or bitumen-compatible material, and that at least one elongated spacing member (13) is inserted therebetween.
2. A joint as claimed in claim 1, **characterised in that** said sheets (11, 12) of bituminous or bitumen-compatible material show complementary deformations at one of their intermediate portions to define a channel (3) where at least an elongated spacing member (13) is inserted between said sheets.
3. A joint as claimed in claim 2 **characterised in that** said sheets (11, 12) of bituminous or bitumen-compatible material substantially lie in a same plane (Fig. 1).
4. A joint as claimed in claim 2, **characterised in that** said sheets (11, 12) of bituminous or bitumen-compatible material extend in two substantially orthogonal planes (Fig. 2).
5. A joint as claimed in claim 3 or 4, **characterised in that** one (11) of said sheets has a concave deformation, while the other (12) has a convex deformation and said elongated spacing member (13) has a generally cylindrical shape.

6. A joint as claimed in claim 2 **characterised in that** it comprises a plurality of spacing members that are longitudinally spaced apart.

7. A joint as claimed in preceding claims, **characterised in that** said two sheets (11, 12) are not completely overlapped at their ends, and that a section of said spacing member (13) is not covered at one of said end, while at the other end said spacing element (13) is not present, so as to allow the longitudinal overlapping of the portions of two adjacent joints without using additional elements accessories for maintaining the covering proofing.

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8. A sealing member between joints according to any of the preceding claims, **characterised in that** it comprises two sheets (31, 34) of bituminous or bitumen-compatible material deformed at one of their intermediate portions.

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9. A sealing member as claimed in claim 8 **characterised in that** said sheets (31, 34) of bituminous or bitumen-compatible material are lie substantially in the same plane (Fig. 3).

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10. A sealing member as claimed in claim 8 **characterised in that** said sheets (31, 34) of bituminous or bitumen-compatible material substantially extend in two orthogonal planes.

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11. An assembly for joining sealing coverings formed by bituminous membranes, **characterised in that** it comprises one or more joints as claimed in claims 1-7 and at least a pair of joining elements as claimed in claims 8-10.

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12. A method for manufacturing a joint for connecting sealing coverings formed by bituminous membranes, **characterised in that** it comprises the following steps:

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preparing two rolls of bituminous membranes with the desired width on two loaders facing each other;

unrolling both rolls so as to overlap them;

applying at least one tubular spacing member between the two membranes being pulled in a matrix;

heat-joining the edges of two membranes not involved with said spacing member;

cutting the resulting joint at the proper length or winding it onto a large support.

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Fig. 1

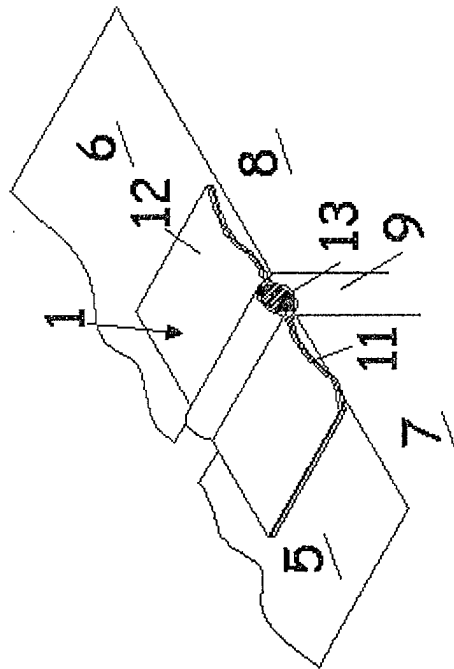


Fig. 2

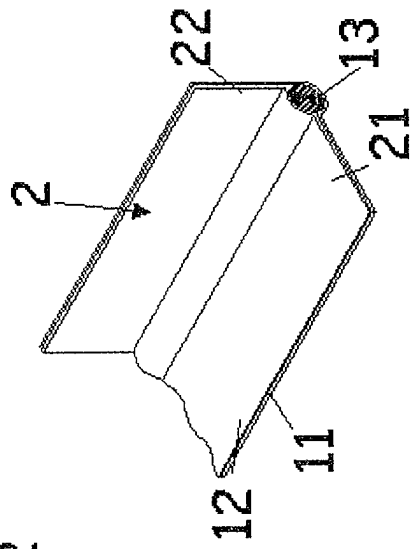


Fig. 3

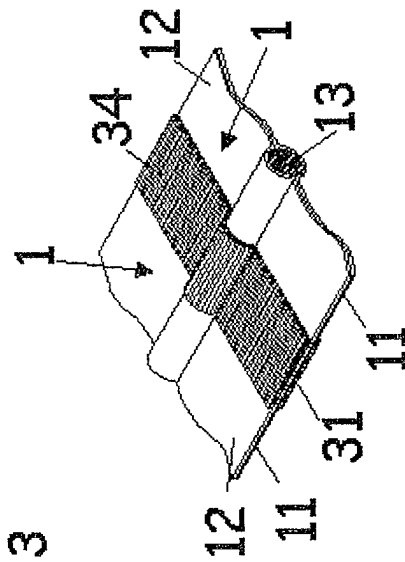
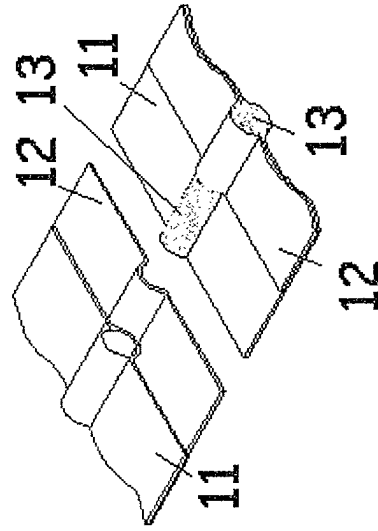


Fig. 7



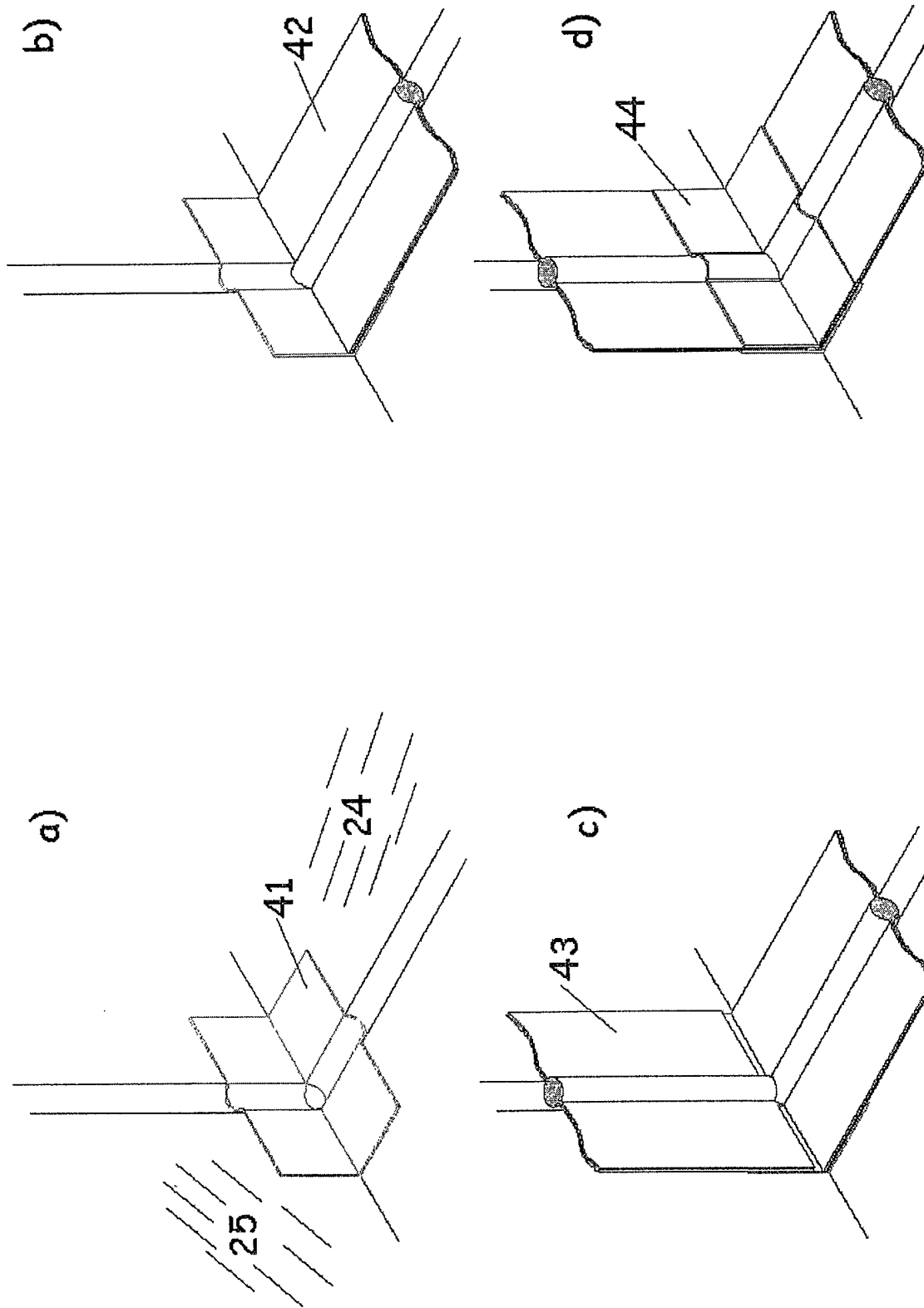
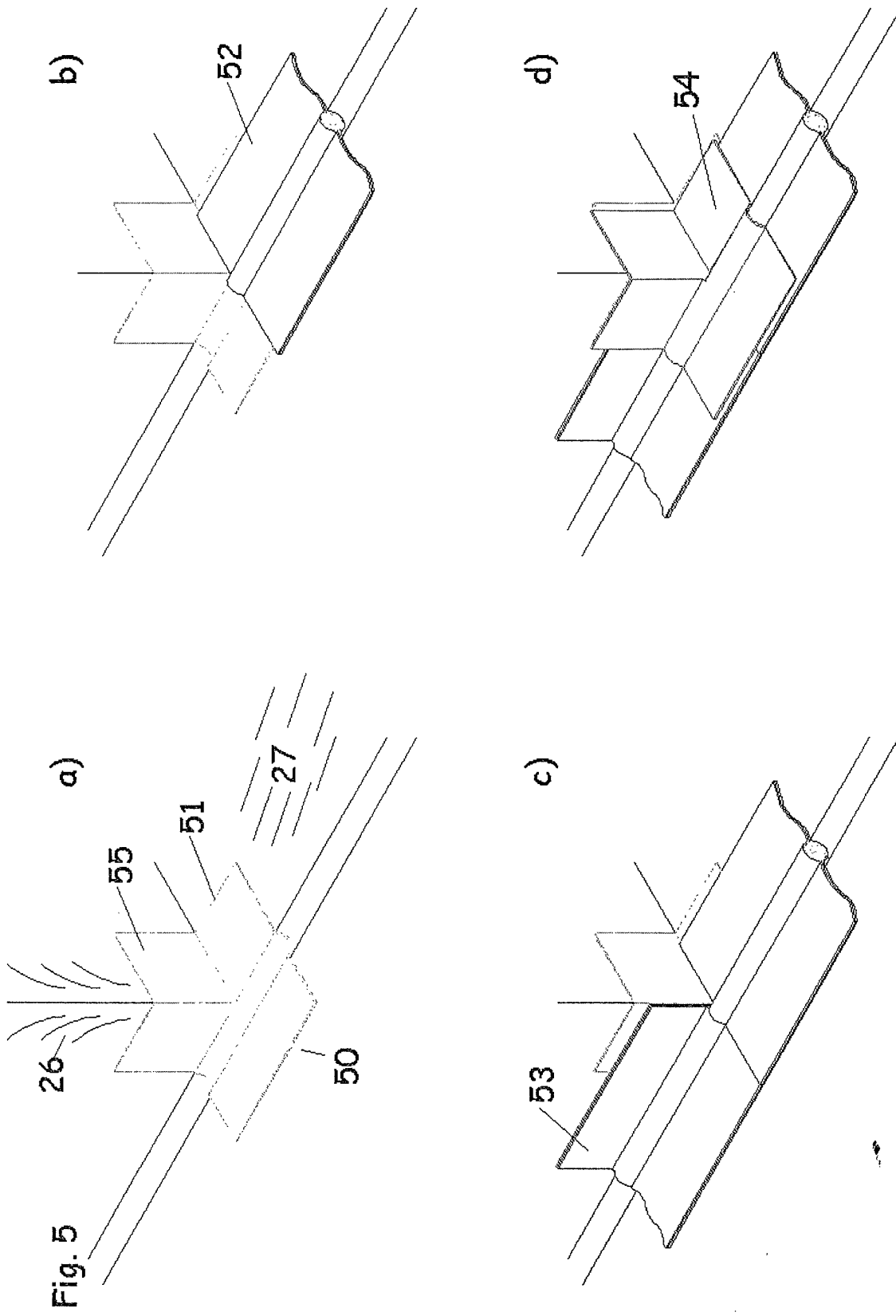


Fig. 4



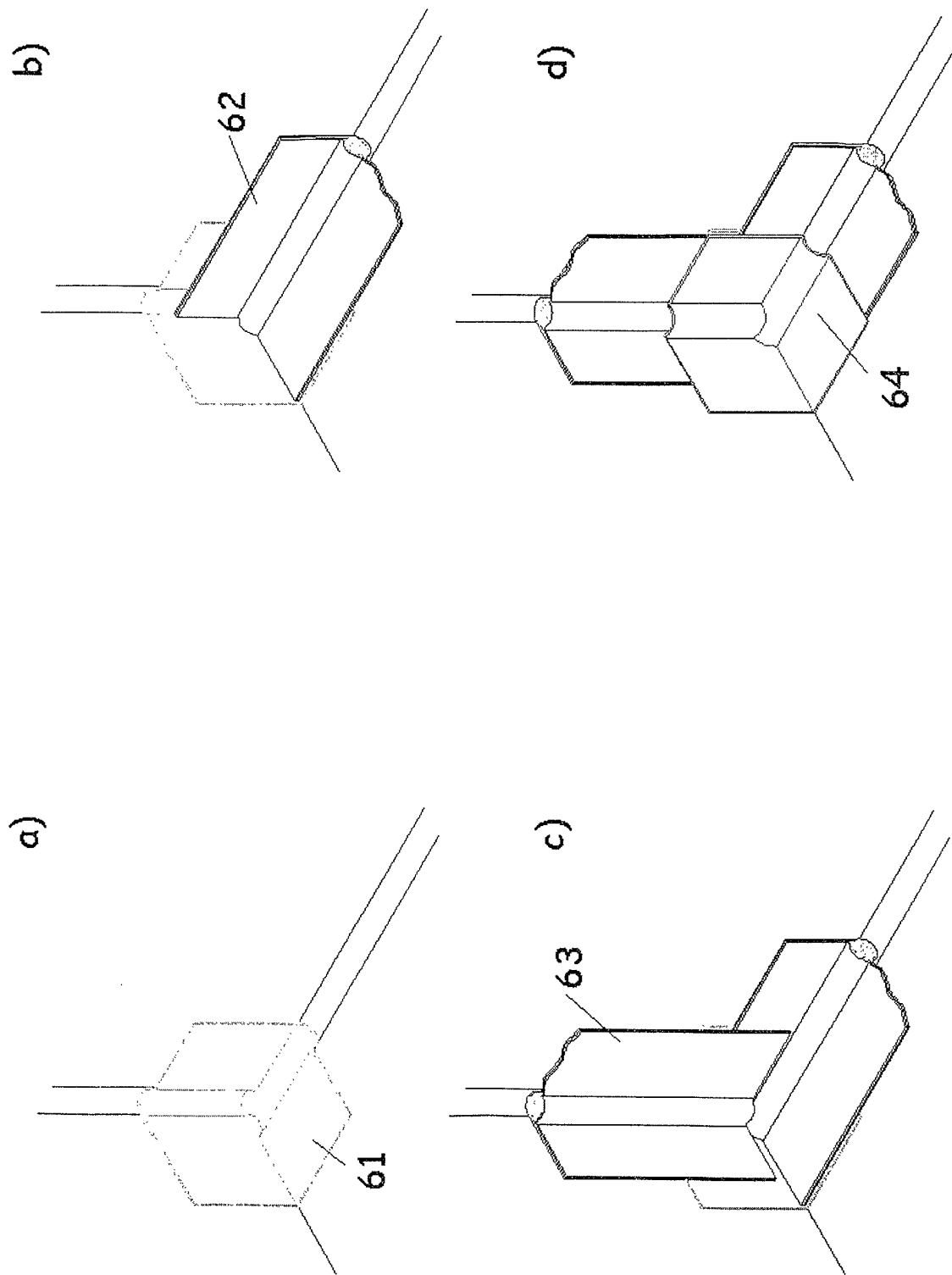


Fig. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5410

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Place of search THE HAGUE		Date of completion of the search 1 November 2002	Examiner Righetti, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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