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(54) ASSEMBLY OF PARTS FOR FIXING JOINT REINFORCEMENT IN CONCRETE MOULDS AND METHOD FOR ITS USE

(57) Assembly of parts which when mounted in a concrete mould will fixate joint reinforcement relative to the mould and the concrete panel to be cast, where said assembly comprises a first part and a second part, where said first part has a periphery delimiting a first part body, where in said body an aperture is provided through the thickness of said body, and where said second part comprises two or more sections, where when said two or more sections are assembled, their outer periphery fits inside the aperture in said first part, and where each of the sections has one or more parts of apertures, such that when the two or more sections are assembled in the aperture in said first part, one or more apertures are formed.

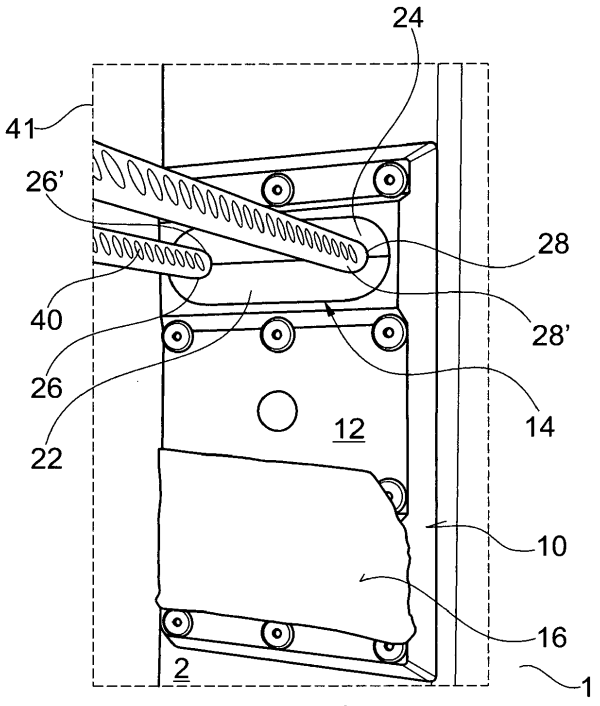

Fig. 1

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Description

Field of the Invention

[0001] The present invention relates to an assembly of parts which when mounted in a concrete mould will fixate joint reinforcement relative to the mould. The invention is also directed to a mould system incorporating such an assembly of parts.

Background of the Invention

[0002] In the art of prefabricated building it is quite common to use concrete panels which are manufactured under controlled conditions, for example in a factory. This provides a number of advantages relating to the finished product, especially relating to a consistent quality of the concrete panels manufactured.

[0003] In order to rationally manufacture concrete panels a number of mould systems have been developed over time which facilitates the production of concrete panels having varying dimensions both with respect to length, width, height etc. Also important when manufacturing concrete panels is the ability to in an economic way make recesses for doors, windows, conduits etc.

[0004] A further important aspect when making structures from pre-manufactured concrete panels is the joints between adjacent concrete panels. The joints will most likely be the weakest point in the construction, and as such great care must be taken when designing joints. A further difficulty in this connection is the fact that the joints between adjacent concrete panels can only be performed once the concrete panels are erected in situ, and as such the joints are not manufactured under controlled factory conditions, but will be created on site under the prevailing weather conditions. For these reasons various joint systems have been developed which should increase the strength of the joint and thereby the overall strength of the entire concrete panel construction.

[0005] The present invention is particularly directed to an assembly of parts used in a mould system suitable for manufacturing concrete panels where the joints between adjacent panels are provided with projections and indentations respectively. When erecting the structure a space is provided between adjacent panels in order to allow space for the joint construction. The joint is created by arranging scaffolding/mould-work around the joint after having arranged suitable reinforcement in the joint. Then concrete is poured in the joint. The indentations and projections will create compression zones in the joint concrete, if vertical loads are applied to the panels or joint, providing relatively high strength in those directions.

[0006] Concrete panels have very good compression strength, but very low tension strength, and for this reason concrete structures are provided with reinforcement, typically in the shape of steel rebars.

[0007] In order to allow the reinforcement also to provide reinforcement in joints between adjacent pre-cast concrete panels it is well-known to allow reinforcement to protrude from the concrete panel. When two adjacent concrete panels having protruding reinforcement, for example in the shape of loops, are arranged next to each other, the loops are designed to overlap, such that for example if two wall elements are positioned next to each other a vertical joint will be present. The loops protruding from the sides of the panels will overlap, and it will be possible to insert a vertical rebar through the overlapping loops and in this manner connect the reinforcement in one panel with the reinforcement in the other panel and thereby create a substantially reinforced and relatively strong joint.

[0008] The positioning and the arrangement of the loops in the side faces of the concrete panels are, however, very labour intensive and difficult to control. One way of arranging the protruding loops is to provide customized mould sides corresponding to the side of the cast concrete panel, where it is desirable to have the loops extend. The customized mould size is provided with apertures and bent rebars in the shape of a U are then inserted such that the free distal ends of the rebars are inserted in apertures in the mould side and the bottom of the U is left outside the mould. When the concrete is cast and the mould is removed, it is often necessary to destroy the mould side with the protruding loops in order to be able to remove the mould, and in this process the loops are often damaged, and the removal requires further labour handling.

[0009] Furthermore, in a number of applications the rebar used to form the loops and in particular the distal ends of the rebar inserted into the concrete panel to be cast are difficult to control during the casting process. This may result in poor adhesion between the rebar and the concrete panel or that the rebars are not sufficiently covered by a concrete layer to be able to absorb the designed tension or to be corrosion resistant.

Object of the Invention

[0010] Consequently, it is an object of the present invention to provide a system where the provision of protruding loops in precast concrete elements is made easier and less labour intensive and with a higher security of correct placement and thereby also correct installation in the wet concrete during the casting process.

Description of the Invention

[0011] The invention addresses this by providing an assembly of parts which when mounted in a concrete mould will fixate joint reinforcement relative to the mould and the concrete panel to be cast, where said assembly comprises a first part and a second part, where said first part has a periphery delimiting a first part body, wherein said body an aperture is provided through the thickness of said body, and where said second part comprises two or more sections, where when said two or more sections

are assembled, their outer periphery fits inside the aperture in said first part, and where each of the sections has one or more parts of apertures, such that when the two or more sections are assembled in the aperture in said first part, one or more apertures are formed.

[0012] Further advantageous embodiments are disclosed in the dependent claims and described in detail below.

Description of the Drawing

[0013] The invention will now be explained with reference to the accompanying drawing wherein

figure 1	illustrates an assembly mounted in a mould
figure 2	illustrates the first part mounted on a mould side
figure 3	illustrates a rear mould side
figure 4	illustrates the first part
figure 5a-c	illustrates various views of the second part

Detailed Description of the Invention

[0014] In figure 1 is illustrated an assembly 1 mounted on a mould side 2. The mould side 2 will typically be a steel member which together with other mould sides will be assembled, for example on a mould table or in a mould battery, in order to provide a moulding for a concrete panel to be cast.

[0015] The assembly comprises a first part 10 and a second part 20. The first part 10 has a periphery which in this example is substantially rectangular delimiting a first part body 12. In the body 12 is provided in this example with two apertures 14, 16.

[0016] The apertures as is evident from figure 4 illustrating the first part 10 go all the way through the thickness of the body 12 such that open apertures 14, 16 are provided in the body 12.

[0017] The further apertures 18 are provided in order to be able to fasten the first part to the mould side 2.

[0018] Turning back to figure 1 a second part comprising two sections 22, 24 are assembled and inserted into the aperture 14 of the first part 10.

[0019] In each of the two sections 22, 24 making up the second part 14, are provided two half holes 26, 26', 28, 28' such that when the second part is assembled in the aperture 14 the apertures 26, 26', 28, 28' will provide two substantially circular opening through which rebars 40, 41 may pass.

[0020] By dimensioning the apertures 26, 26' in the second part 20 correctly it is possible to firmly hold and engage the rebars 40, 41 such that when the concrete is cast in the mould the rebars will not move, but will be firmly held in the desired position.

[0021] Turning shortly to figure 2 the first part 10 is illustrated mounted on a mould side where the apertures 14, 16 are open. Similarly, in figure 3 which is the backside 2' of the mould 2 the rear side of the apertures 14, 16 is visible. Furthermore, in this embodiment the first part 10 is riveted, see rivets 19, through the apertures 18 (see figure 4) such that the first part 10 is firmly held by the rivets 19 in position on the mould side 2.

Naturally any type of suitable fastening may be used.

[0022] In figures 5a, 5b and 5c is illustrated the second part 20. The second part 20 as already explained above comprises in this embodiments two mirror image halves 22, 24 which each is provided with two half apertures 26, 26', 28, 28' such that when the two halves 22, 24 are assembled as illustrated with reference to figure 5c a rebar is firmly held by the second part 20.

[0023] In the embodiment illustrated in figure 5c the rebar is a steel wire 40, but any type of rebar is suitable to use with the present invention.

[0024] Turning shortly to figure 5b the two halves 22, 24 are illustrated from a different angle.

[0025] In this embodiment the second part is in two halves which are mirror image identical such that they may be assembled and fitted inside the apertures 14, 16 of the first part 10.

[0026] As is evident the two halves 22, 24 are provided with a flange 30 which flange fits inside the corresponding recess 32 in the first part 10, see figure 4. When the two halves are assembled around a rebar as illustrated in figure 1 the flange 30 will be inserted in the recess 32 such that the upper surface of the two halves 22, 24 is substantially flush with the surface of the first part 10.

[0027] Furthermore the two halves are each provided with ribs 34 in this embodiment in the shape of a thread such that when the two halves 22, 24 are assembled around the rebars as illustrated in figure 1 the thread more or less corresponds to the thread or unevennesses provided on the outer surface of the rebars 40, 41. The rebars 40, 41 will therefore be firmly held by the ribs 34 provided in the second part 20.

[0028] The outside of the two halves may also be provided with ridges 36 such that as they are inserted in the aperture 14, 16 in the first part, only a limited contact will be created between the first and second parts 10, 20. On the other hand it is possible to provide the second part with a slightly larger overall periphery than the inner periphery of the apertures 14, 16, such that the parts are squeezed into the apertures 14, 16 and thereby firmly held by the first part.

[0029] In figure 5c is as already mentioned above illustrated the second part 20 fitted around the rebar 40 in the shape of a steel wire. The flange 30 will be on the side of the mould facing the concrete panel such that the loop 46 will extend outside the mould. As the mould plate 2 is removed by withdrawing the mould in the direction indicated by the arrow, the concrete surface of the concrete panel will be substantially flush with the surface 32 of the second part 20. Consequently the two halves 22, 24 making up the second part 20 may be removed and the rebar 40 protrudes outside the concrete panel and is ready for mounting in a construction.

[0030] In fig. 6 a and b is illustrated a further example of a second part 20'. In this embodiment 4 apertures 51 are provided, which each may accommodate a rebar or the like.
The second part 20', as is evident from fig. 6a has a main portion 52, and four inserts 53. The inserts 53 fits in the openings 54 provided in the main portion 52, as illustrated in fig 6b, whereby the apertures 51 are formed. The inserts 53 as well as the receiving faces 57 of the openings 54 may be provided with serrations 58 or the like in order to lock the inserts 53 in the openings 54.

[0031] Having described various embodiments of the invention above, it should be understood that the scope of protection should only be limited by the appended claims.

Claims

1. Assembly of parts which when mounted in a concrete mould will fixate joint reinforcement relative to the mould and the concrete panel to be cast, where said assembly comprises a first part 10 and a second part 20, where said first part 10 has a periphery delimiting a first part body 12, where in said body 12, at least one aperture 14,16 is provided through the thickness of said body 12, and where said second part 20 comprises two or more sections 22,24, where when said two or more sections 22,24 are assembled, their outer periphery fits inside the aperture 14,16 in said first part 10, and where each of the sections 22,24 has one or more parts of apertures 26,26'28,28' such that when the two or more sections 22,24 are assembled in the aperture 14,16 in said first part 10, one or more apertures are formed.

2. Assembly of parts according to claim 1, wherein the first part is rectangular, and where said second part comprises two mirror image sections.

3. Assembly of parts according to claim 1 or 2 wherein the apertures in both the first and second parts are mutually conically shaped through the thickness, such that the second part only can be removed in one direction relative to the first part.

4. Assembly of parts according to claim 1 or 2 wherein the apertures in both the first and second parts 10,20 are mutually cylindrical, and where the second part 20 is provided with a flange 30 having an outer periphery larger than the aperture 14,16 in the first part 10, and where a recess 32 corresponding to the flange is provided in the first part 10.

5. Assembly of parts according to claim 1 wherein the part apertures 26,26',28,28' in both the first and second parts 22,24 are mutually provided with ribs 34 and optionally the that the outer surface suitable to engage the aperture 14,16 in the first part 10, is also provided with ribs 36 or notches.

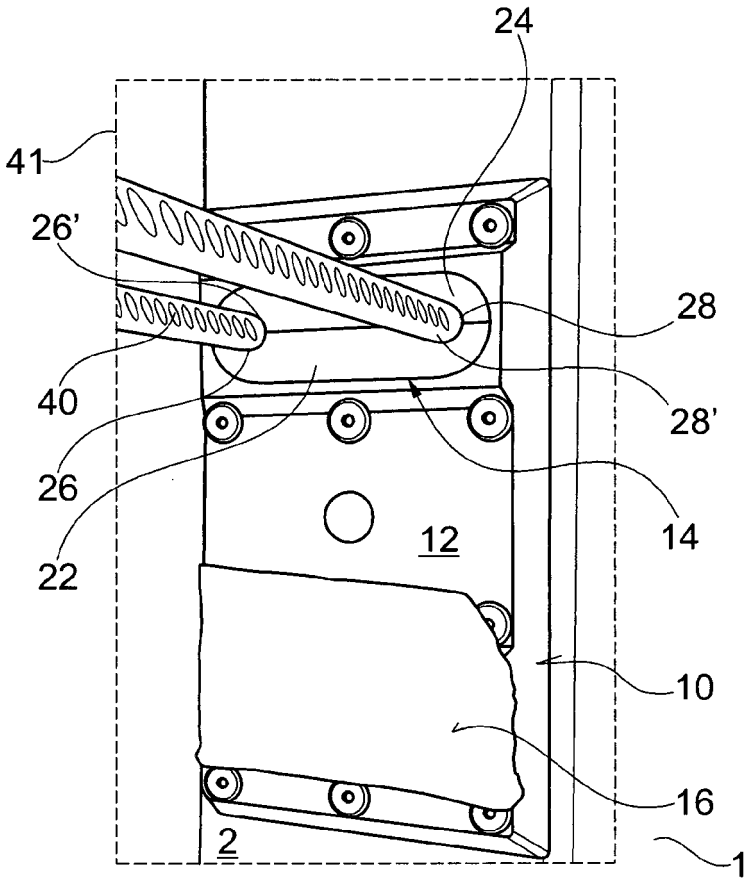

Fig. 1

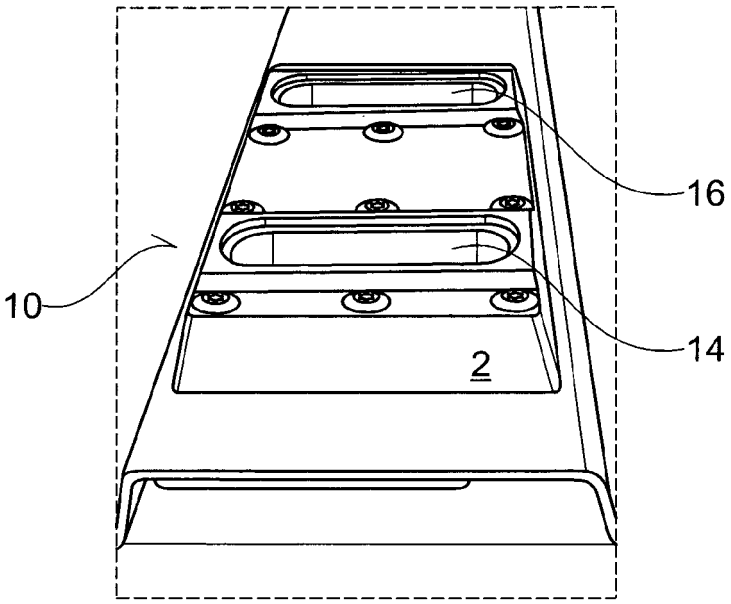

Fig. 2

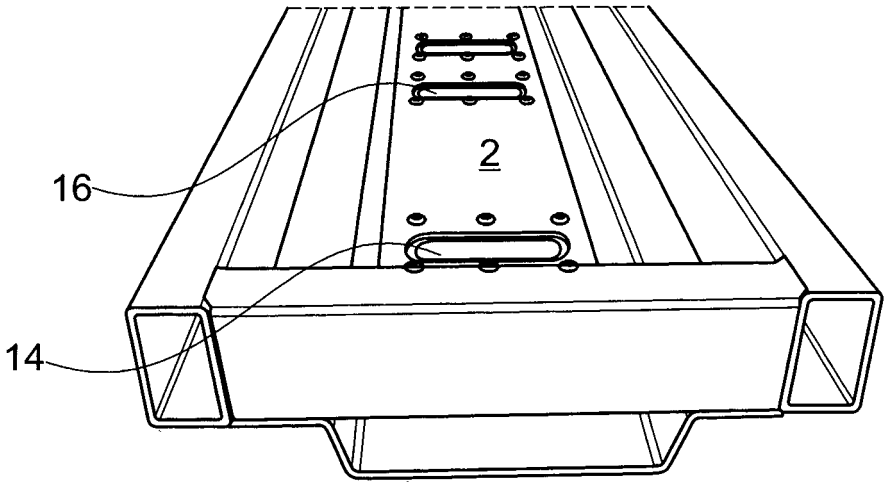

Fig. 3

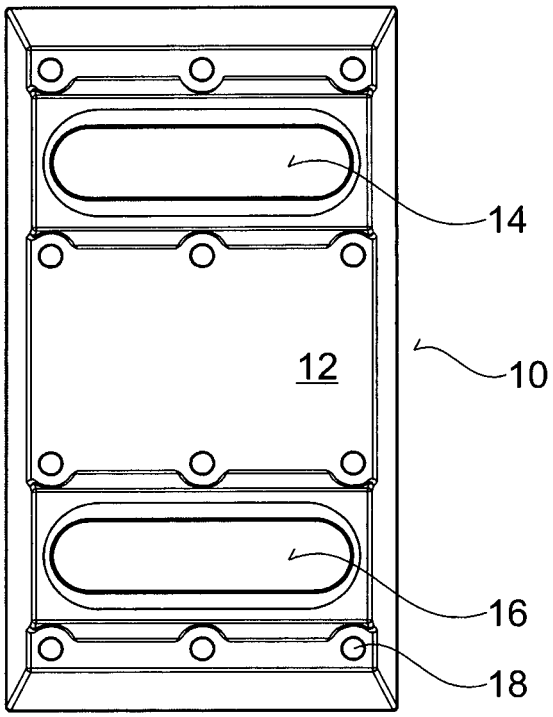

Fig. 4

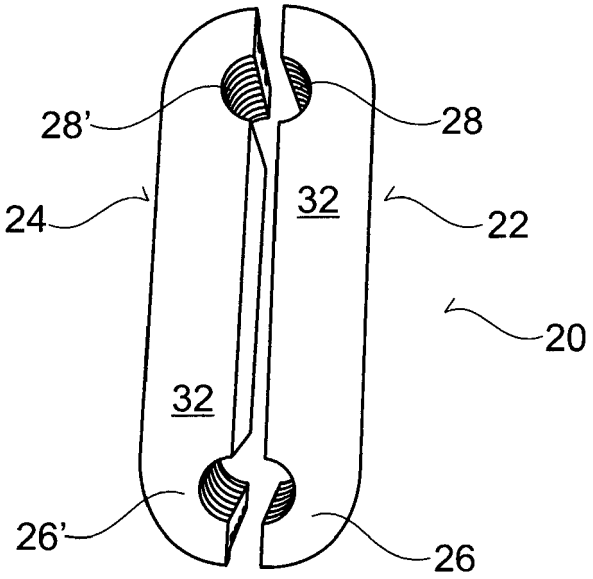

Fig. 5a

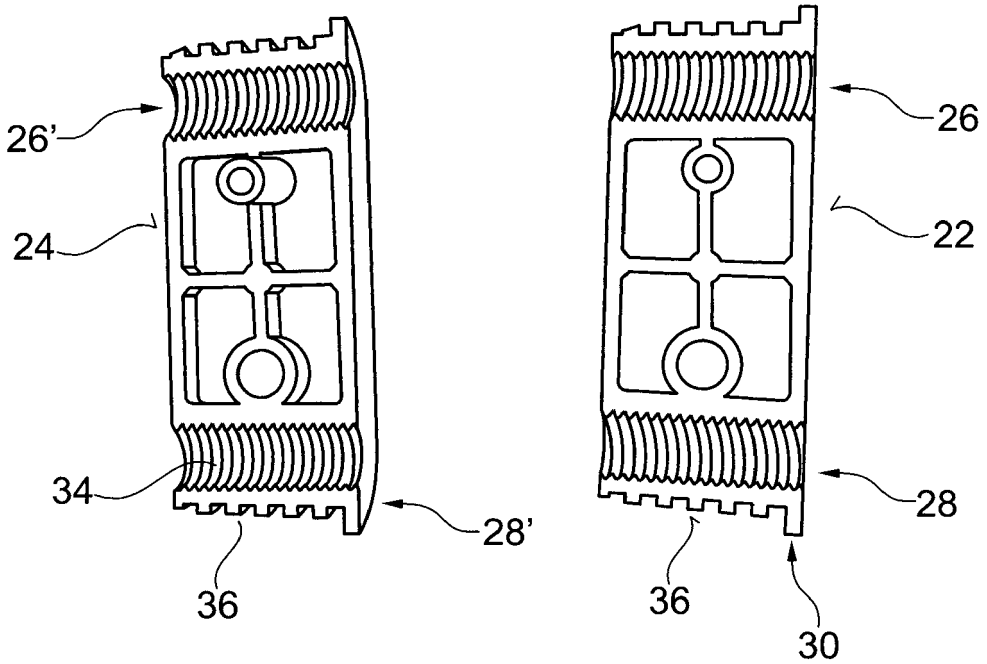

Fig. 5b

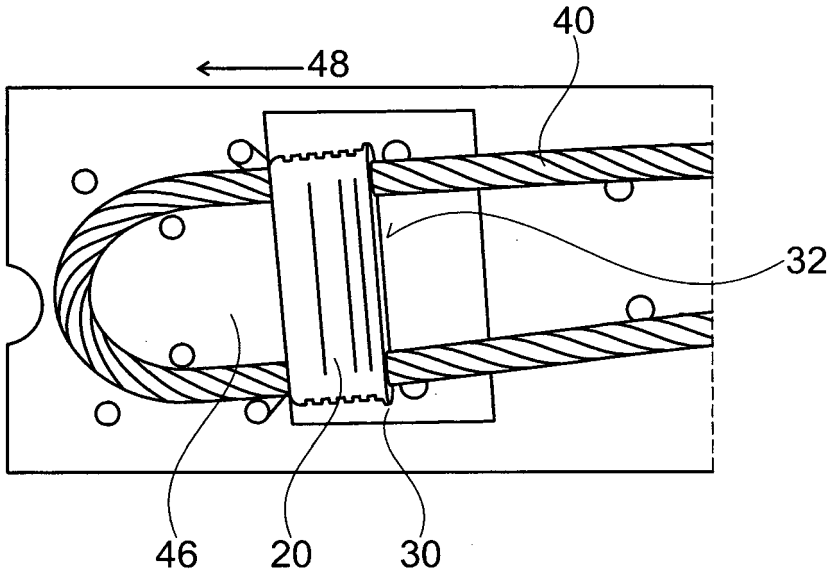

Fig. 5c

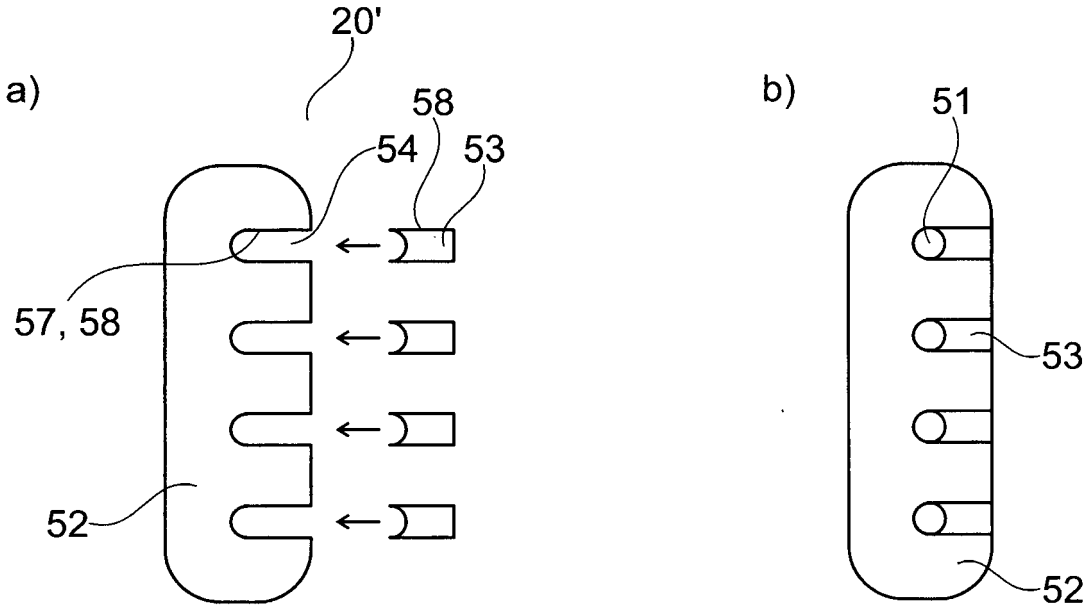

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 6131

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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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A	* abstract; figures 25-28 *	2-5	
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			TECHNICAL FIELDS SEARCHED (IPC) E04G E04C B28B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 June 2016	Righetti, Roberto

CATEGORY OF CITED DOCUMENTS

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