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(54) **Self-supporting prefabricated structure for stairwells and elevator shafts and assembly thereof**

(57) A prefabricated structure (4) for a stairwell and elevator shaft, comprising a plurality of panels (8) mechanically joined and positioned to form a closed, hollow structure so as to define an elevator shaft (12) of a tubular shape having a mainly vertical extension (Y-Y). Advantageously, the panels (8), on an outer side (36), opposite

an inner side (38) looking onto said elevator shaft (12), comprise at least one step (40), firmly anchored to them at a first attachment extremity (44). The prefabricated structure (4) is self-supporting so as to be able to support itself without requiring mechanical restraints to the building in which the said structure is inserted, and can be lowered directly inside the building from above.

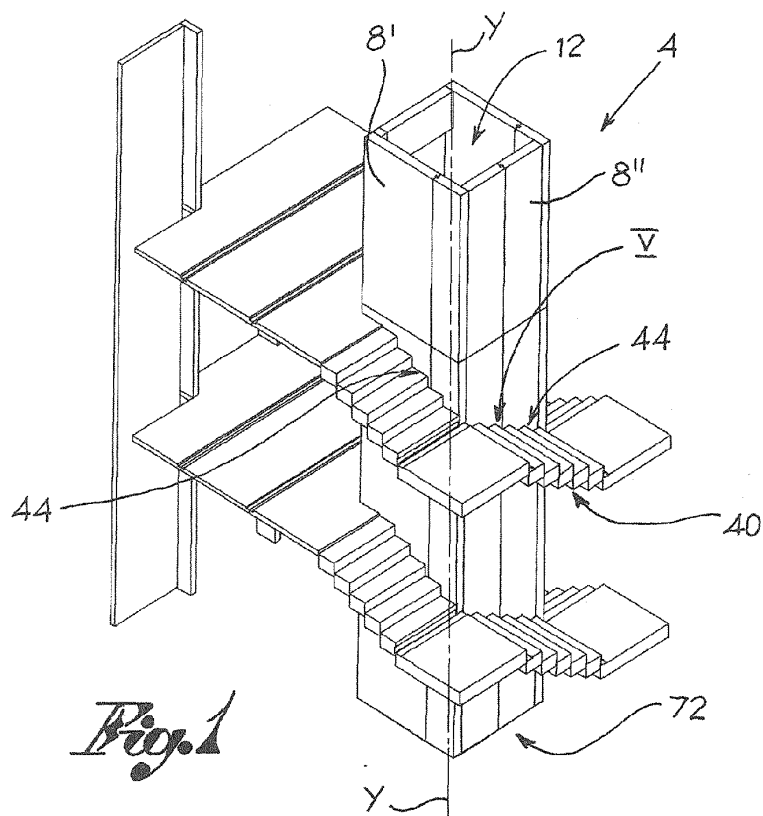


Fig. 1

Description

[0001] The present invention relates to a self-supporting prefabricated structure for a stairwell and elevator shaft, and assembly method of said structure.

[0002] In the building trade it is known of, when building stairwells and elevator shafts, to lay panels of various types which are positioned along the perimeter of the stairwell with subsequent application of the steps. The building of the stairwell and application of the relative steps is quite expensive and slow on account of having to use scaffolding within a small space.

[0003] As a result, the solutions of the prior art have drawbacks in terms of costs and production time.

[0004] The problem which the present invention addresses is to overcome the drawbacks spoken of with reference to the prior art.

[0005] Such drawbacks and limitations are resolved by a prefabricated structure according to claim 1 and by an assembly method according to claim 11.

[0006] Other embodiments of the prefabricated structure according to the invention are described in the following claims.

[0007] Further characteristics and advantages of the present invention will be more clearly comprehensible from the following description of its preferred embodiments, made by way of a non-limiting example, wherein:

[0008] figure 1 shows a perspective view of a self-supporting prefabricated structure according to one embodiment of the present invention;

[0009] figure 2 shows a view from above of a detail of the structure in figure 1;

[0010] figure 3 shows a cross-section view of a detail in figure 2, along the section plane III-III in figure 2;

[0011] figure 4 shows a cross-section view of a detail in figure 2, along the section plane IV-IV in figure 2;

[0012] figures 5A and 5B show cross-section views, along section planes perpendicular to each other, of the detail V in figure 1;

[0013] figure 6 shows a partial, longitudinal cross-section of the structure in figure 1;

[0014] figures 7-8 show transversal cross-section views, according to different embodiments of the structure in figure 1.

[0015] The elements or parts of elements common to the embodiments described below will be indicated by the same reference numerals.

[0016] With reference to the aforesaid figures, reference numeral 4 globally denotes a self-supporting prefabricated structure for a stairwell and elevator shaft.

[0017] The prefabricated structure 4 comprises a plurality of mechanically joined panels 8 positioned so as to form a closed, hollow structure so as to define an elevator shaft 12 of a tubular shape having a mainly vertical extension Y-Y.

[0018] The panels 8 may be of the solid type; it is also possible to use multilayer panels wherein between the inner and outer panels, intermediate layers are provided

for heat/noise insulation.

[0019] According to one embodiment, the panels 8 are bound to each other at the top, on contact arranging and mechanically assembling a rim 16 of a top extremity 20' of a first panel 8' with an inner lateral portion 24 of a top extremity 20" of a second panel 8", said inner lateral portion 24 facing the elevator shaft 12.

[0020] Preferably, the top extremities 20', 20" of the panels 8', 8" are mechanically joined to each other by the direct interposition of plugs 28 and/or screws 32.

[0021] Preferably (figures 6-8), the top extremities 20', 20" of the panels 8', 8" adjacent to each other are joined by the alternate interposition, along the main vertical extension Y-Y, of plugs 28 and screws 32.

[0022] According to one embodiment, the plugs 28 are sunk into the panels 8 with the interposition of a binding agent, such as a resin.

[0023] Advantageously the panels 8, on an outer side 36, opposite an inner side 38 looking directly onto the elevator shaft 12, comprise at least one step 40, firmly anchored to them at a first attachment extremity 44.

[0024] According to one embodiment, the steps 40 are bound to the panels 8 by threaded connection devices 48 passing through the first attachment extremity 44 of the steps 40 and through the entire thickness of the panels 8.

[0025] Preferably, the threaded connection devices 48 are blocked in the panels 8 and in the steps 40 with the interposition of a binding agent, such as a resin.

[0026] According to one embodiment, between the first attachment extremity 44 of the steps 40 and the relative panel 8 there is a support plate 52 in neoprene.

[0027] The prefabricated structure 4 further comprises joints 60 for the anchorage of the structure 4 to a foundation 64, the joints 60 being positioned at a lower extremity 68 of the panels 8, at the base 72 of the elevator shaft 12 to the foundation 64.

[0028] For example, the joints 60 comprise a pair of plates 76 separated by a cavity 80 which houses the lower extremity 68 of the panels 8, the plates 76 being mechanically connected to the panels 8 by threaded connection devices 48.

[0029] For example, the joints 60 comprise a rabbet 84 which connects the plates to each other 76 and which comprises threaded connection devices 48 on the side of each plate 76, to bind the joint 60 to the foundation 64, both from the inside 38 and from the outside 36 of the elevator shaft 12.

[0030] Preferably, the joints 60 are positioned astride the joints 88 between two adjacent panels 8', 8", so that the plates 76 connect the adjacent panels 8', 8" to each other by means of threaded connection devices 48, at the lower extremities 68 of the panels 8', 8".

[0031] Advantageously, the prefabricated structure 4 is self-supporting so as to support itself without requiring mechanical restraints to the building which the structure is inserted in. The only type of restraint required is the attachment of the structure to the relative foundation 64.

[0032] The method of production and assembly of a prefabricated structure according to the present invention will now be described.

[0033] The method of assembly of the prefabricated structure 4 according to the invention comprises the steps of assembling and mechanically joining panels 8 to each other to form a self-supporting, closed, hollow structure which defines an elevator shaft 12 of a tubular shape with a main vertical extension Y-Y.

[0034] At least one step 40 is then joined to the outer side 36 of the panels 8, firmly anchored to them at a first attachment extremity 44, for the creation of stairs joined externally to the elevator shaft 12. The lower extremities 68 of the panels 8 are also provided with joints 60 for the anchorage of the structure 4 to a foundation 64 of a building,

[0035] - The prefabricated structure so assembled is self-supporting and can therefore be raised, for example using a crane to then be lowered from above into the area chosen for the elevator shaft.

[0036] After lowering the prefabricated structure and laying it on the relative foundation 64, the joints 60 of the panels 8 are anchored to said foundation.

[0037] As may be appreciated from the description, the present invention makes it possible to overcome the drawbacks present in the prior art.

[0038] In particular, building of the stairwell and elevator shaft structure is fast and economical.

[0039] In fact, the entire structure is pre-assembled separately from the building it is subsequently inserted in thereby avoiding the need for scaffolding in the area chosen for the stairwell.

[0040] The absence of scaffolding leads to considerable savings of time and money given that the space available in the stairwell is limited and therefore the erection of scaffolding is particularly complicated and expensive.

[0041] Advantageously, the structure is self-supporting and statically independent of the rest of the building which it is inserted in. In other words it is an independent structure built separately and lowered from above into the chosen containment area.

[0042] The connections between the various panels which define the stairwell and the attachments of the structure to the foundation ensure considerable mechanical resistance and means that the stairwell does not need to be anchored to the building after relative positioning inside it. This way, the mechanical separateness of the stairwell is conserved and it remains statically independent of the rest of the structure.

[0043] A person skilled in the art may make numerous modifications and variations to the structures described above so as to satisfy contingent and specific requirements while remaining within the sphere of protection of the invention as defined by the following claims.

Claims

1. Prefabricated structure (4) for a stairwell and elevator shaft, comprising

- a number of mechanically joined panels (8) positioned so as to form a closed, hollow structure so as to define an elevator shaft (12) of a tubular shape having a mainly vertical extension (Y-Y), wherein

- the panels (8), on an outer side (36), opposite an inner side (38) looking onto said elevator shaft (12), comprise at least one step (40), firmly anchored to them at a first attachment extremity (44),

- wherein the prefabricated structure (4) is self-supporting so as to be able to support itself without requiring mechanical constraints to the building in which the said structure is inserted, **characterised by the fact that**

- the steps (40) are directly bound to the panels (8) by threaded connection devices (48) passing through the first attachment extremity (44) of the steps (40) and through the entire thickness of the panels (8),

- wherein the threaded connection devices (48) are blocked in the panels (8) and in the steps (40) with the interposition of a binding agent, such as a resin.

2. Prefabricated structure (4) according to claim 1, wherein said panels (8) are bound to each other at the top, on contact arranging and mechanically assembling a rim (16) of a top extremity (20') of a first panel (8') with an inner lateral portion (24) of a top extremity (20'') of a second panel (8''), said inner lateral portion (24) facing the elevator shaft (12).

3. Prefabricated structure (4) according to claim 2, wherein said top extremities (20', 20'') of the panels (8', 8'') are mechanically joined to each other by the direct interposition of plugs (28) and/or screws (32).

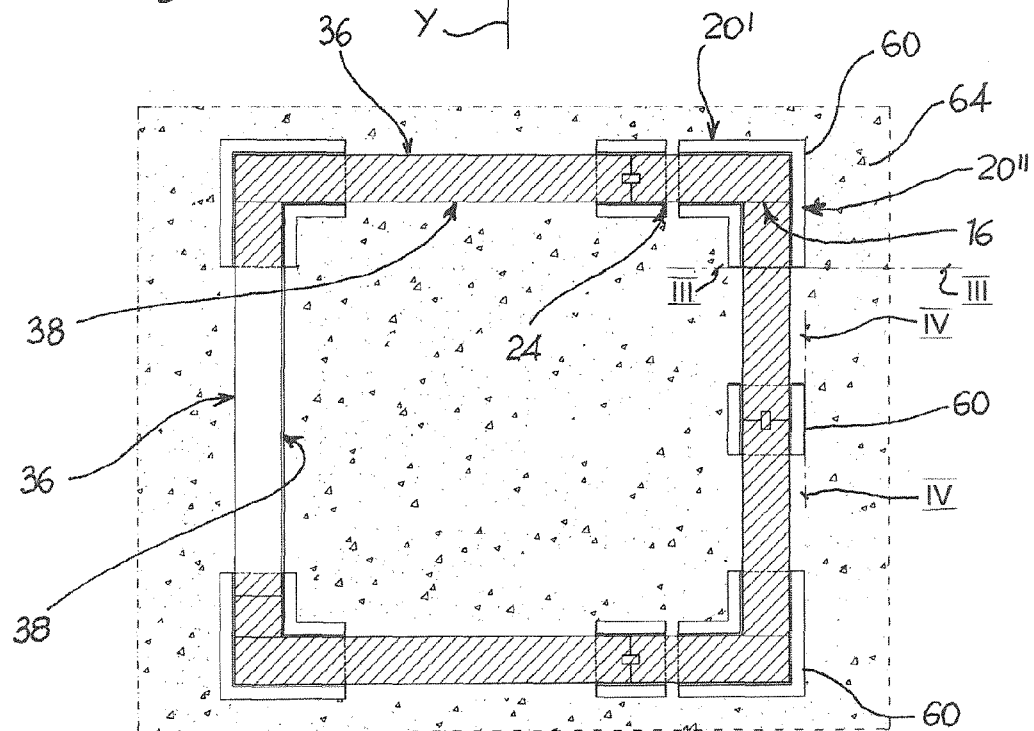
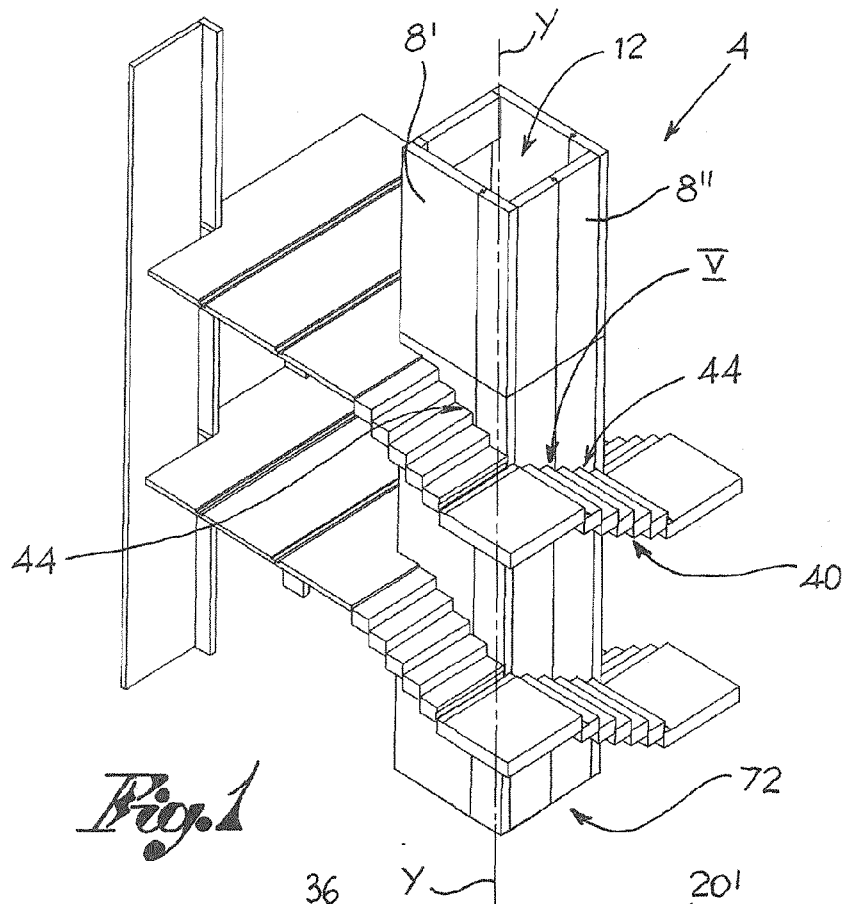
4. Prefabricated structure (4) according to claim 3, wherein the top extremities (20', 20'') of the panels (8', 8'') are mechanically joined to each other by the alternate interposition, along the main vertical axis (Y-Y), of plugs (28) and screws (32).

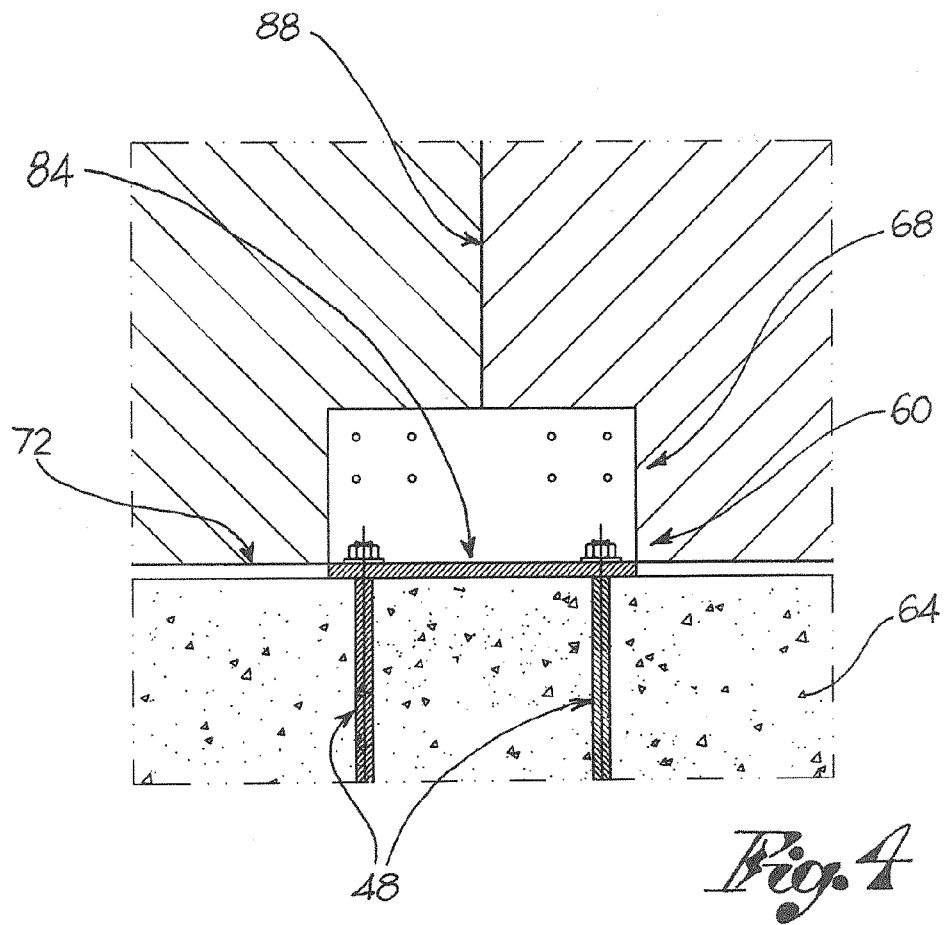
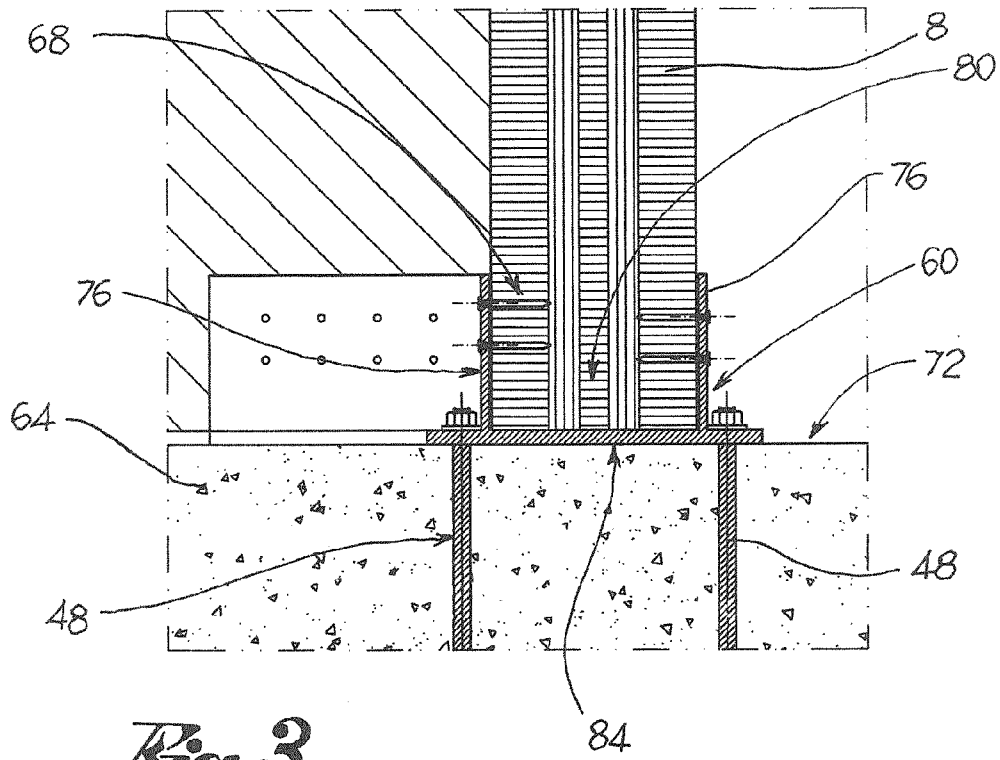
5. Prefabricated structure (4) according to claim 3 or 4, wherein the plugs (28) are sunk into the panels (8) with the interposition of a binding agent, such as a resin.

6. Prefabricated structure (4) according to any of the preceding claims, wherein between the first attachment extremity (44) of the steps (40) and the relative panel (8) there is a support plate (52) in neoprene.

7. Prefabricated structure (4) according to any of the previous claims, comprising joints (60) for the anchorage of the structure (4) to a foundation (64), the joints (60) being positioned at a lower extremity (68) of the panels (8), at the base (72) of the elevator shaft (12) to the foundation (64). 5
8. Prefabricated structure (4) according to claim 7, wherein said joints (60) comprise a pair of plates (76) separated by a cavity (80) which houses the lower extremity (68) of the panels (8), said plates (76) being mechanically connected to the panels (8) by threaded connection devices (48). 10
9. Prefabricated structure (4) according to claim 8, wherein said joints (60) comprise a rabbet (84) which connects the plates to each other (76) and which comprises threaded connection devices (48) on the side of each plate (76), to bind the joint (60) to the foundation (64), both from the inside (38) and from the outside (36) of the elevator shaft (12). 15 20
10. Prefabricated structure (4) according to claim 8 or 9, wherein said joints (60) are positioned astride joints (88) between two adjacent panels (8', 8''), so that the plates (76) connect the adjacent panels (8', 8'') to each other by means of threaded connection devices (48), at the lower extremities (68) of said panels. 25
11. Method of assembling a prefabricated structure (4) according to any of the claims from 1 to 10, comprising the phases of: 30
 - assembling and mechanically joining panels (8) to each other to form a self-supporting, closed, hollow structure which defines an elevator shaft (12) of a tubular shape with a main extension axis (Y-Y), 35
 - joining to the outer side (36) of the panels (8) at least one step (40), firmly anchored to them at a first attachment extremity (44), for the creation of stairs joined externally to the elevator shaft (12), 40
 - providing a lower extremity (68) of the panels (8) with joints (60) for the anchorage of the prefabricated structure (4) to a foundation (64) of a building, 45
 - lowering the prefabricated structure (4) from above into the area chosen for the elevator shaft,
 - anchoring the joints (60) of the panels (8) to the foundations (64) of the elevator shaft (12). 50

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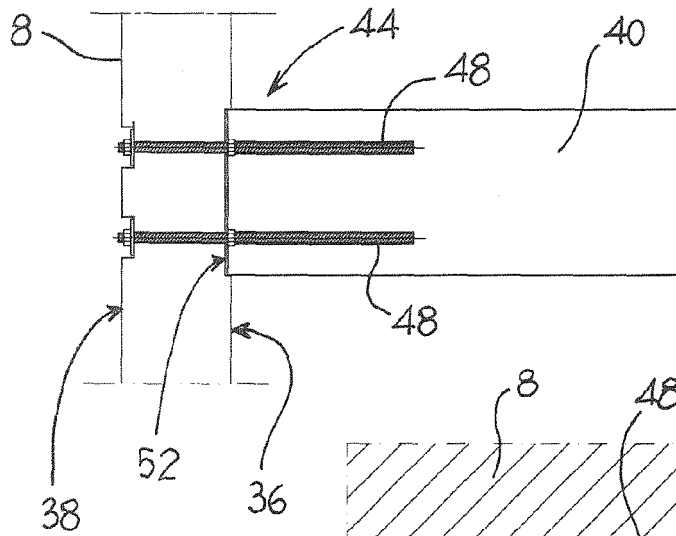


Fig. 5a

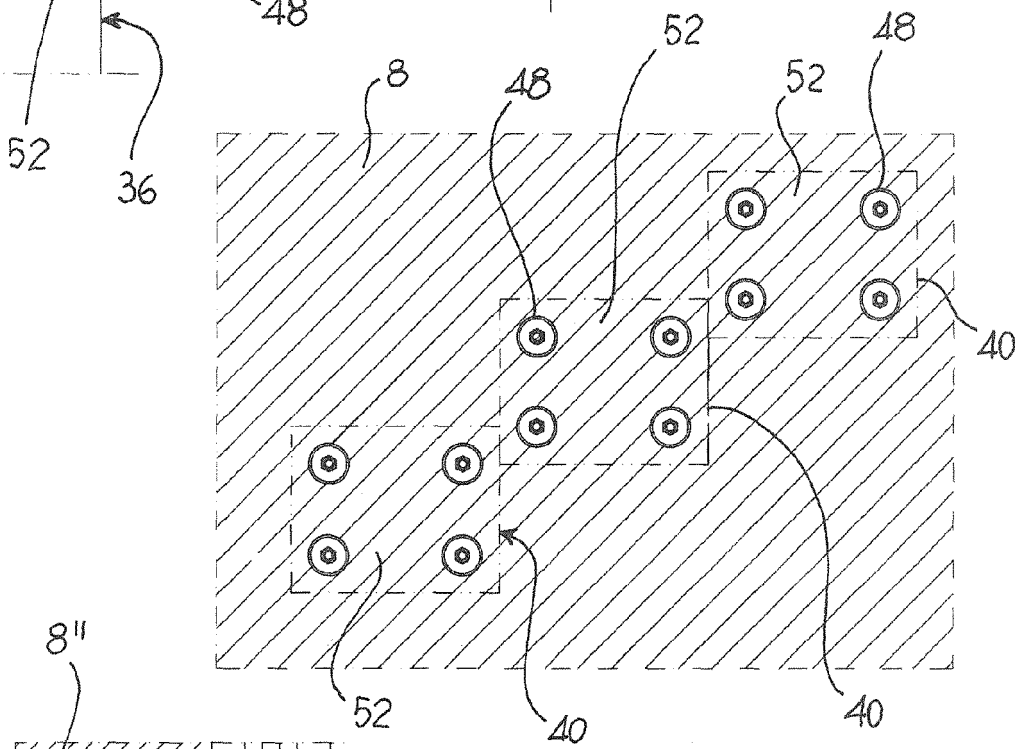


Fig. 5b

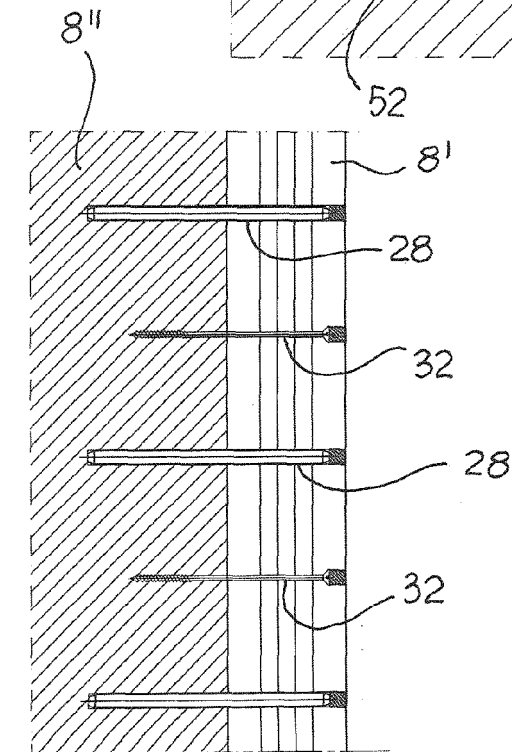
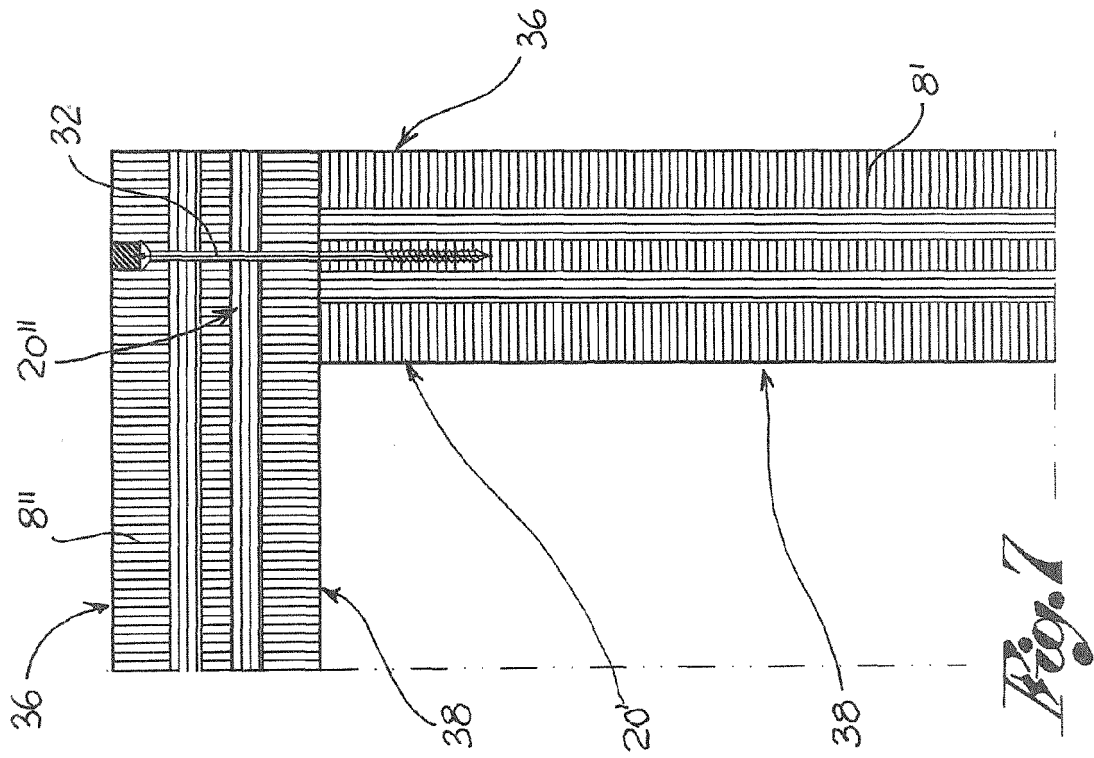
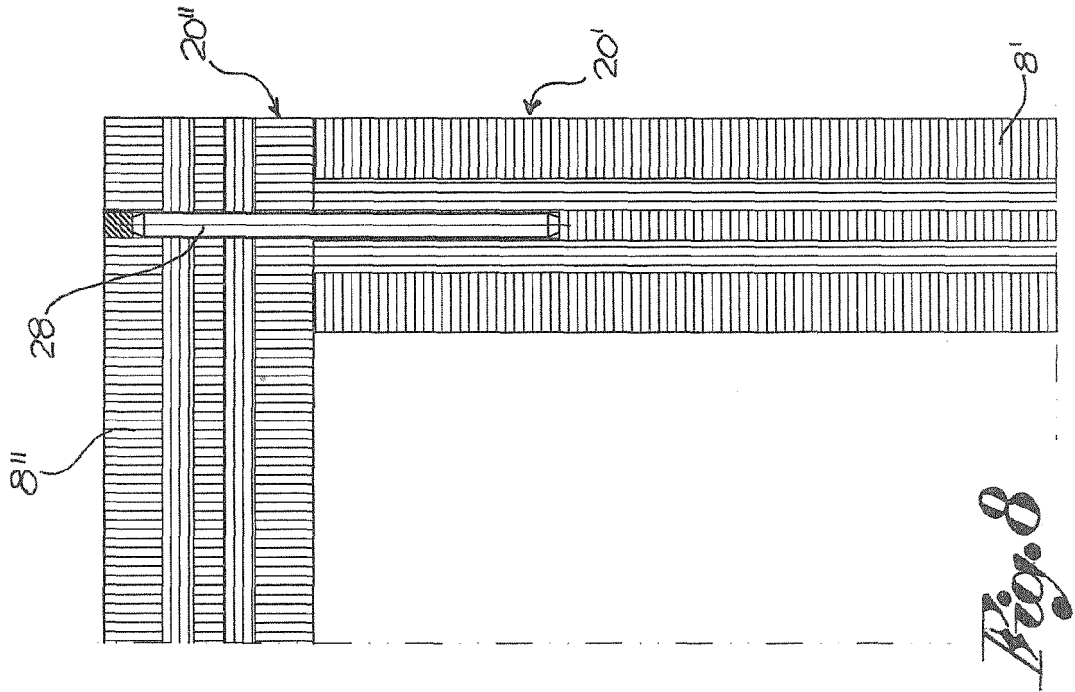


Fig. 6





EUROPEAN SEARCH REPORT

Application Number
EP 10 17 1446

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 22 10 631 A1 (HAUSHAHN FA C) 20 September 1973 (1973-09-20) * page 2, line 3 - line 18; figure 3 * -----	1-5,7-11	INV. E04F11/022 E04F17/00
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			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		18 May 2011	Severens, Gert
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 10 17 1446

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18-05-2011

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DE 1940921	A1	13-05-1971	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82