



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**12.05.2010 Bulletin 2010/19**

(51) Int Cl.:  
**E04F 11/022<sup>(2006.01)</sup> E04F 11/025<sup>(2006.01)</sup>**

(21) Application number: **09175602.3**

(22) Date of filing: **10.11.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
Designated Extension States:  
**AL BA RS**

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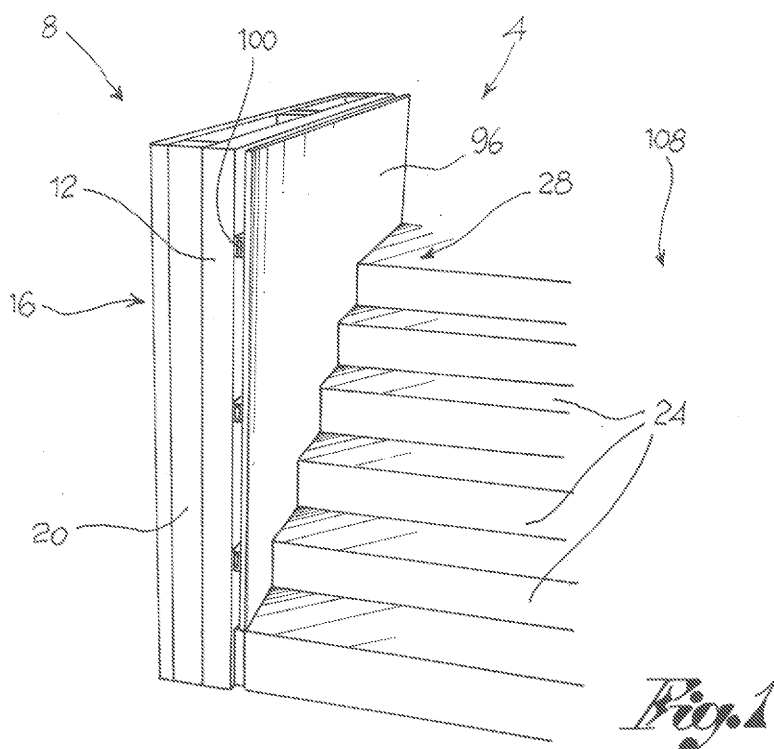
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(30) Priority: **10.11.2008 IT BS20080203**

(54) **Prefabricated structure for stairwells, lifts, goods lifts and similar, and assembly method of a prefabricated structure**

(57) A prefabricated structure (4) for stairwells, lifts, goods lifts and similar, comprising at least one prefabricated panel (8) having an inner layer (12) which faces the inside of the structure (4) and an outer layer (16), opposite said inner layer (12) and having at least one step (24) joined to the inner layer (12) of the panel at a first extremity (28) of the step (24). Advantageously, an attachment interface (32) is positioned between the inner

layer (12) of the panel (8) and the first extremity (28) of the step (24) which is mechanically separate from the panel (8) and from the step (24) and which comprises first means of attachment (36) of the interface (32) to the panel (8) and second means of attachment (40) of the interface (32) to the step (24). The step (24) can be attached to the panel (8) on site, during assembly of the structure, without the use of scaffolding.



## Description

**[0001]** The present invention relates to a prefabricated structure for stairwells, lifts, goods lifts and similar and an assembly method of said prefabricated structure.

**[0002]** The prefabricated structures of the known art, especially the structures for making stairwells and similar, foresee the production of panels of various types which are positioned along the perimeter of the well and, subsequently, the application of the stairs. The realisation of the stairs proves rather expensive and slow on account of the fact that scaffolding needs to be used and the available space is quite small.

**[0003]** As a result, the state of the art solutions have a number of drawbacks in terms of production costs and times.

**[0004]** The purpose of the present invention is to resolve the drawbacks mentioned with reference to the known technique.

**[0005]** Such drawbacks and limitations are resolved by a prefabricated structure according to claim 1 and by an assembly method according to claim 13.

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

**[0007]** Further characteristics and advantages of the present invention will be more evident from the description below of its preferred embodiments, made by way of example and not limited to such, wherein

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

**[0009]** figure 2 shows a perspective view, in separate parts, of a detail in figure 1;

**[0010]** figure 3 shows a perspective view, partially in cross-section, of a detail in figure 1;

**[0011]** figure 4 shows a cross-section view of the detail in figure 2, in separate parts;

**[0012]** figure 5 shows a cross-section view of the detail in figure 3, in an assembled configuration.

**[0013]** The elements or parts of elements in common to the embodiments described will be indicated using the same reference numerals.

**[0014]** With reference to the aforesaid figures, reference numeral 4 globally denotes a prefabricated structure, preferably for stairwells, lifts, goods lifts and similar.

**[0015]** The structure 4 comprises at least one prefabricated panel 8 having an inner layer 12, which faces the inside of the structure 4 and an outer layer 16, opposite said inner layer 12.

**[0016]** Preferably, the prefabricated panel 8 is of the multilayer type and the inner and outer layers 12, 16 of the panel comprise concrete; in addition, preferably between them, there is an intermediate layer 20 comprising for example wood and/or material for heat and noise insulation.

**[0017]** The structure 4 comprises at least one step 24 joined to the inner layer 12 of said panel 8 at a first ex-

tremity 28 of the step 24.

**[0018]** Advantageously, an attachment interface 32 is positioned between the inner layer 12 of the panel 8 and the first extremity 28 of the step 24. Such attachment interface 32 being mechanically separate from the panel 8 and from the step 24 and comprising first means of attachment 36 of the interface 32 to the panel 8 and second means of attachment 40 of the interface 32 to the step 24, so as to permit the attachment of the step 24 to the panel 8 on site, during assembly of the structure 4.

**[0019]** Preferably, the first means of attachment 36 are detachable means of attachment which form a threaded coupling between the attachment interface 32 and the panel 8.

**[0020]** According to one embodiment the attachment interface 32 comprises at least one cavity 44 able to accommodate at least one of the first and second means of attachment 36, 40. Such cavity 44 is advantageously externally accessible following assembly of the step 24 to the panel 8 so as to enable on site tightening of the means of attachment 36, 40.

**[0021]** According to one embodiment, the attachment interface 32 is joined to the second means of attachment 40.

**[0022]** For example, the second means of attachment 40 comprises at least one pin 48 inserted in the step 24 at said first extremity 28 by means of a forced coupling.

**[0023]** According to one possible embodiment, the pin 48 is inserted in a seat 52 lodged in the first extremity 28 of the step 24 and is fixed to this by means of an interposed binder, such as a resin.

**[0024]** According to one embodiment, the first means of attachment 36 comprises at least one bar 56, partially embedded in the panel 8 and having an attachment extremity 60 able to be blocked to said attachment interface 32.

**[0025]** Preferably, the attachment interface 32 comprises at least one attachment hole 64 able to allow the passage of the attachment extremity 60.

**[0026]** For example, the attachment extremity 60 is threaded to allow attachment to the interface 32 by means of threaded connection devices; in addition the attachment hole 64 houses the threaded extremity 60 of the bar 56 and the first means of attachment 36 comprises at least one nut or bolt 68 which fixes the threaded extremity 60 of the bar 56 to the interface 32.

**[0027]** Preferably, the nut or bolt 68 is accessible from the outside of the attachment interface 32 for the attachment on site of the step 24.

**[0028]** According to a preferred embodiment, the first means of attachment 36 is partially embedded in the inner layer 12 of the panel 8.

**[0029]** For example, the first means of attachment 36 comprises a portion bent into a 'U' 72 embedded in the panel 8 and fitted with two branches 76 having attachment extremities 60 which protrude from the inner layer 12 of the panel 8 and enter the attachment interface 32.

**[0030]** According to one embodiment, the first means

of attachment 36 comprises at least one abutment plate 80 interposed between the inner layer 12 of the panel 8 and the attachment interface 32, the sheet being traversed by the attachment extremities 60 through respective apertures 84.

**[0031]** Preferably, the abutment plate 80 is embedded in the inner layer 12 of the panel 8.

**[0032]** According to one embodiment, between the abutment plate 80 and the attachment interface 32 there is a sound-absorbent and/or sound-insulation pad 86, so to insulate the panel 8 acoustically from the steps 24. For example the pad 86 is counter-shaped to the abutment plate 80 and receives the attachment interface 32 in abutment.

**[0033]** Preferably, at the point of the first extremity 28 of each step 24, pairs of interface attachments are fitted 32 alongside one another.

**[0034]** The attachment interfaces 32 preferably have a tubular structure which defines a cavity 44 open at the point of the upper 88 and lower extremities 92.

**[0035]** Preferably, each panel 8, comprises an abutment plate 80 counter-shaped to the associated steps 24, made in one piece and embedded in the inner layer 12 of the panel 8.

**[0036]** According to one embodiment, the structure 4 comprises at least one cover panel 96 positioned so as to cover the inner layer 12 of the panel 8. The cover panel 96 is for example in plasterboard; preferably the cover panel 96 is laid on and attached to spacers 100 so as to form a cavity 104 with the inner layer 12.

**[0037]** The cavity 104 is able to allow the passage of cables and installations of various types through the prefabricated structure 4.

**[0038]** The cover panel 96 is preferably positioned flush with the attachment interface 32 at the point of the second means of attachment 40, so as to completely conceal the attachment interface 32 of the step 24.

**[0039]** The prefabricated structure 4 according to the invention may comprise panels 8 counterpoised with each other between which the steps 24 are positioned. In other words the steps 24, at the point of a second extremity 108, opposite the first extremity 28, are fixed to a second panel 8 by means of a second attachment interface 32 fixed to the second panel 8 and to the second extremity by means of the first and second means of attachment 36, 40 respectively.

**[0040]** The method of production and assembly of a prefabricated structure 4 according to the present invention will now be described.

**[0041]** In particular, the method comprises the phases of joining an attachment interface 32 to at least a first extremity 28 of a step 24, positioning the step 24 with the relative interface 32 alongside a panel 8 of a wall, at the point of a lower extremity of the panel 8, inserting the first means of attachment 36 in special attachment holes 64 of the interface 32.

**[0042]** The first means of attachment 36 is then tightened through the cavity 44 of the attachment interface

32, for example, by inserting a wrench from the side of the lower and/or upper extremity 88, 92 of the interface 32.

**[0043]** According to one embodiment the panel is pre-assembled on site so as to perform setting by casting of the first means of attachment 36 and of the abutment plates 80.

**[0044]** Preferably, the attachment interface 32 is pre-assembled by inserting the pins 48 in the relative seats; such insertion may be by press fit, that is by a forced coupling or with play. Should insertion be with play, the phase of pouring in a binding agent, preferably a resin, is foreseen, so as to cement the attachment interface 32 to the step 24.

**[0045]** The assembly method comprises the phase of attaching one step 24 at a time to the panels 8 starting from the lower step to the upper step, using the already assembled lower step as a support for the operator without any need for scaffolding.

**[0046]** After completing the assembly phase of the steps the method comprises the phase of joining the cover panel 96 to the prefabricated panels 8 so as to conceal the inner layer 12 and form a cavity 104 between the cover panel 96 and the inner layer 12 for the passage of cables and installations.

**[0047]** As may be appreciated from the description, the present invention makes it possible to overcome the drawbacks of the known technique.

**[0048]** Specifically, the building of the stairs proves fast and economical.

**[0049]** In fact assembly does not require any scaffolding to be put up since the steps can be assembled directly to the panel starting from the bottom and rapidly continuing upwards.

**[0050]** In addition, the operator can use the wall attachment systems to anchor himself by means of personal protective equipment. For example the operator may attach a harness to the means of attachment positioned on the panels.

**[0051]** The absence of scaffolding entails a considerable saving in time and money given that the available space in a stairwell is limited and therefore the erection of scaffolding is particularly expensive and complicated.

**[0052]** In addition, the use of a cover panel makes it possible to lay the various installations, such as the electrical wiring, without having to cut or break the inner layer of the panels in any way.

**[0053]** In fact the installations can be laid directly on the inner layer of the panels, without having to make any chases in the cement, and then everything is covered by a cover panel which also acts as further heat and noise insulation of the stair well.

**[0054]** In addition the stairwell structure can be advantageously insulated in terms of heat and noise thanks also to the use of multilayer panels in which the central layer, included between the inner and outer layer, forms a heat and/or noise shield.

**[0055]** A person skilled in the art may make numerous

modifications and variations to the structure 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 stairwells, lifts, goods lifts and similar, comprising

- at least one prefabricated panel (8) having an inner layer (12), which faces the inside of the structure (4) and an outer layer (16), opposite said inner layer (12),
- at least one step (24) joined to the inner layer (12) of said panel (8) at a first extremity (28) of the step (24),
- wherein an attachment interface (32) is positioned between the inner layer (12) of the panel (8) and the first extremity (28) of the step (24), said attachment interface (32) being mechanically separate from the panel (8) and from the step (24) and comprising first means of attachment (36) of the interface (32) to the panel (8) and second means of attachment (40) of the interface (32) to the step (24), so as to permit the attachment of the step (24) to the panel (8) on site, during assembly of the structure (4),

### characterised in that

said attachment interface (32) comprises at least one cavity (44) able to accommodate at least one of the first and second means of attachment (36,40) and is externally accessible following assembly of the step (24) to the panel (8) so as to enable on site tightening of the means of attachment (36,40), the attachment interfaces (32) having a tubular structure which defines a cavity (44) open at the point of the upper (88) or lower extremities (92) to enable on site tightening of the means of attachment (36,40).

2. Prefabricated structure (4) according to claim 1, wherein said first means of attachment (36) are detachable means of attachment which form a threaded coupling between the attachment interface (32) and the panel (8).
3. Prefabricated structure (4) according to claim 1 or 2, wherein the attachment interface (32) is joined to the second means of attachment (40).
4. Prefabricated structure (4) according to any of the previous claims, wherein said second means of attachment (40) comprise at least one pin (48) inserted in the step (24) at said first extremity (28) by means of a forced coupling.

5. Prefabricated structure (4) according to claim 4, wherein said pin (48) is inserted in a seat (52) lodged in the first extremity (28) of the step (24) and is fixed to this by means of an interposed binder, such as a resin.

6. Prefabricated structure (4) according to any of the previous claims, wherein the first means of attachment (36) comprise at least one bar (56), partially embedded in the panel (8) and having an attachment extremity (60) able to be blocked to said attachment interface (32) by means of threaded connection devices.

7. Prefabricated structure (4) according to claim 6, wherein the interface comprises at least one attachment hole (64) which accommodates the threaded attachment extremity (60) of the bar (56) and the first means of attachment (36) comprise at least one nut or bolt (68) which fixes the threaded attachment extremity (60) to the interface (32).

8. Prefabricated structure (4) according to any of the previous claims, wherein the first means of attachment (36) comprise a portion bent into a 'U' (72) embedded in the panel (8) and fitted with two branches (76) having attachment extremities (60) which protrude from the inner layer (12) of the panel (8) and go into the attachment interface (32).

9. Prefabricated structure (4) according to any of the previous claims, wherein the first means of attachment (36) comprise at least one abutment plate (80) interposed between the inner layer (12) of the panel (8) and the attachment interface (32) and crossed by the attachment extremities (60) through relative openings (84).

10. Prefabricated structure (4) according to claim 9, wherein a sound-absorbent and/or sound-insulation pad (86) is placed between the abutment plate (80) and the attachment interface (32), so to insulate the panel (8) acoustically from the steps (24).

11. Prefabricated structure (4) according to any of the previous claims, comprising at least one cover panel (96) positioned so as to cover the inner layer (12) of the panel (8), the cover panel (96) being laid on spacers (100) so as to form a cavity (104) with the inner layer (12).

12. Prefabricated structure (4) according to any of the previous claims, wherein said inner (12) and outer layers (16) of the panel (8) comprise concrete and between them there is an intermediate layer (20) comprising wood and/or material for thermal and acoustic insulation.

- 13.** Method of assembly of a prefabricated structure (4) according to any of the claims from 1 to 12, comprising the phases of:

- joining an attachment interface (32) to at least a first extremity (28) of a step (24),
- positioning the step (24) with the relative interface (32) alongside a panel (8) of a wall, at the point of a lower extremity of the panel, inserting the first means of attachment (36) in special attachment holes (64) of the interface (32),
- tightening the first means of attachment (36) through the cavity (44) of the attachment interface (32).

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- 14.** Method of assembly according to claim 13, comprising the phase of attaching steps (24) to the panels (8) one at a time starting from the lower step to the upper step, using the already assembled lower step as a support for the operator without any need for scaffolding.

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- 15.** Method of assembly according to claim 13 or 14, comprising the phases of joining a cover panel (96) to the panels (8) so as to conceal the inner layer (12) and form a cavity (104) between the cover panel (96) and the inner layer (12) for the passage of cables and installations.

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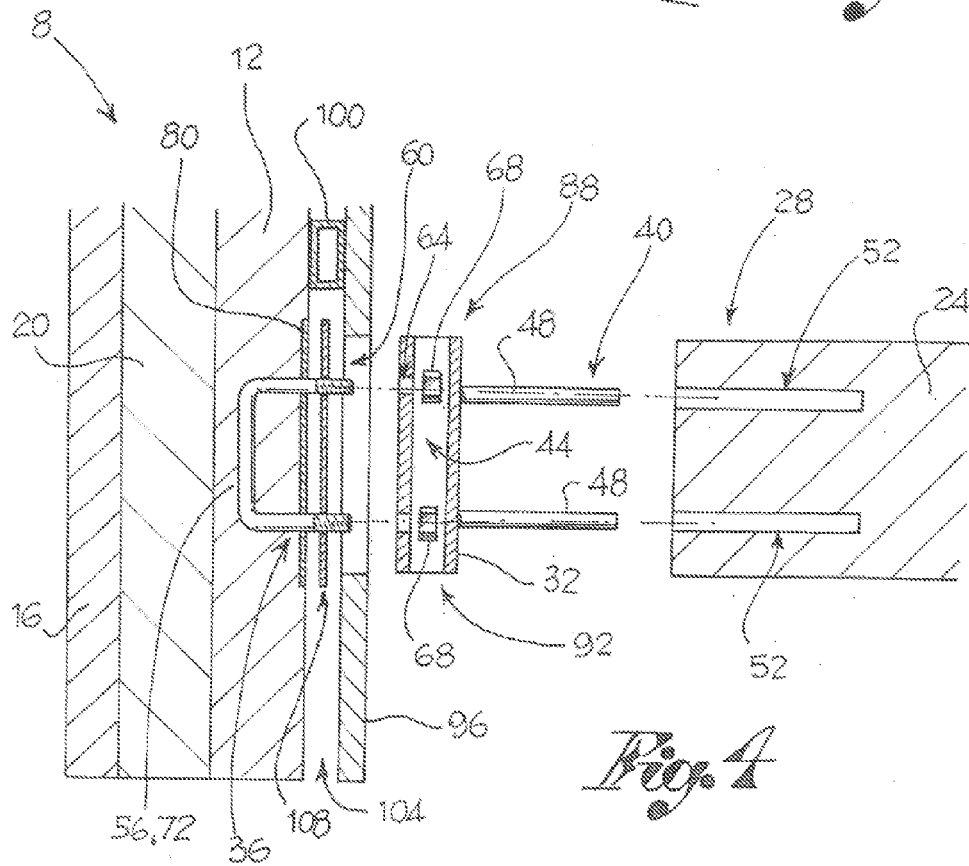
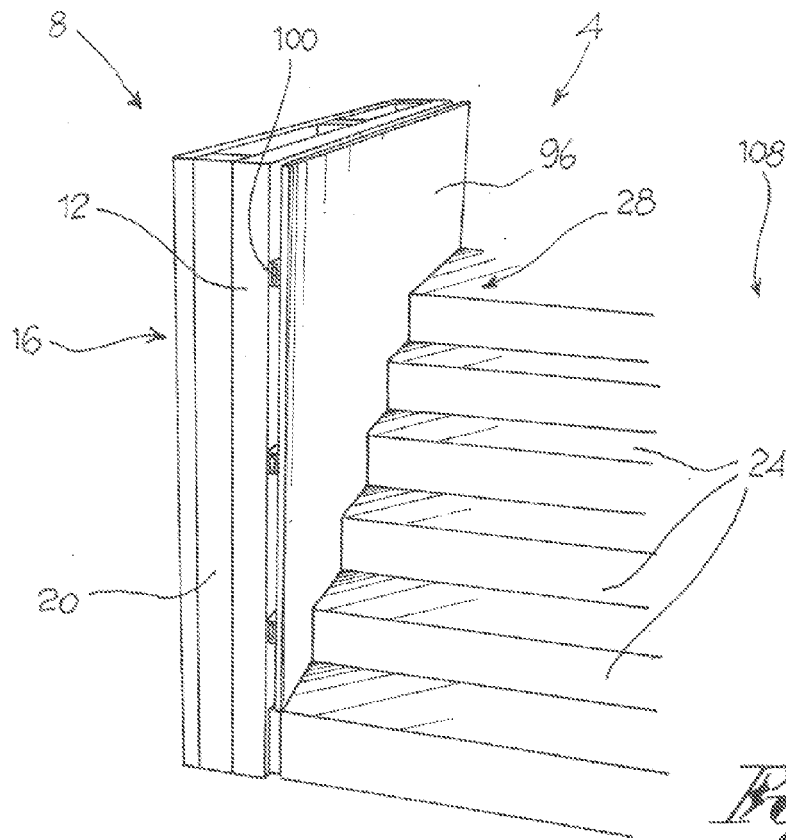
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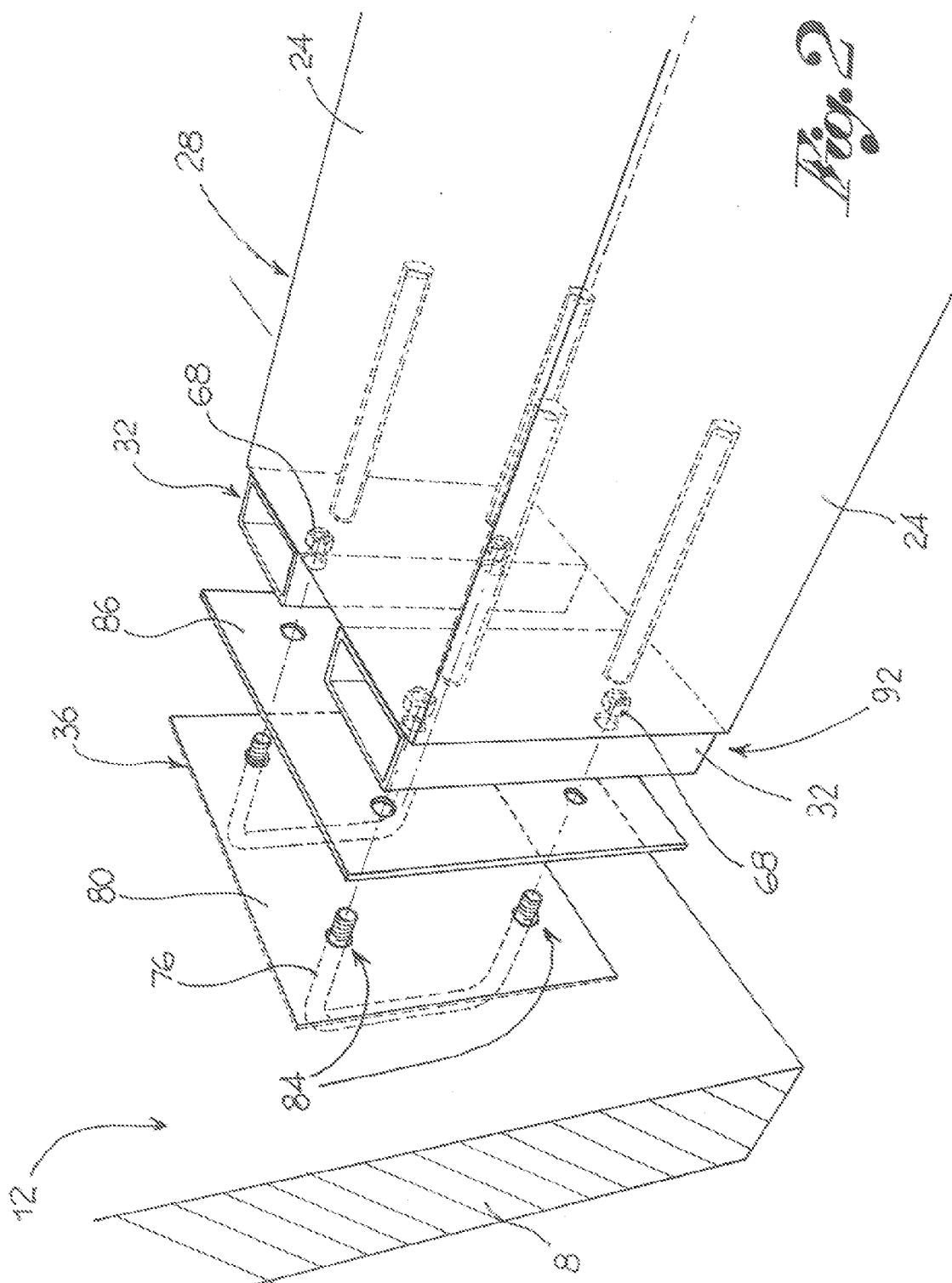
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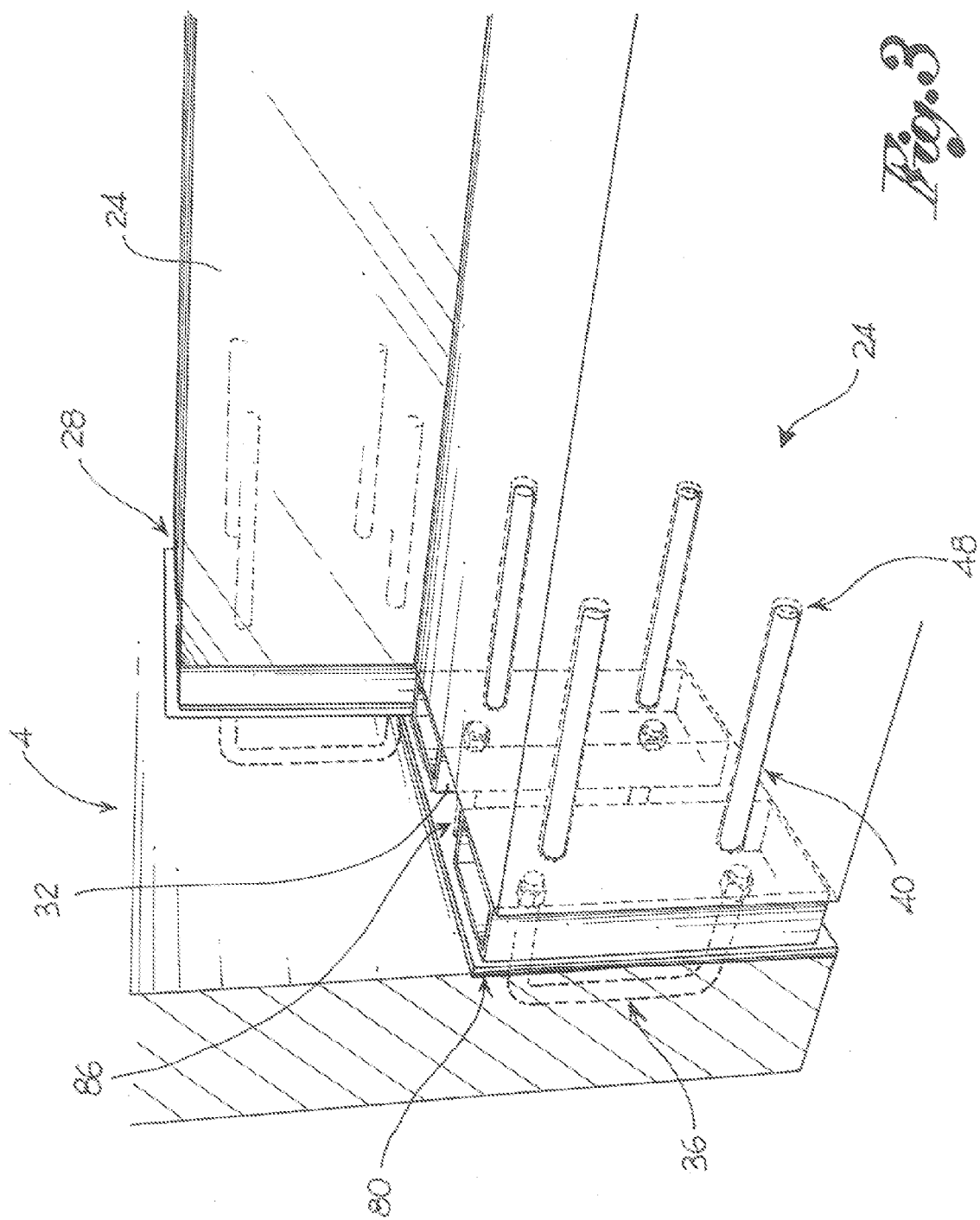
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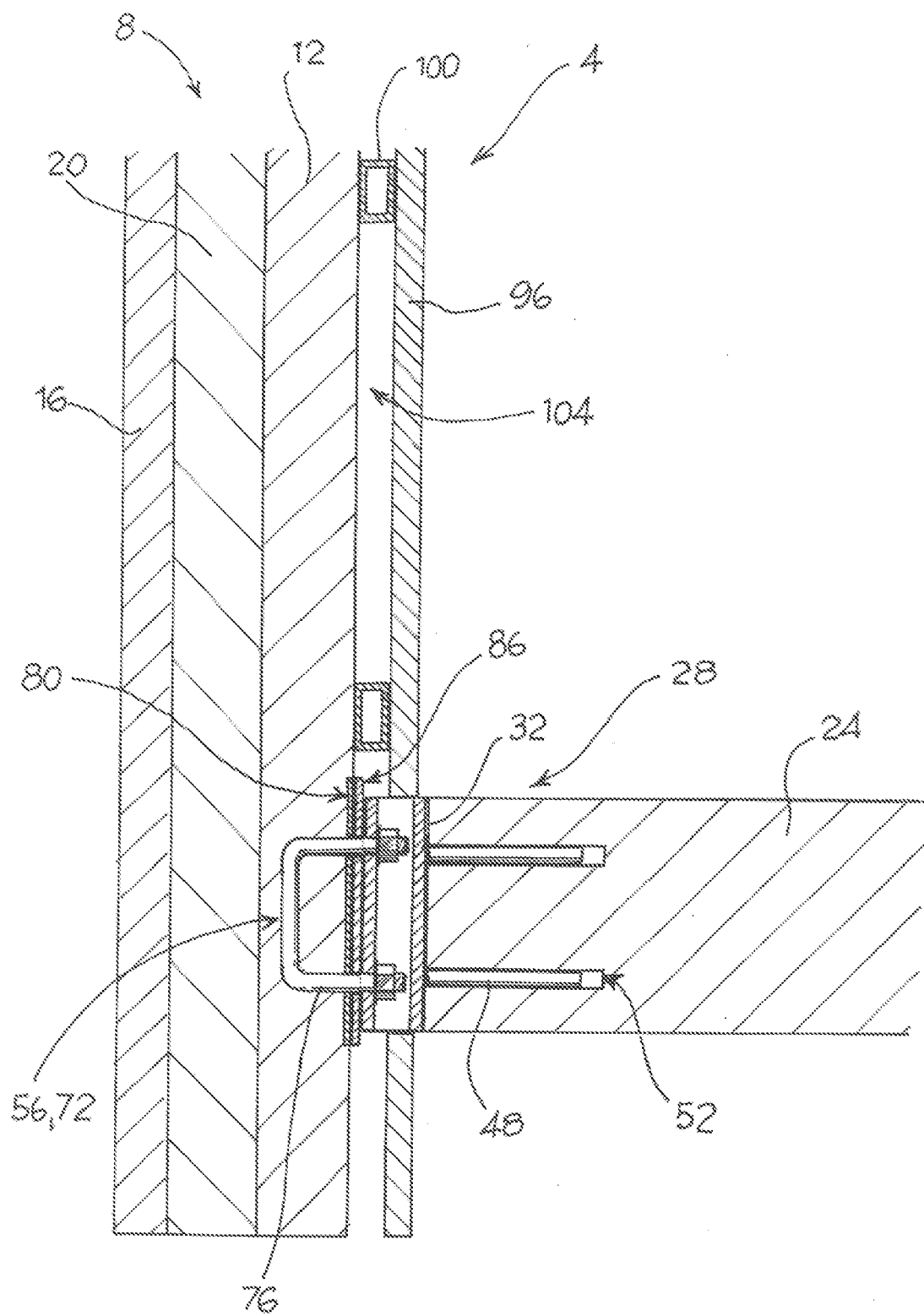
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*Fig. 5*



## EUROPEAN SEARCH REPORT

Application Number  
EP 09 17 5602

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 844 537 A (TUBESCA [FR]) 19 March 2004 (2004-03-19) * page 3, line 7 - page 4, line 4; figures 1-3 *	1,13	INV. E04F11/022 E04F11/025
A	DE 44 44 485 A1 (SOLTENDIECK HENNING [DE]) SOLTENDIECK [DE] 27 June 1996 (1996-06-27) * column 2, line 36 - column 3, line 19; figures 2-4 *	1,13	
A	DE 19 30 677 A1 (ANDERNACH ANTON) 14 January 1971 (1971-01-14) * the whole document *		
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 January 2010	Examiner Bastian, Almut
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 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 17 5602

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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08-01-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2844537	A	19-03-2004	NONE	
DE 4444485	A1	27-06-1996	NONE	
DE 1930677	A1	14-01-1971	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82