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(11)

EP 1 389 664 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.02.2004 Bulletin 2004/08

(51) Int Cl.7: **E06B 3/48**, E06B 5/16,
E06B 9/165

(21) Application number: **03077409.5**

(22) Date of filing: **01.08.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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(30) Priority: **14.08.2002 BE 200200487**

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(54) Partition wall

(57) Partition wall of the type which is composed as an articulated wall (1), consisting of horizontally oriented panels (2) which are coupled together, characterised in that these panels (2) comprise at least two metal wall

parts, respectively first wall parts (9) and second wall parts (10), which are situated at a distance of each other, which wall parts (9-10) are thus fastened that they can expand independently, or mainly independently anyhow from each other in case of temperature differences.

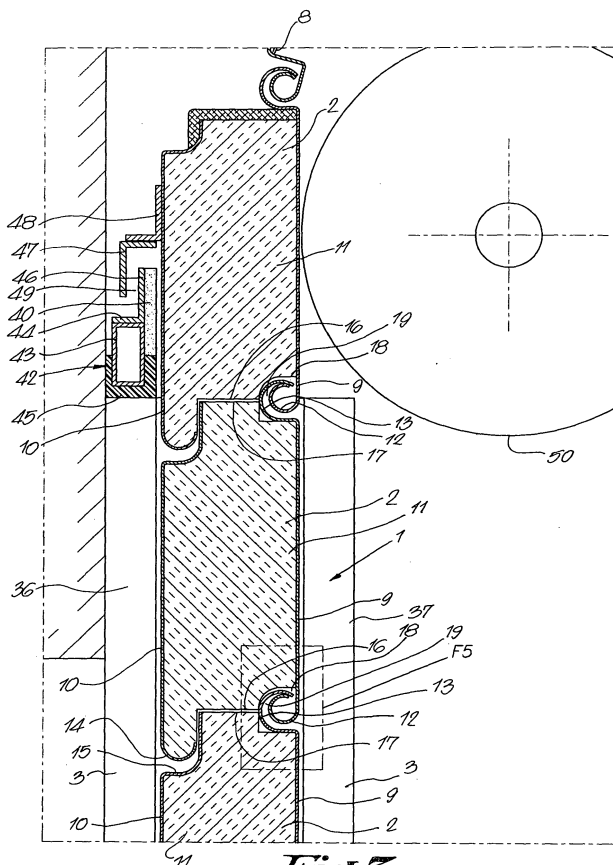


Fig. 3

EP 1 389 664 A1

Description

[0001] The current invention concerns a partition wall of the type that is composed as an articulated wall, consisting of two horizontally oriented panels coupled together.

[0002] The invention in particular concerns partition walls which are meant to form a secure fire resistant or fire inhibiting partition between the seat of the fire on one side of the wall and the space on the other side of the wall.

[0003] The invention aims in the first place a partition wall executed as sectional gate, roll-down shutter, rolling gate or the like, that can be used as such, however more in general the invention concerns fixed partition walls.

[0004] In the known partition walls of the above-mentioned type, the panels are formed by hollow metal, whether or not compound, profiles in which an insulating fire-resistant material has been inserted.

[0005] A disadvantage of these known partition walls is that in case of fire the panels of the partition wall can fairly warp as a result of the various expansions of the metal wall parts of the panels on one and the other side of the partition wall, this due to the large temperature differences between these two sides of the partition wall.

[0006] Moreover, in case of fire the panels are more warped at the top of these known partition walls than the panels at the bottom, this due to the fact that the temperatures at the fire side of the partition wall are higher than those at the bottom.

[0007] The warping of the panels causes cracks between these panels, as well as at the edges of the partition wall, due to which the flames can spread from one side of the partition wall to the other side and due to which the seat of the fire can draw in fresh oxygen through these cracks, due to which the fire is maintained.

[0008] It also occurs that gases accumulate and explode in case of further temperature increase.

[0009] It is also known that in the existing partition walls the panels are coupled together by means of traditional hinges which do not allow for any lateral movement between the panels which are coupled together, due to which in case of fire, the differential lateral expansion between these panels is counteracted and the panels subsequently warp further and hence the above-mentioned disadvantages are even stronger.

[0010] A further disadvantage of the known partition walls is that possible poisonous vapours and gases which are caused due to the heating of the insulating material remain on the site, so that they form a possible danger for emergency services and bystanders.

[0011] The current invention aims a solution for the above-mentioned and other disadvantages.

[0012] To this end the invention concerns a partition wall of the above-mentioned type which is composed as an articulated wall consisting of horizontally oriented

panels which are coupled together, characterised in that these panels comprise at least two metal wall parts, respectively first and second wall parts, which are situated at a distance of each other, which wall parts are thus fastened that they can expand independently, or mainly independently anyhow, from each other in case of temperature differences.

[0013] An advantage of such partition wall according to the invention is that, due to the fact that the metal wall parts can expand independently from each other in case of heating, the panels do not warp, due to which the panels always join together well and hence form a solid wall, which in case of fire prevents that the flames spread from one side of the partition wall to the other side, and furthermore cut off the room in which the fire burns relatively air-tight, smoke-tight and gas-tight, in order to prevent that the seat of the fire might be fanned by a supply of fresh air.

[0014] Preferably the above-mentioned panels are coupled together by means of beads, due to which coupled panels can expand in lateral direction independently from each other, so that in case of fire the panels remain absolutely straight.

[0015] According to a preferred embodiment, these beads are executed as horizontal outlet channels for vapours and gases from the panels, whereby these outlet channels are preferably, at least in case of a certain heating, closed towards the outside of the wall, formed by the first wall parts.

[0016] This has the advantage that possible poisonous vapours and gases, caused by the heating of insulating material that might be present in the panels, can be discharged sideways, so that these vapours and gases form a lesser danger for the emergency services and bystanders, and moreover an accumulation of gases in the panels, causing the latter to be separated, is prevented.

[0017] In order to better explain the characteristics of the invention, the following preferred embodiments of a partition wall according to the invention are described as an example without being limitative in any way, with reference to the accompanying drawings, in which

Figure 1 is a schematic and perspective view of a partition wall according to the invention, which is executed in the form of a sectional gate;

Figure 2 is a cross-sectional view according to line II-II in figure 1;

Figures 3 and 4 are on a larger scale views of the parts, indicated by F3 and F4 in figure 2;

Figures 5 to 8 are on an even larger scale views of the part, indicated by F5 in figure 3 and this for various positions;

Figure 9 is a cross-sectional view according to the line IX-IX in figure 1;

Figure 10 and 11 are cross-sectional views, respectively according to lines X-X and XI-XI in figure 9;

Figure 12 is a cross-sectional view as in figure 9,

however for a variant;

Figure 13 is a schematic view of a number of possibilities to lift a sectional gate according to the invention.

[0018] The figures 1 to 11 show a partition wall according to the invention which is composed of an articulated wall 1 consisting of horizontally oriented panels 2 which are coupled together and which are with their ends slidably fixed in two vertical guides 3.

[0019] At the top, the partition wall is provided with a cabinet 4 in which is installed a known drive 5 which is further not discussed in detail, but which is in this specific case mainly executed as a roll-up mechanism 6 that is connected by means of a laminated chain 7 or any other way to the upper panel 2 of the articulated wall 1, whereby in the chain 7 or in the drive, a fuse switch 8 or any other disconnecting means is provided.

[0020] The panels 2 are composed of two metal wall parts, respectively a first wall part 9 and a second wall part 10, which are provided at a distance of each other and in between which is applied an insulating material, more particularly an insulating, preferably rigid, filling 11 from an inflammable material.

[0021] This filling 11 and the surrounding wall parts 9 and 10 are preferably connected to each other by gluing, or any other means. The insulating material and the connection with the wall parts 9-10 is hereby thus executed that the wall parts can, mainly independently from each other, still expand at temperature differences, either because the insulating material is or becomes supple when heated, or because the connection allows for a movement, or because this connection is in itself easily disconnectable at the slightest expansion differences.

[0022] The wall parts 9 at one side of the partition wall are each formed of a plate-like body, the lower edge of which is folded back inwardly of the said panel 2, in order to form a mainly circular bead 12 seen in cross-section, while the upper edge is folded back inwardly of the said panel 2 in order to form mainly a C-formed bead 13, the opening of which is seen in cross-section, oriented outwardly of the panel 2.

[0023] The panels 2 are among themselves coupled by means of the above-mentioned beads 12-13, whereby the beads 12 with a vertical play A are set in the beads 13.

[0024] At the side of the wall parts 10 each panel 2 is provided with a lip 14 that is oriented downwards, and a notch 15, the form and size of which are thus that the lip 14 of a panel 2 can interact with the notch 15 of an underlying panel 2 coupled thereto.

[0025] In the illustrated example, the wall parts 10 are each formed of a plate-like body, whereby the above-mentioned lip 14 and groove 15 of the said panel 2 are formed by profiling of respectively the lower and upper edge of the wall part 10.

[0026] The filling 11 is provided with two horizontal surfaces, respectively 16 and 17, whereby in the lower

surface 16 at the bead 12 is provided a notch 18, so that in between this bead 12 and filling 11, there is a space 19, in which the upper bead 13 of an underlying panel 2 fits, preferably with a vertical play B in between this bead 13 and the wall of the notch 18, in suspended position anyhow.

[0027] The panels 2 are, in the shown example anyhow, at each end provided with an end piece 20, whereby each end piece 20, in this case is mainly composed of two plates 21-22, preferably in MDF and between these plates 21-22 a metal plate 23. Furthermore, this end piece 20 is connected by means of a layer of "super wool" 24 in any way to the actual panel 2. For that matter each end piece 20, as shown, can contain a piece of L-profile 25, which can for example interact with the guide 3.

[0028] The parts composing the end pieces 20 are thus provided with notches and/or passages that it is prevented that the horizontal channels 26 and 27, which are respectively formed inside the beads 12 and 13, are not covered by these parts and hence these channels 26-27 are always in connection with vertical channels 28, formed between the ends of the panels 2 and the surrounding structure, which in this case is among others formed by the vertical guides 3, so that, in case of fire, vapours and gases which might possibly be caused in the panels 2 as a result of the heating of the filling 11, can escape sideways via the channels 26-27 and further via the channels 28.

[0029] The plates 21-22 are slightly tilted in relation to each other, as shown in the figures 10 and 11, due to which an overlapping effect between the subsequent panels 2 is obtained and these are when mounted prevented to move sideways in relation to each other, preferably anyway as long as the panels are in the usual working position. By turning them in a certain position among themselves, for example 90°, they can actually be dismantled.

[0030] Every vertical guide 3 is mainly executed as a U-formed profile which is composed, as shown in figure 9, of a number of metal profiles, respectively 29 to 35, two sealing profiles 36 and 37 and a heat sensitive swelling strip 38 which is applied with a certain play in relation to the panels 2 and which allows to remove the above-mentioned play by swelling, and hence to create a sealing when heated.

[0031] At the bottom and top of the partition wall horizontally oriented swelling strips, respectively 39 and 40, are provided, which in case of heating should form a sealing of the partition wall.

[0032] The swelling strip 39 is applied on the lower panel 2 of the articulated wall 1 by means of a metal corner profile 41, while the swelling strip 40 is in this case applied on a support 42 which is in the illustrated example composed of two metal profiles 43 and 44 and a sealing profile 45.

[0033] Against one of the panels 2, in this case the upper panel 2, a profile is fitted consisting of two corner

profiles 47-48, which due to its design forms a labyrinth-like channel 49 together with the above-mentioned support 42.

[0034] On the opposite side of the above-mentioned support 42 and on the other side of the partition wall, a guide is provided, for example in the form of a guiding roll 50.

[0035] As regards the design of the panels and of the beads 12-13 it is preferred that the partition wall further has one or more of the following characteristics:

- that as shown in figure 5 there is a play C between the insulation 11 of panels 2, suspended to each other, and that this play C disappears when, as shown in figure 6, the panels 2 rest freely on each other;
- that the beads 12-13 of the adjacent panels 2 are coupled together with a certain play A, so that with panels 2 freely resting on each other, a sealing is created between the panels 2, as shown in figure 6, at normal temperatures, and in particular a sealing is also created between the panels 2 in case of heating by fire, as is more particularly shown in the figures 7 and 8 during two subsequent phases of the fire;
- that the play A in the beads 12-13 is thus that, as shown in the figures 7 and 8, when the insulating material 11 is shrinking due to heating, the panels 2 which are freely resting on one another, can move towards each other in order to absorb the shrinking of the insulating material 11;
- that the play A in the beads 12-13 is thus that in case of further shrinking of the insulating material 11 due to heating, the beads 12-13 of the adjacent panels 2 eventually are resting on each other as shown in figure 8;
- that the channels 26-27, internally formed in the beads 12-13, are closed towards the outside of the wall formed by the first wall parts 9 in case of heating.

[0036] It is clear that the articulated wall 1 can be composed in a very easy way by sliding the panels 2 between themselves with their beads 12-13 lengthwise in each other. The beads 12-13 can also be thus formed that when two panels 2 which are to be coupled to each other, are brought together under a sufficiently sharp angle, the beads 12-13 can be fitted together sideways.

[0037] In figure 12 an embodiment variant is presented, whereby in this case the end pieces 20 are provided with free revolving guide wheels 53 which are set in a vertical guide 54.

[0038] In figure 13 a number of possibilities is schematically presented to raise a sectional gate according

to the invention by means of a drive to lift or roll up the gate, whether on a slope or not.

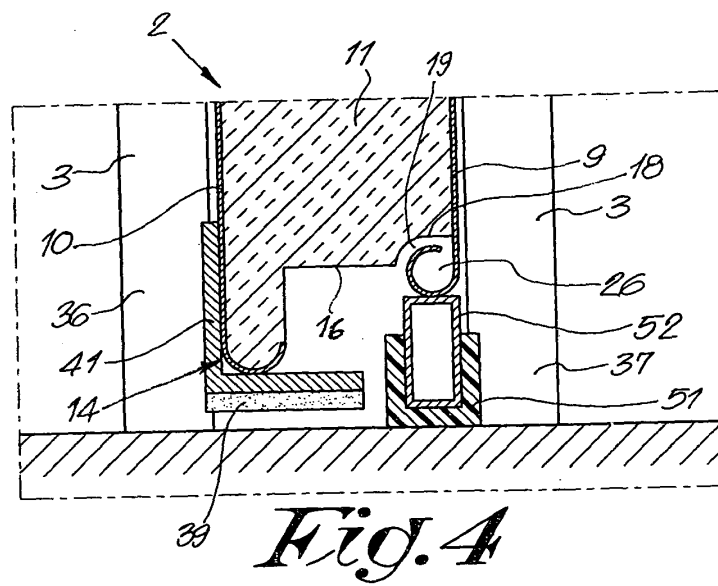
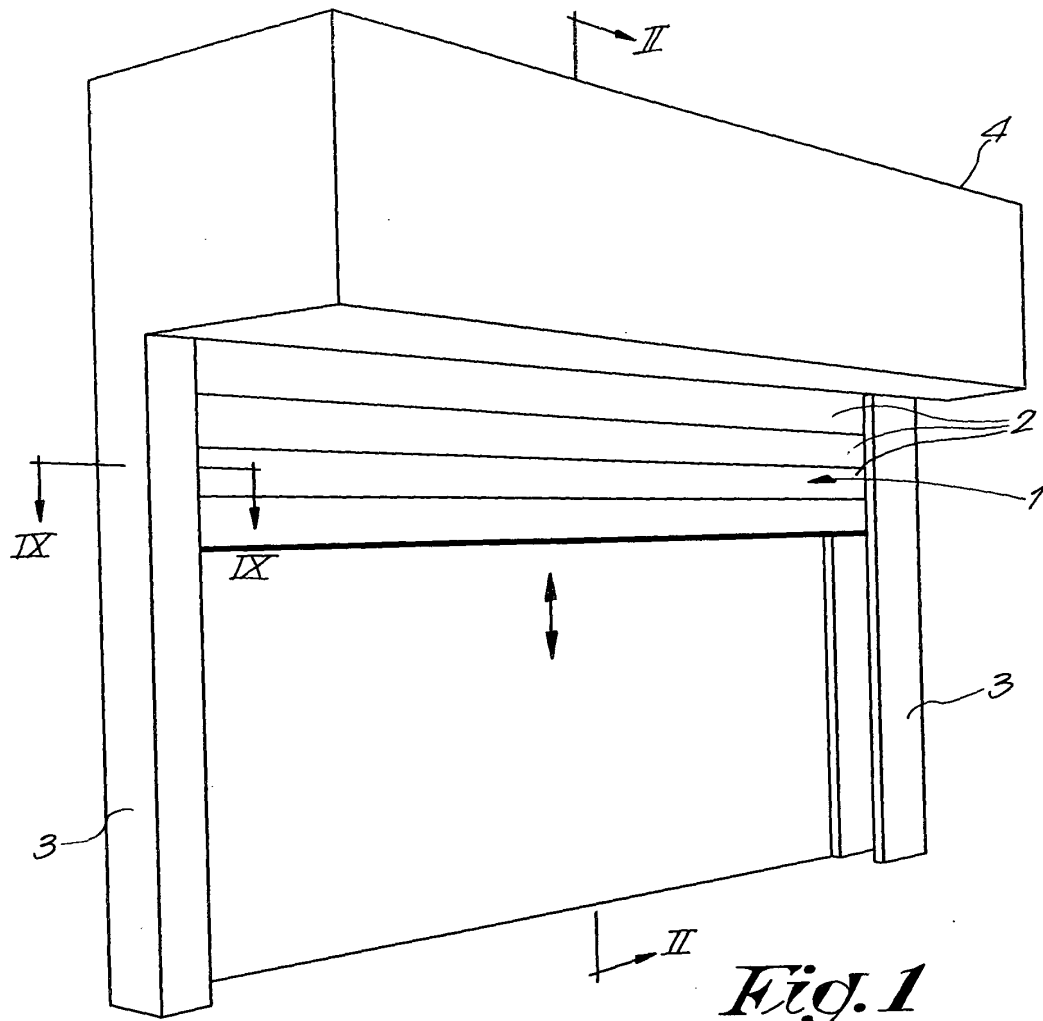
[0039] It is observed that the vertical channels 28 are preferably both at the top and at the bottom in connection with the internal space. Indeed, it is known that in case of fire up top in this internal space an overpressure will occur, while at the bottom, there is a relative underpressure. This will result in the creation of a downward gas stream through the channels 28, which in its turn will cause the discharge channels 26-27 to be exhausted, due to which an accumulation of explosive gases in the panels themselves will be excluded.

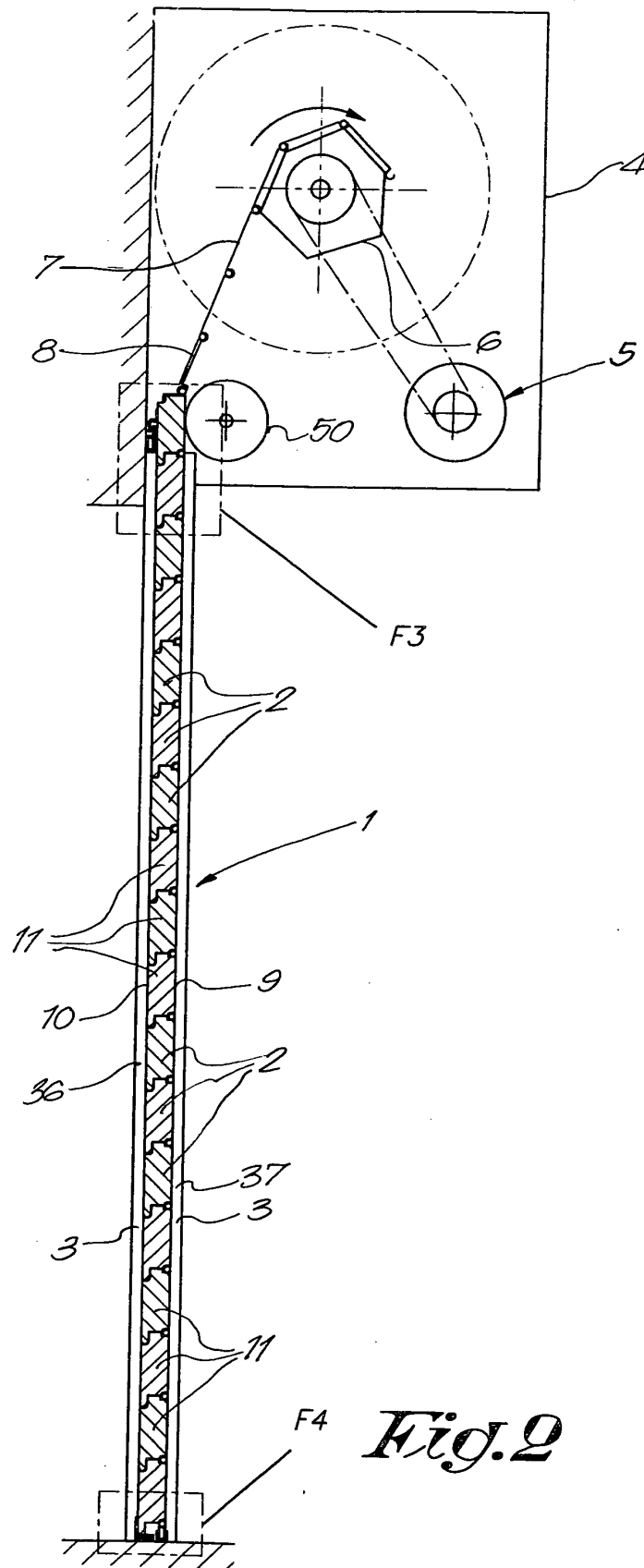
[0040] The current invention is in no way limited to the embodiments described as an example and represented in the figures, but a partition wall according to the invention can be realised in various forms and sizes without departing from the scope of the invention.

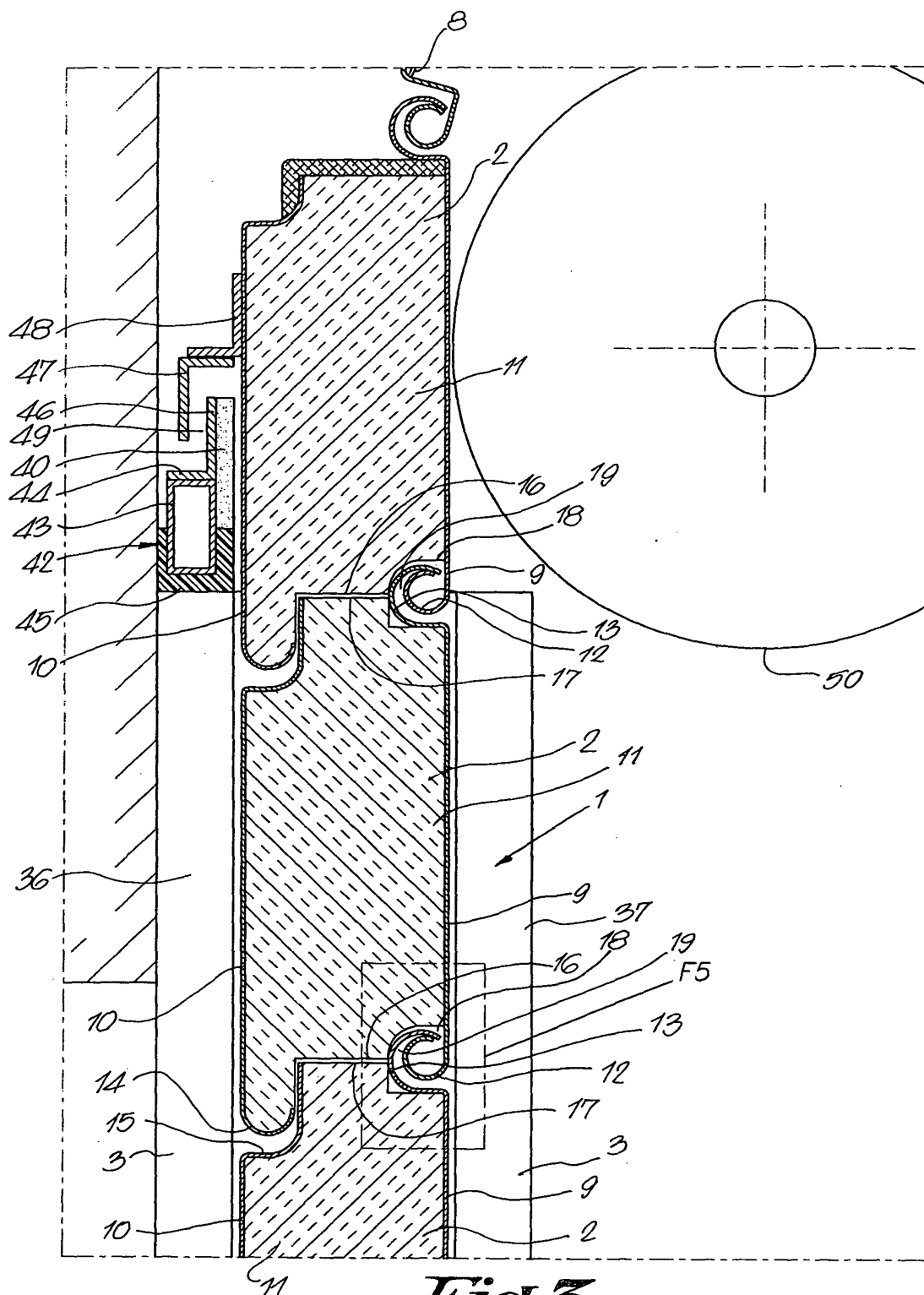
Claims

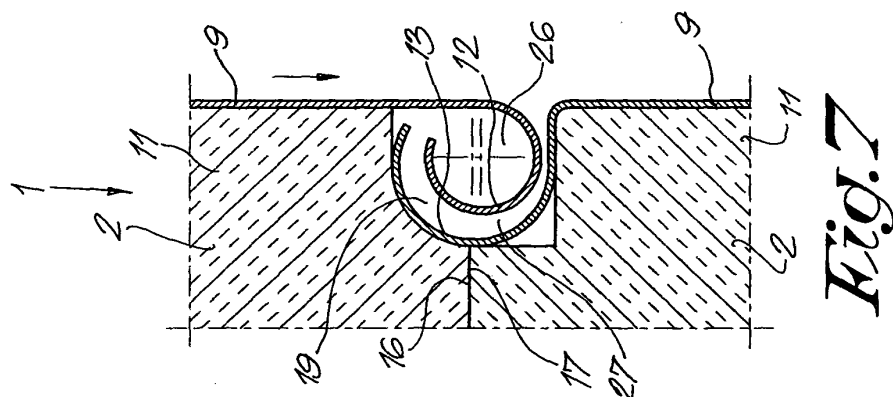
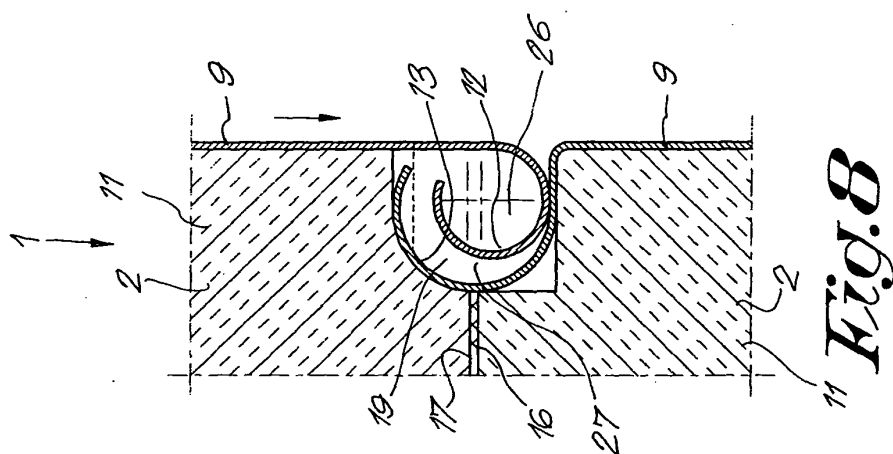
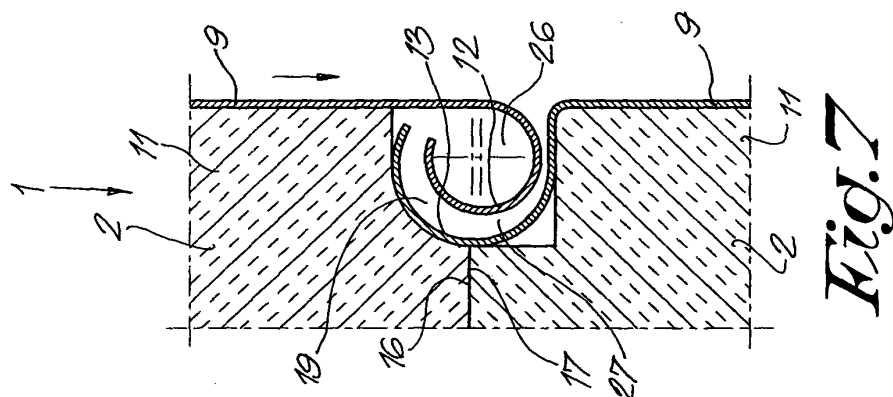
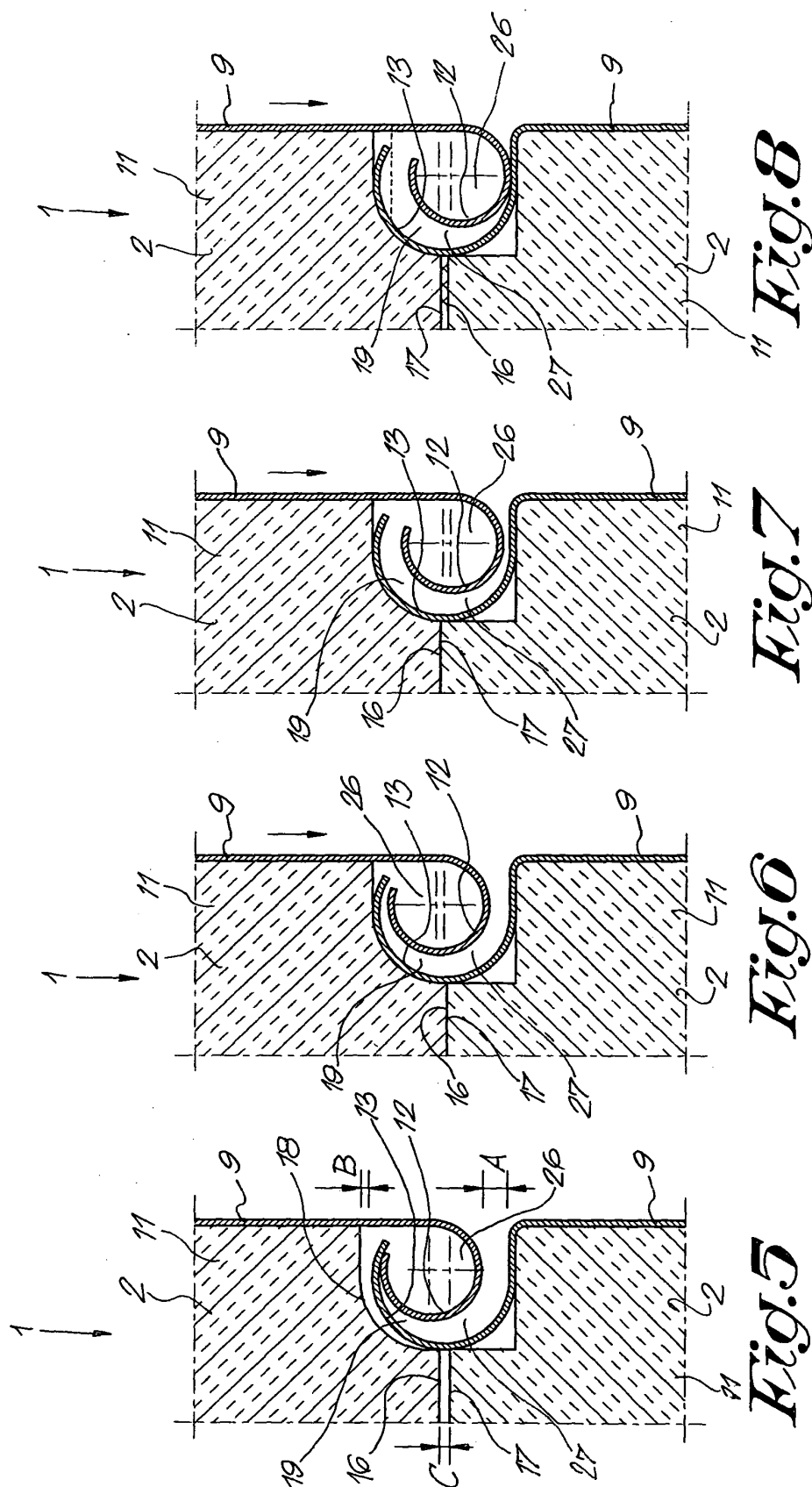
1. Partition wall of the type which is composed as an articulated wall (1), consisting of horizontally oriented panels (2) which are coupled together, **characterised in that** these panels (2) comprise at least two metal wall parts, respectively first wall parts (9) and second wall parts (10), which are situated at a distance of each other, which wall parts (9-10) are thus fastened that they can expand independently, or mainly independently anyhow, from each other in case of temperature differences.
2. Partition wall according to claim 1, **characterised in that** in the panels (2) insulating material (11) has been inserted in between the wall parts, more in particular an insulating material (11) which is connected with the above-mentioned wall parts (9-10), but the material and the connection of which with the wall parts (9-10) is thus executed that the wall parts (9-10) can expand mainly independently from each other in case of temperature differences.
3. Partition wall according to claim 1 or 2, **characterised in that** the above-mentioned panels (2) are coupled to each other by means of beads (12-13).
4. Partition wall according to claim 3, **characterised in that** the above-mentioned beads (12-13) are provided respectively at the upper edge and at the lower edge of each of the first wall parts (9), whereby the lower beads (12) are mainly formed as a circular edge, folded back inwardly of the said panel, while the upper beads (13) are mainly formed as a C-formed folded edge the opening of which is oriented outwardly of the panel (2) and whereby the lower beads (12) are set in the upper beads (13) of an adjacent panel (2).

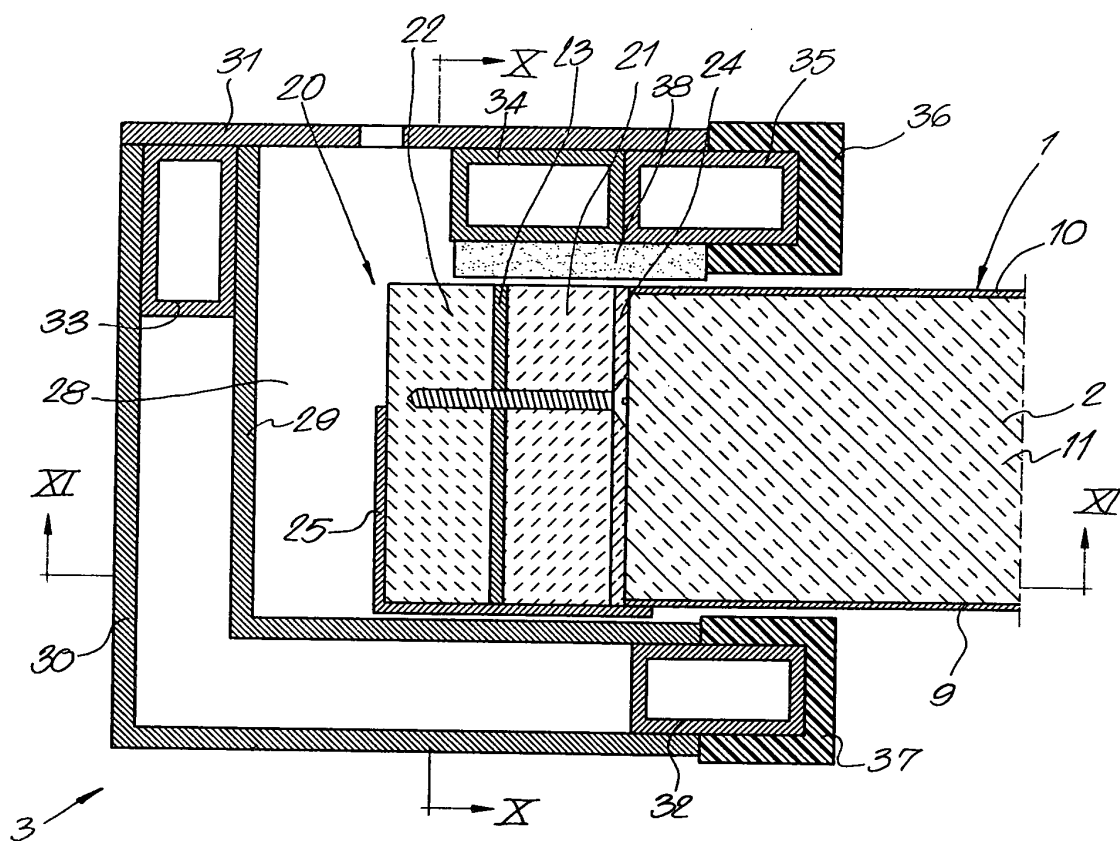
5. Partition wall according to claim 3 or 4, **characterised in that** each panel (2) is provided at the side of the second wall part (10) at the top with a notch (15) and at the bottom with a lip (14), whereby this lip (14) is thus formed that it can interact with the above-mentioned notch (15) of an underlying panel (2). 5
6. Partition wall according to claim 5, **characterised in that** the above-mentioned notch (15) and the above-mentioned lip (14) of each panel are mainly formed by profilings which are formed of the second wall part (10) of the said panel (2). 10
7. Partition wall according to one of the claims 3 to 6, **characterised in that** the beads (12-13) of adjacent panels (2) are coupled together with a certain play (A), so that in case of panels (2) resting freely on each other, even in case of heating of the panels by fire, a sealing is created between the panels (2). 15 20
8. Partition wall according to claims 2 and 7, **characterised in that** there is a play (C) between the insulation (11) of panels (2), suspended to each other, and that this play (C) disappears when the panels (2) rest freely on each other. 25
9. Partition wall according to one of the claims 7 or 8, **characterised in that** the play (A) of in the beads (12-13) is thus that in case of shrinking of the insulating material (11) due to heating, the panels (2), resting freely on each other, move towards each other in order to absorb the shrinking of the insulating material (11). 30 35
10. Partition wall according to claim 9, **characterised in that** the play (A) in the beads (12-13) is thus that in case of shrinking of the insulating material (11) due to heating, the beads (12-13) of adjacent panels (2) eventually will rest on each other. 40
11. Partition wall according to one of the claims 3 to 10, **characterised in that** the beads (12-13) are executed as horizontal outlet channels (26-27) for vapours and gases from the panels (2), whereby these outlet channels (26-27) are preferably, at least in case of a certain heating, closed towards the outside of the wall, formed by the first wall parts (9). 45
12. partition wall according to claim 11, **characterised in that** the outlet channels (26-27) formed by the beads (12-13), run into vertical outlet channels (28), which preferably at the top and at the bottom are in connection with the inner space situated against the partition wall. 50 55
13. Partition wall according to one of the claims 3 to 12, **characterised in that** the panels (2) each show a cross-section due to which they can slide into each other either exclusively due to a mutual lengthwise shifting with their beads (12-13), or can be fitted together sideways, however only after the panels (2) have been tilted in a certain angle in relation to each other.
14. Partition wall according to one of the preceding claims, **characterised in that** the panels (2) are set with a certain play in an adjacent structure, in which they are included either as a fixed element, in particular a fixed wall part, or as a movable element, in particular a gate and that heat-sensitive swelling strips (38-39-40) are applied to the adjacent structure which allow for the above-mentioned play to be removed by the swelling and subsequently to create a sealing.
15. Partition wall according to one of the preceding claims, **characterised in that** it is executed as a gate, in particular a sectional gate or rolling gate, or as a roll-down shutter, which is provided with a drive (5) in the form of a raising of rolling mechanism.



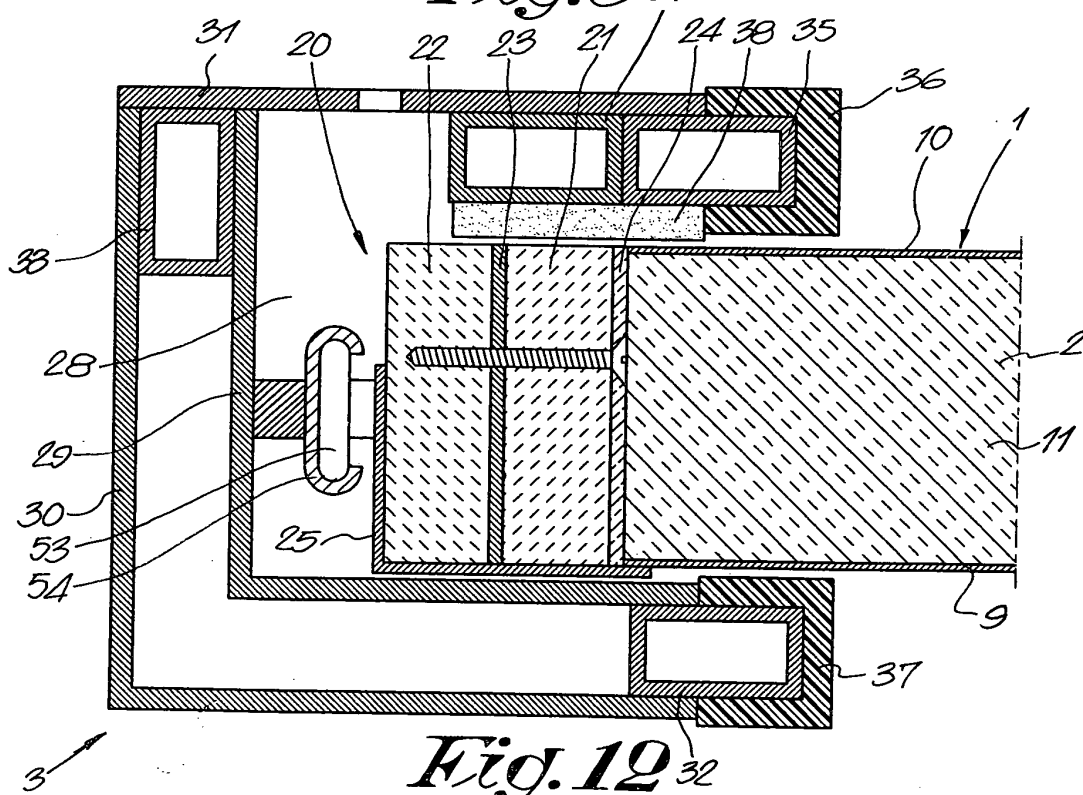








*Fig. 9*₃₄



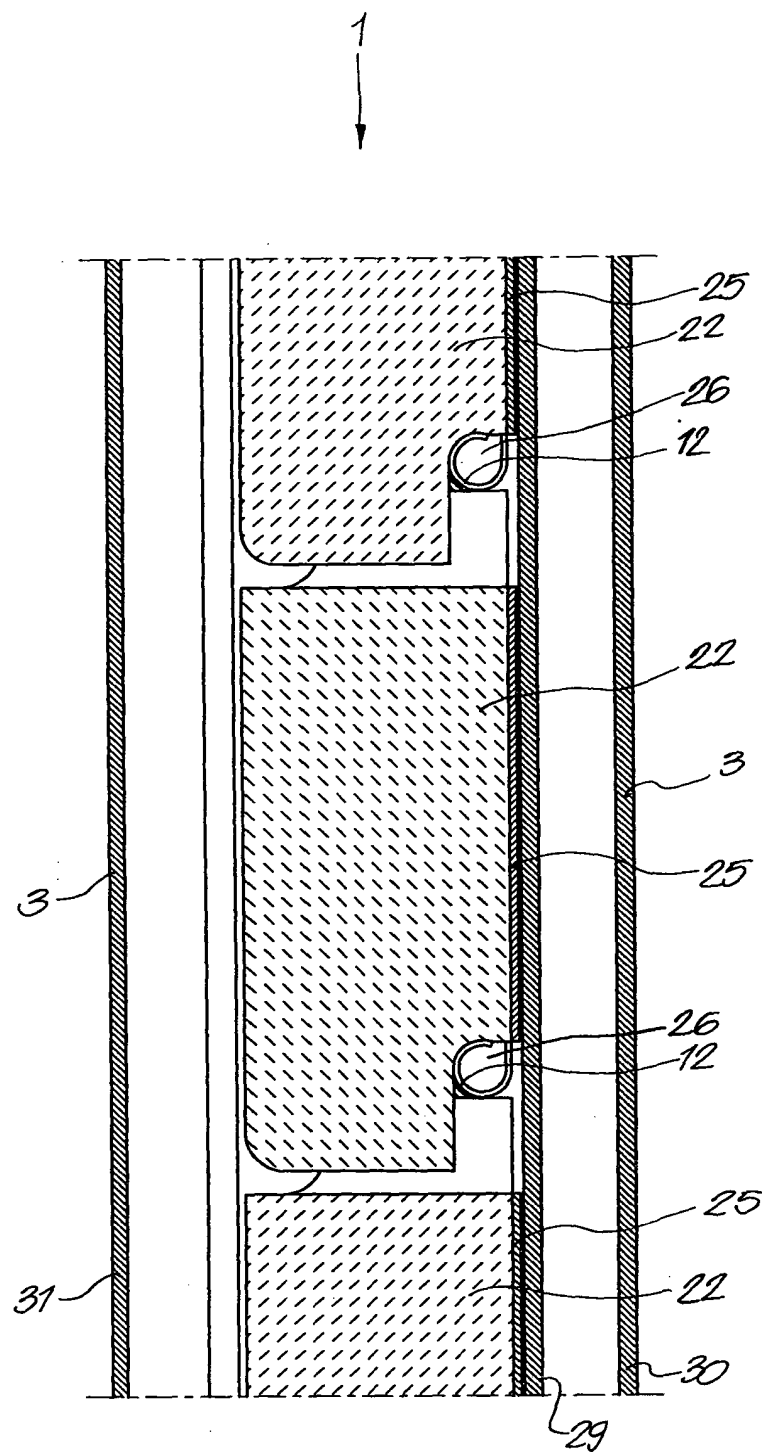


Fig.10

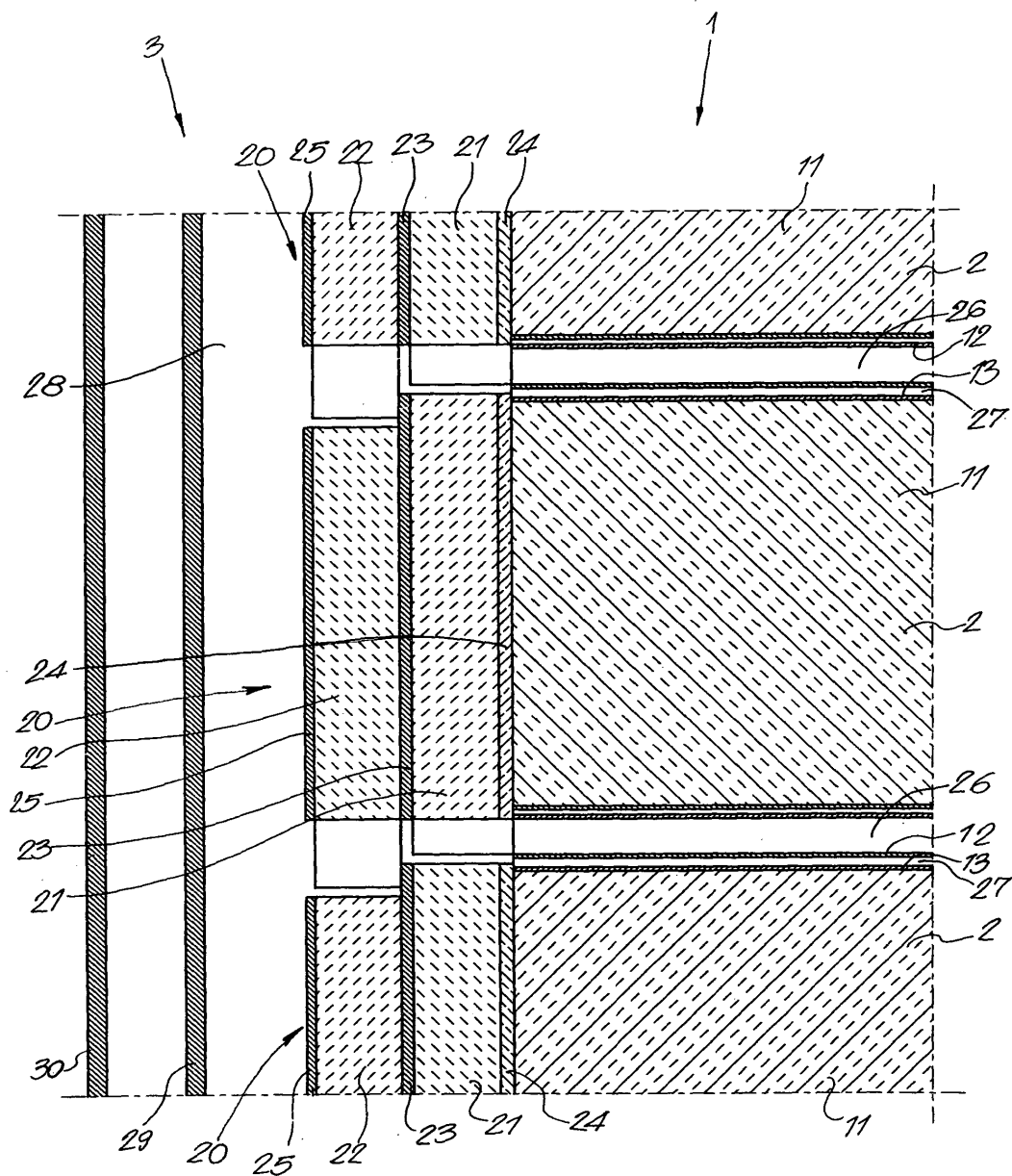


Fig. 11

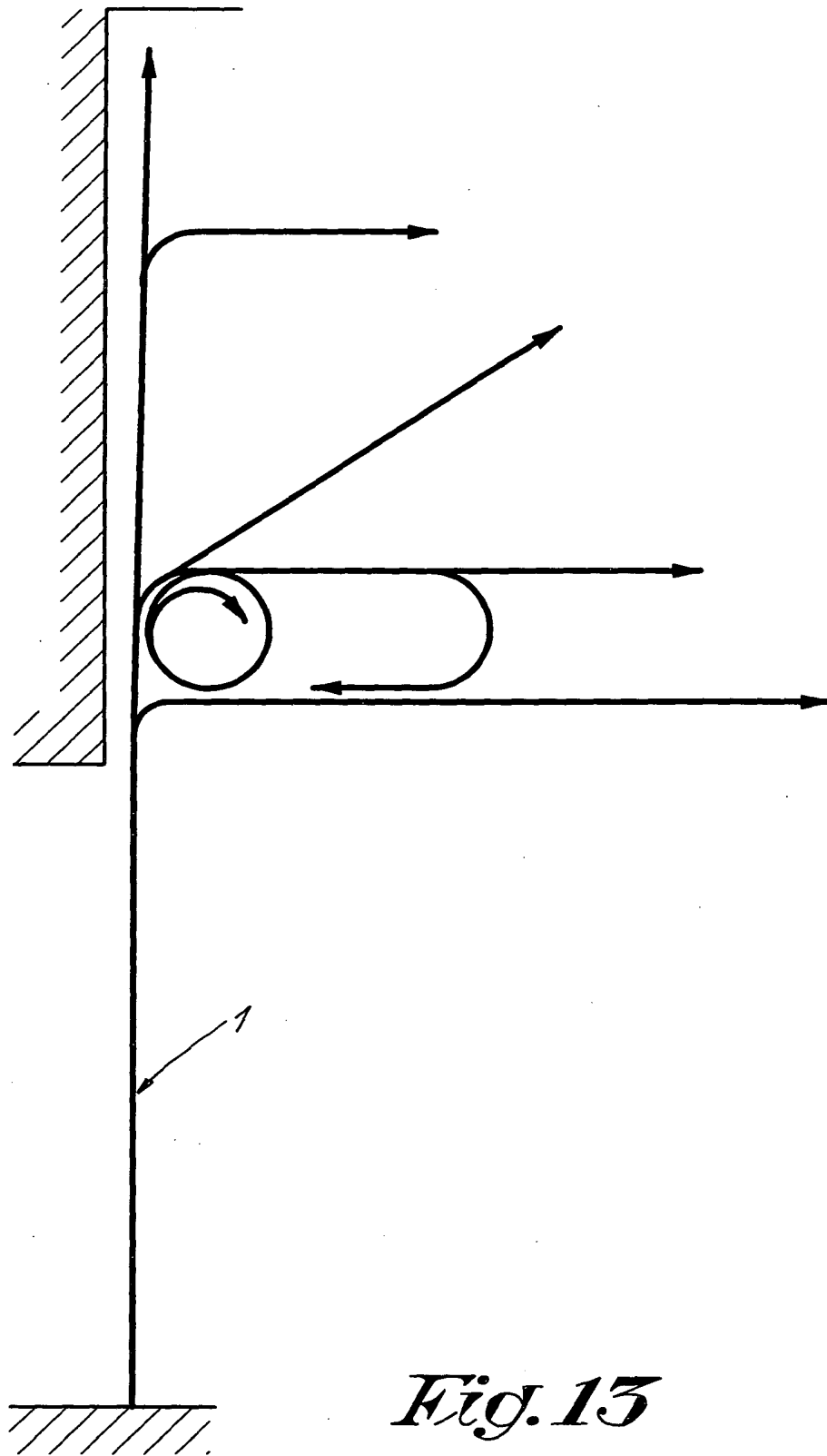


Fig. 13



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Application Number
EP 03 07 7409

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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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X	EP 0 394 691 A (NIEMETZ TORSYSTEME) 31 October 1990 (1990-10-31) * column 5, line 42 - column 7, line 35 * * figure 1 *	1,2	
A	EP 1 096 098 A (KRALER FRANZ) 2 May 2001 (2001-05-02) * figures 1,2 *	3,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 October 2003	Examiner Verdonck, B
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