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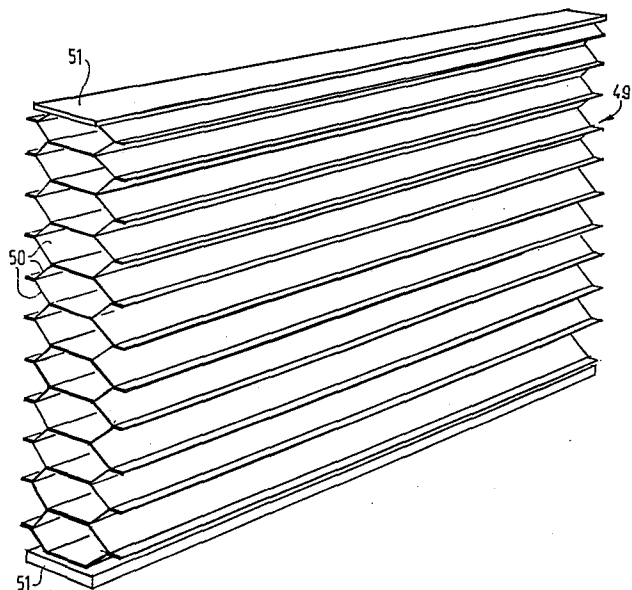
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54 Collapsible screen.

57 The invention relates to a concertina-like collapsible screen, e.g. a screen for heat-insulation, said screen comprising deformable, separated cells, adhered to one another with side surfaces.

The disadvantage of this known screen is that the folding edges at the outer walls of the screen are apt to show readily small dents or impressions, e.g. by lightly pushing, causing the impossibility of bringing back the screen in its collapsed position.

The invention proposed a collapsible screen of the type described in the preamble, characterized in that each of two adjacent walls of a cell extending at an outer surface of said screen is provided with an edge strip and in that said edge strips on said two walls are adhered to one another, e.g. the edge strips may be adhered to one another in such a way that one of said both edge strips is folded around the other one and the three-layered construction does made is integrated by pressure, if necessary while adding heat.



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Title: Collapsible screen  
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The invention relates to a concertina-like collapsible screen, e.g. a screen for heat-insulation, said screen comprising deformable, separated cells, adhered to one another with side surfaces.

5 Such a screen is known from DE-A-28 40 023. This prior art screen has some disadvantages and limitations.

The disadvantage of this known screen is that the folding edges at the outer walls of the screen are apt to shown readily small dents or impressions, e.g. by lightly pushing, causing the impossibility of bringing back the screen in its collapsed position.

10 For certain applications a further disadvantage of the prior art screen may be that its stiffness leaves to be desired.

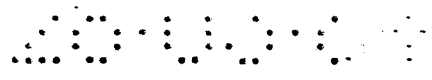
15 At last under certain circumstances it may be a disadvantage that at the fully collapsing to its smallest possible length of the screen the resulting thickness is determined by the curvature radius, at the position of the folding edges in the outer walls of the screen.

20 It is the purpose of the invention to offer solutions for the described problems of the prior art; in view thereof the invention proposed a collapsible screen of the type

described in the preamble, characterized in that each of two adjacent walls of a cell extending at an outer surface of said screen is provided with an edge strip and in that said edge strips on said two walls are adhered to one another, 5 e.g. the edge strips may be adhered to one another in such a way that one of said both edge strips is folded around the other one and the three-layered construction does made is intergrated by pressure, if necessary while adding heat. Further the edge strips may be glued or welded with each 10 other whilst further use may be made of two-sided adhesion tape, staples, or other suitable adhering means.

The screen according to the invention may be used for many applications. It may e.g. serve for thermally insulating green-houses, in which case the wall material preferably is 15 reflecting. In such a green-house insulation, in view of insulation of the roof use may be made of a plurality of wires or strings under tension in the longitudinal direction of which the screen may be unfolded and collapsed. It will be clear that the prior art screen mentioned above according to 20 DE-A-28 40 023 will surely not be usable for such an application as after a short period the impression by the wires of the folding edges causes the impossibility of reliably collapsing the screen to its resting position.

By this horizontal position of the screen it cannot be 25 avoided that regularly on the upper surface of the screen condensate is formed. In order to readily and reliably drain this condensate, whilst maintaining the thermally insulating properties of the screen use may be made of a variant, in which the adhesion between the side surfaces of pairs of 30 cells is locally interrupted. In case of some accumulation of condensate the side surfaces not adhered to each other of pairs of cells are pushed aside by the weight of the moisture present above them, in such a way that openings are created through which the moisture can be drained.



The invention will now be described more fully with reference to a drawing of a few arbitrary embodiments to which the invention is not limited. The drawing shows in

5 Fig. 1 a fragmentary, perspective view of an architectural structure comprising a standing cavity wall and a floor, below which floor a heat insulating layer embodying the invention is provided,

Fig. 2 a schematic representation of a first stage of a method embodying the invention,

10 Fig. 3 a further stage in a view corresponding to Fig. 2,

Fig. 4 a cross-sectional view of an insulating layer embodying the invention applied below a floor,

15 Fig. 5 a schematic representation of an insulating layer having a honeycomb profile,

Fig. 6 a fragmentary, perspective view of a cooling house having a variable degree of insulation and

Fig. 7 a fragmentary, perspective view of a detail of the cooling house shown in Fig. 6.

20 Figs. 8 and 9 each a cross-sectional view of insulating layers the side edges of which are provided with flanges,

25 Fig. 10 a partial, perspective view of a further embodiment of an insulating layer in accordance with the invention,

Fig. 11 a broader structure of the layer of Fig. 10,

Fig. 12 a fragmentary, perspective view of a cavity wall with an insulating layer,

30 Fig. 13 a perspective view of an insulating layer foldable in zigzag fashion.

Fig. 14 a perspective view of part of a variant of the layer shown in Fig. 13,

Fig. 15 a partial, perspective view of a layer foldable in zigzag fashion provided with fastening eyelets,

35 Fig. 16 a perspective view showing a potential mode of suspension of the layer of Fig. 15,

Fig. 17 a perspective view of a further use of an insulating layer embodying the invention;

Fig. 18 a fragmentary, perspective view of a swimming pool in which the cover is formed by an inflatable insulating layer embodying the invention; and

Fig. 19 an insulating layer as applied in connection with a green-house.

Fig. 1 shows an architectural structure comprising an outer wall 1, an inner wall 2 and a floor 3 connected with the former. Below the floor 3 is provided a creep space 4, which is ventilated through the cavity 5 between the outer wall 1 and the inner wall 2 through ventilation slots 6 and 7 respectively.

Below the floor 3 is arranged an insulating layer 8 by which a thermal separation is created between the space above the floor 3 and the creep space 4. With reference to Fig. 3, in particular, the structure of the insulating layer will be described in detail.

Fig. 2 shows how by using glue a strip 9 is adhered to the underside of the floor. The strip 9 is at its underside provided with two adhering strips 10, 11 which are in advance provided with covering tape that after applying strip 9 has to be removed for connecting the elongated bags 12 with the adhesion strip 10, 11. The covering tape that has to be removed in the direction of arrows 13 is in fig. 2 indicated with reference numbers 14, 15. The bag 12 shown in fig. 2 is in the direction of arrows 16 adhered to the adhesion strip 11 over a zone indicated with a dotted line.

Fig. 3 shows the construction in its ready state. It will be clear that for arranging adjacently the isolating bags 12 firstly the one covering tape has to be removed after which the related bag is adhered after which only the adjacent covering tape is removed and the next following bag can be applied. By choice of the mutual distance between the strips 9 the effective distance between the upper surface and the lower surface of bags 9 may be chosen, due to which the degree of insulating may be controlled. In order to ensure a very good dust tightness the open ends of bags 12 are closed by means of double-sided adhesion tape 26.

Fig. 4 shows a section through an insulating bag 18, consisting of three layers 19, 20, 21 said layer 20 being connected with layer 19 with its edges as well as with a line 22.

5 After the discussion of figures 2 and 3 the way of adhesion to floor 3 by means of strips 9 with adhesion strips 10, 11 will not necessarily have to be explained.

Two adjacent bags are connected to one another with adhesion strips 24, 25 by means of an additional strip 23, in such a way that the lower layer 21 is more or less stretched. Due to this it is avoided that the insulation over the side edges is not as good. Also strip 23 encloses together with the part of layers 21 being positioned over it again a bag-shaped space contributing to a good insulation.

15 Fig. 5 shows a heat-insulating layer, consisting of six layers which are connected with each other over lines in the way of a honeycomb-profile. After the foregoing the structure need not be explained further. For the layer 27 it is only necessary to use strips 28 having a single adhesive side 29. It will be obvious that by choosing the distance between the strips 28 the thickness of the layer 27 and hence the insulating capacity can be chosen at will.

25 Fig. 6 shows a cold store 30 provided with insulating layers 31. These insulating layers enclose bags 32 which communicate in the manner shown in Fig. 7 through perforations 33 with a source of air at an optional pressure. The source 34 communicates through ducts 35 with spaces bounded on one side by the outer walls 36 and on the other side by perforated partitions 37 applied thereto. These partitions are provided through adhesive strips (not shown) with the insulating layers 31.

30 By raising the pressure in the bags 32 by a corresponding energization of the air source 34 the insulating layer can be "inflated" and thus thickened as a result of which the degree of insulation increases. Conversely, by 35 corresponding energization of the air source 34 subatmospheric pressure can be created in the bags 32 so that the bags are

emptied and the degree of insulation is drastically reduced. In this way a space of variable degree of insulation is obtained, in which in the case of a relatively cold ambiance the interior of the cold store can dissipate its heat to the outside, whereas at the instant at which good insulation is required the degree of insulation can be maximized.

Fig. 8 is a cross-sectional view of an insulating layer 38 of the kind shown in Figs. 1, 2 and 3, the side edges of which are provided with flanges 39 to obtain a firm fixation.

Fig. 9 shows an embodiment in which an insulating layer corresponding with the embodiment shown in Fig. 5 is provided with fastening flanges 41.

Fig. 10 shows an insulating layer 42 formed by interconnected foils 43 arranged in zigzag fashion. The layer 42 has the thickness of two compartments.

Fig. 11 shows a comparable configuration. A layer 44 embodying the invention also comprises interconnected foils 43 arranged in zigzag fashion. The layer 44 has a thickness of three compartments.

Fig. 12 shows a cavity wall structure comprising two walls 45 and 46. In the cavity between the two walls 45 and 46 there is arranged an insulating layer 47 embodying the invention. In this embodiment the layer 47 is suspended to a fastening beam 48.

Fig. 13 shows an insulating layer 49 comprising foil parts 50 inwardly and outwardly foldable in zigzag fashion, whilst the lower and the upper end of the layer 49 are provided with a beam 51. By fastening the upper beam, for example to the lintle of a door frame satisfactory heat insulation can be obtained between two rooms with an open door.

Referring to Fig. 13 it is noted with respect to Figs. 10 and 11 that the layers 42 and 44 may, as an alternative, be provided with an upper and a lower beam, whilst in addition means may be provided to lift the lower

beam towards the upper beam so that a heat insulating wall is obtained which may be used or removed as desired.

Fig. 14 shows a variant of the layer 49. The layer 52 of Fig. 14 is formed by a foil alternately bent over and glued to corresponding fastening lines.

Fig. 15 shows an insulating layer foldable in zigzag fashion 53 and having reinforcing strips 54 having punched holes 55. The holes 55 serve for suspending the layer 53, for example, in the manner shown in Fig. 16, to hooks 56. It will be obvious that instead of using hooks a rail may be employed.

Fig. 17 shows a shed 56 having an insulating ceiling coating 57.

Finally Fig. 18 shows a swimming pool 58. On the water 59 is floating an insulating layer 60 of the type shown in Fig. 10. Through a hose 61 air can be introduced by means (not shown) into the layer 60 so that the layer will float on the water and thus serves as a swimming pool cover with excellent insulating properties. By sucking the air out of the compartments of the layer 60, the floating capacity can be reduced to an extent such that the layer 60 as a whole sinks to the bottom so that the swimming pool is ready for use.

With respect to the insulating properties of this swimming pool cover in the form of the layer 60 it is noted that it involves a very high resistance to cooling in contrast to the known swimming pool covers necessarily consisting of only one relatively thin insulating layer of a correspondingly low heat resistance, since an excessive thickness of this insulating layer would render rolling the cover rather difficult. Therefore, the known swimming pool covers are, in practice, substantially only effective in suppressing evaporation. The loss of heat by conduction is substantially not reduced.

It should be noted that the layer 60 as a swimming pool cover may, if desired, be rolled up and off. The possibility of inflating and emptying is only given by way of practical example.

Fig. 19 shows a detail of a green-house, in which plants are present, said green-house being covered by a transparent plate 63, below which and in spaced relation whereto wires 64 are positioned under tension. On these wires 5 64 an insulating layer 65 according to the invention is supported. In the embodiment according to this figure the insulating layer 65 consists of foils 66 extending perpendicularly on the direction of the wires 64, said foils being connected alternately with their longitudinal edges and 10 middle parts, e.g. by means of double-sided adhesion tape. Locally the connections of the middle parts are interrupted. In case of the forming of condensate in the space between layer 65 and cover 63 condensate will arrive on layer 65. In case of a too large accumulation the parts of the adjacent 15 foils not adhered to each other, will be pressed away from each other by the weight of the water lying on them, in such a way that openings 67 develop, from which the water can be drained and spread over the plants 62.

It should be noted that the shape of the holes 67 20 is for the sake of clarity presented in a somewhat exaggerated manner. In practice an opening will not or hardly be visible by the fact that the relatively stiff material of the foils 66 keeps the foils pressed against one another, such that holes 67 will not or bearly perceptible. It should 25 further be noted that adjacent rows of holes can e.g. be positioned in staggered relation over a half pitch.

Further it should be noted in connection to the embodiment according to fig. 19 that adjacent foils can be 30 glued to one another over a zone having a smaller thickness.

It will be obvious that the invention is not 35 limited to the embodiments dexcribed and illustrated. The number of applications of the insulating layer according to the invention is extraordinarily large. Certain applications may require a specific design.

With reference to Figs. 15 and 16 it is noted that a variant may be used in which the peripheral parts at right angles to the peripheral parts shown are provided with

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reinforcing strips and holes rather than those shown.

Reference is furthermore made to the possibility of providing a sun blind to be placed in front of a window with a single or double layer of the type shown, for example, in Fig. 10,

5 which sunblind can be lowered and raised with the aid of known fixable hoisting means.

Claims

1. Concertina-like collapsable screen, e.g. a screen for heat-insulation, said screen comprising deformable, separated cells, adhered to one another with side surfaces, characterized in that each of two adjacent walls of a cell  
5 extending at an outer surface of said screen is provided with an edge strip and in that said edge strips on said two walls are adhered to one another.

2. Screen according to claim 1, characterized in that  
10 the adhesion between the side surfaces of pairs of cells is locally interrupted.

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FIG.1

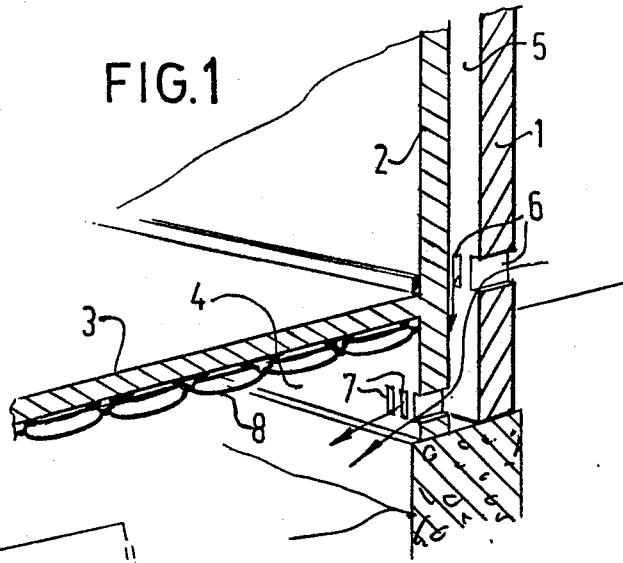


FIG.2

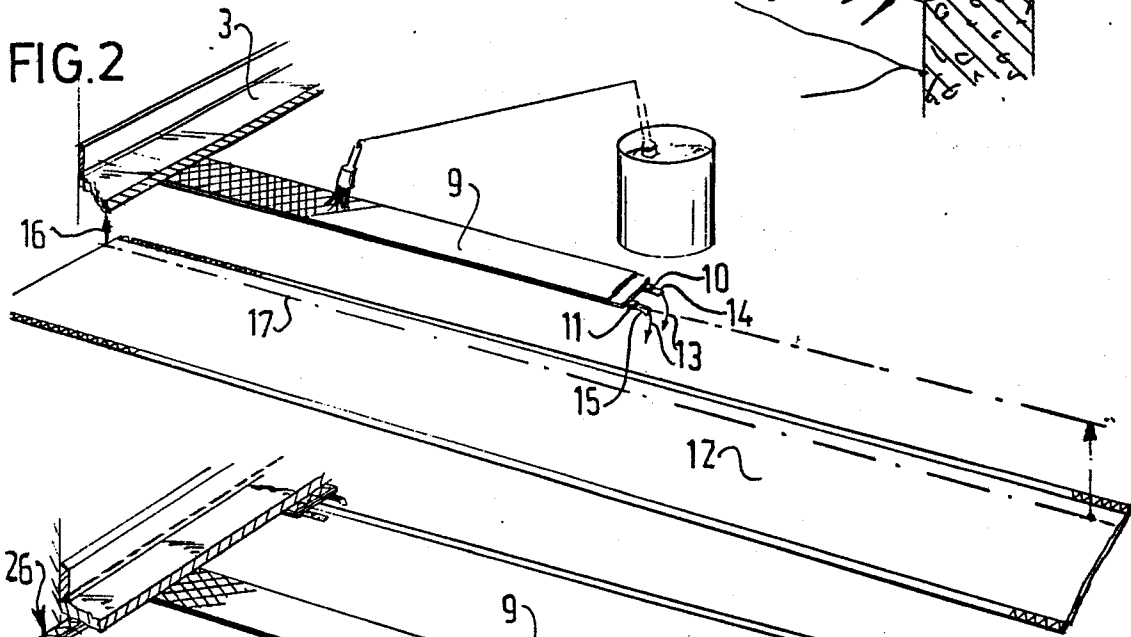


FIG.3

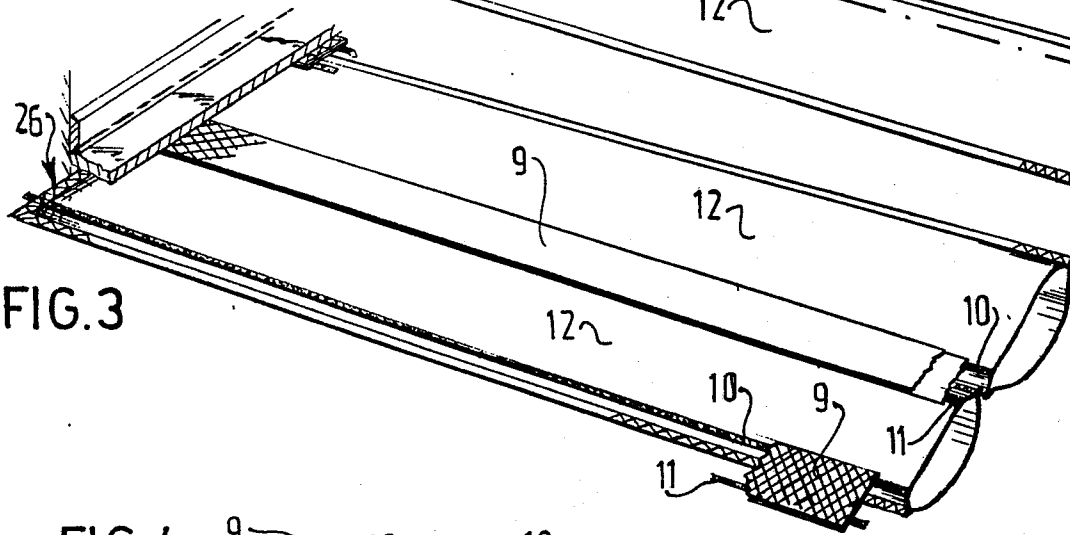
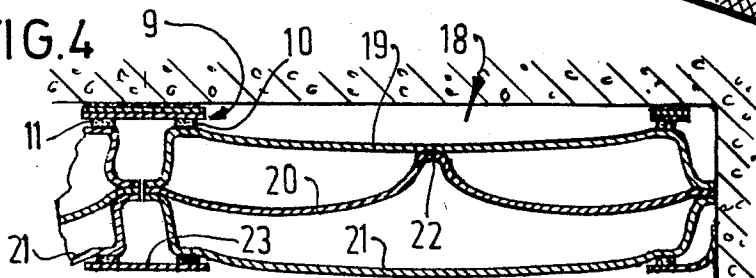


FIG.4



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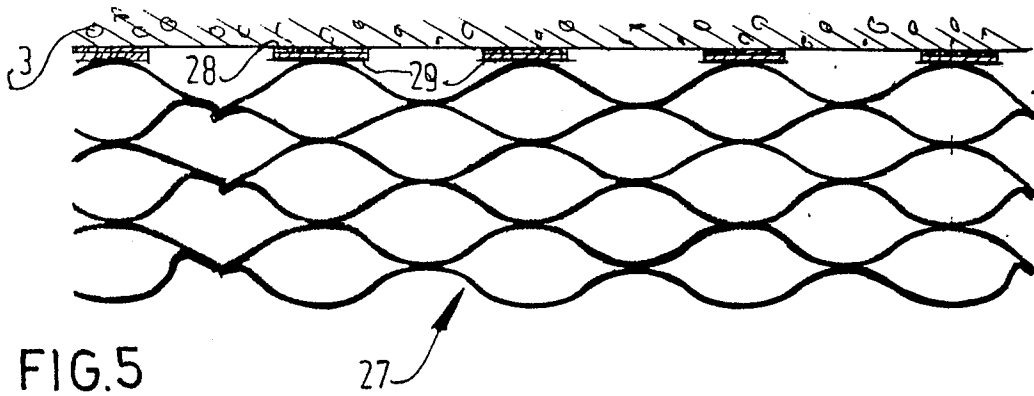


FIG. 5

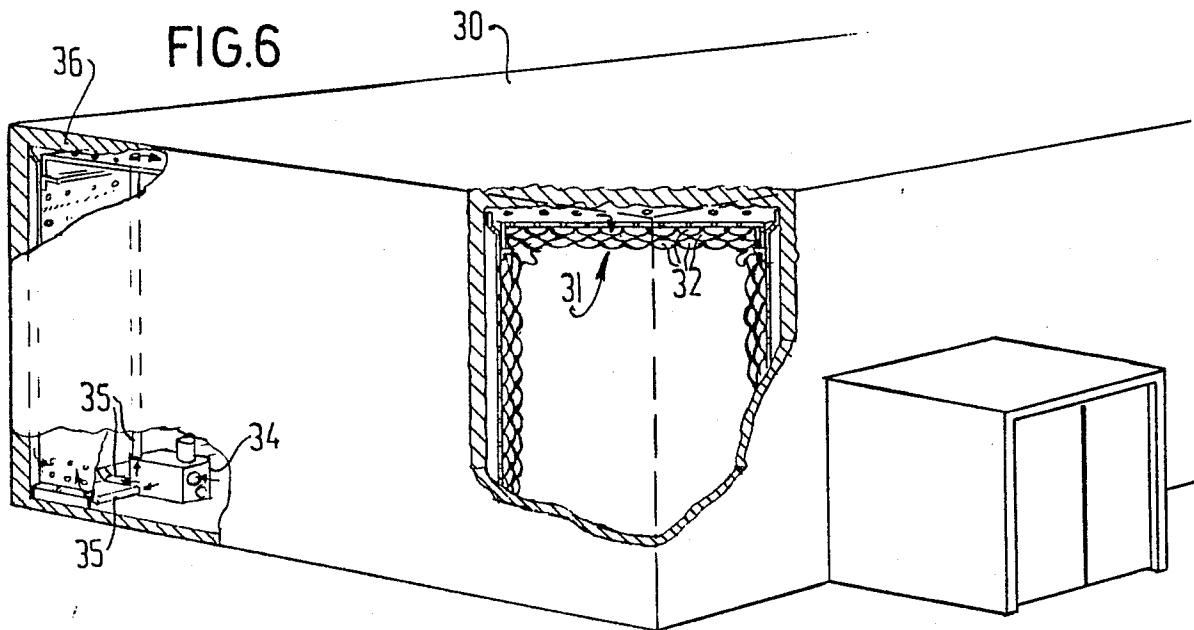


FIG. 6

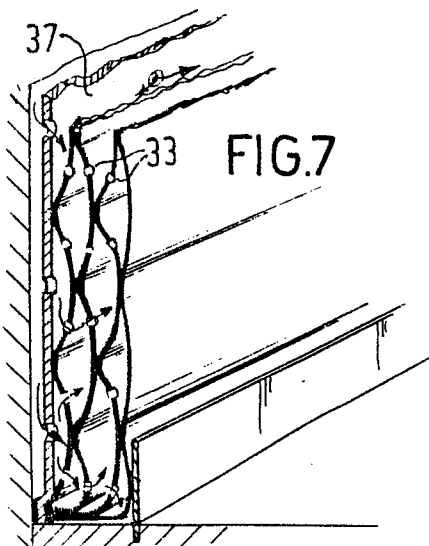


FIG. 7

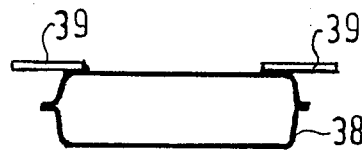


FIG. 8

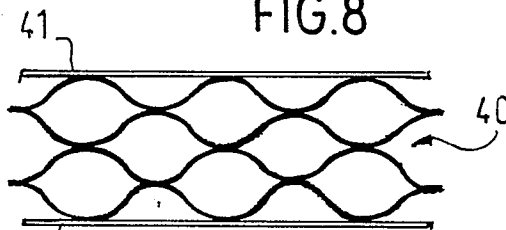


FIG. 9

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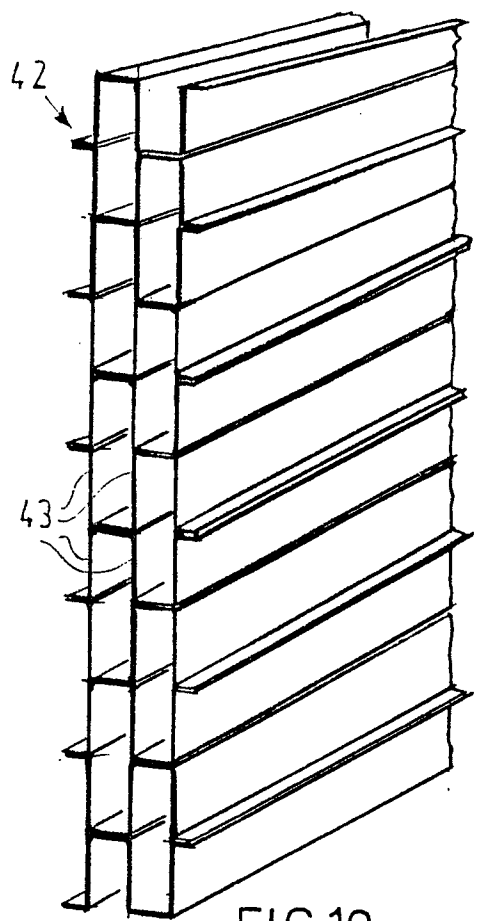


FIG. 10

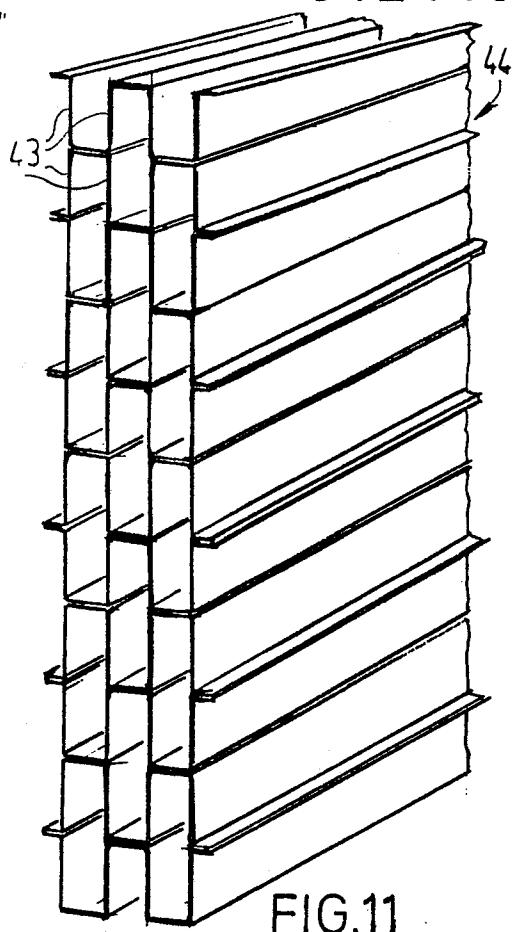


FIG. 11

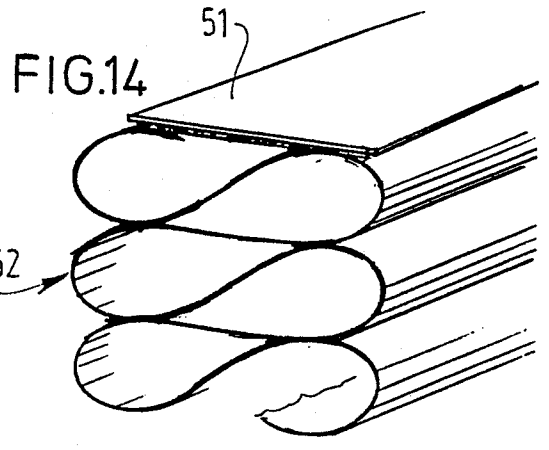


FIG. 14

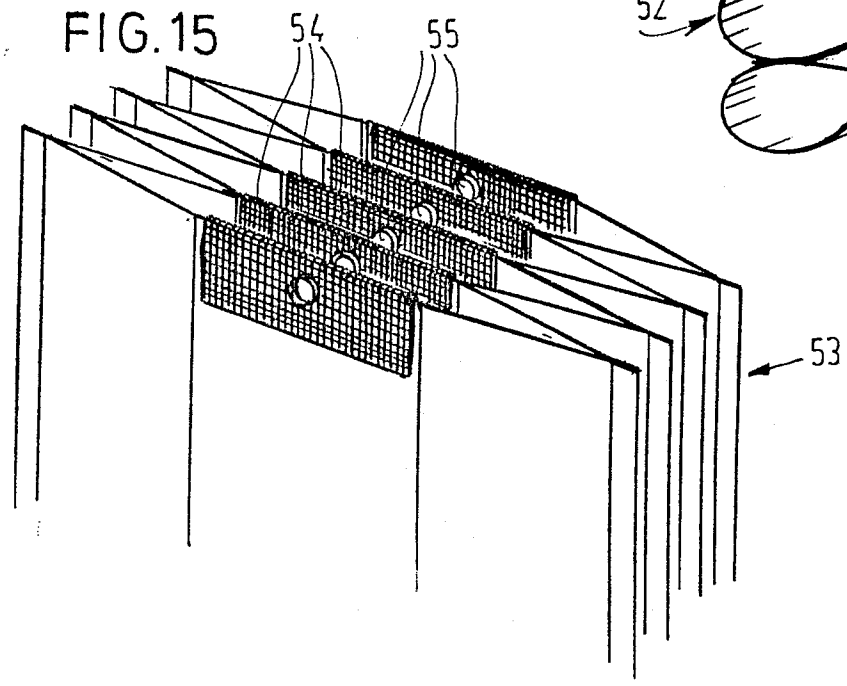
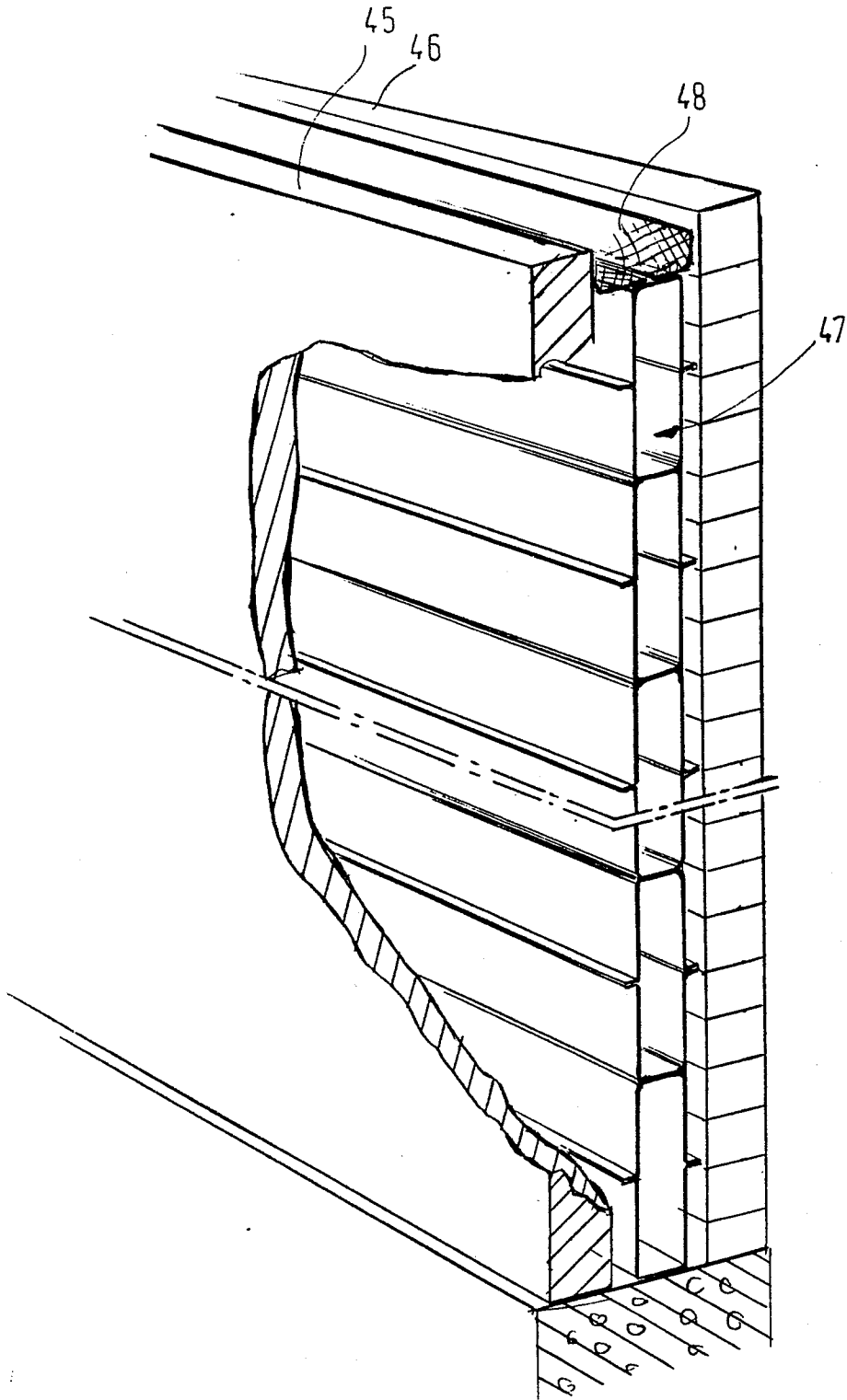


FIG. 15

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FIG. 12



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FIG. 13

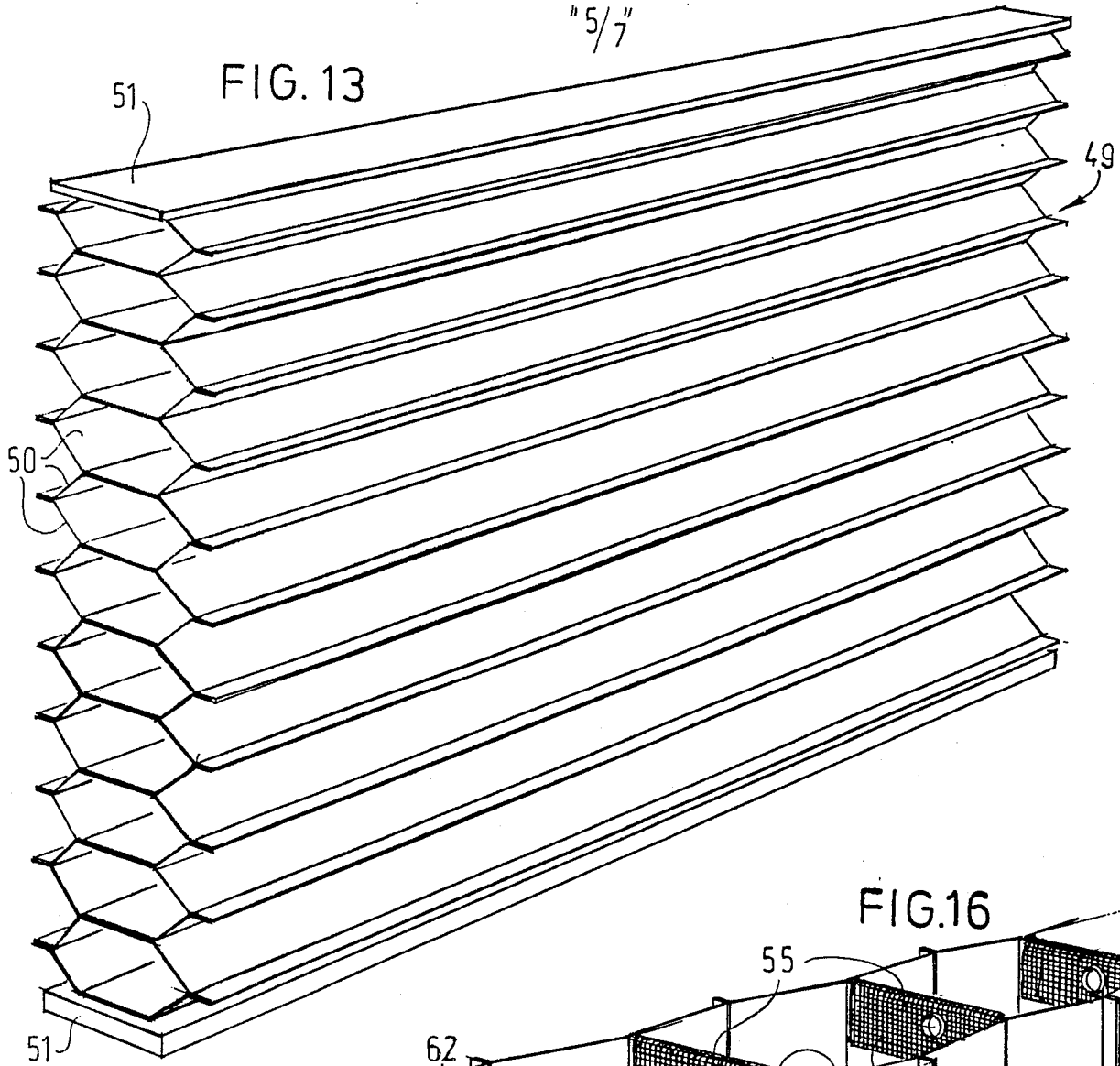
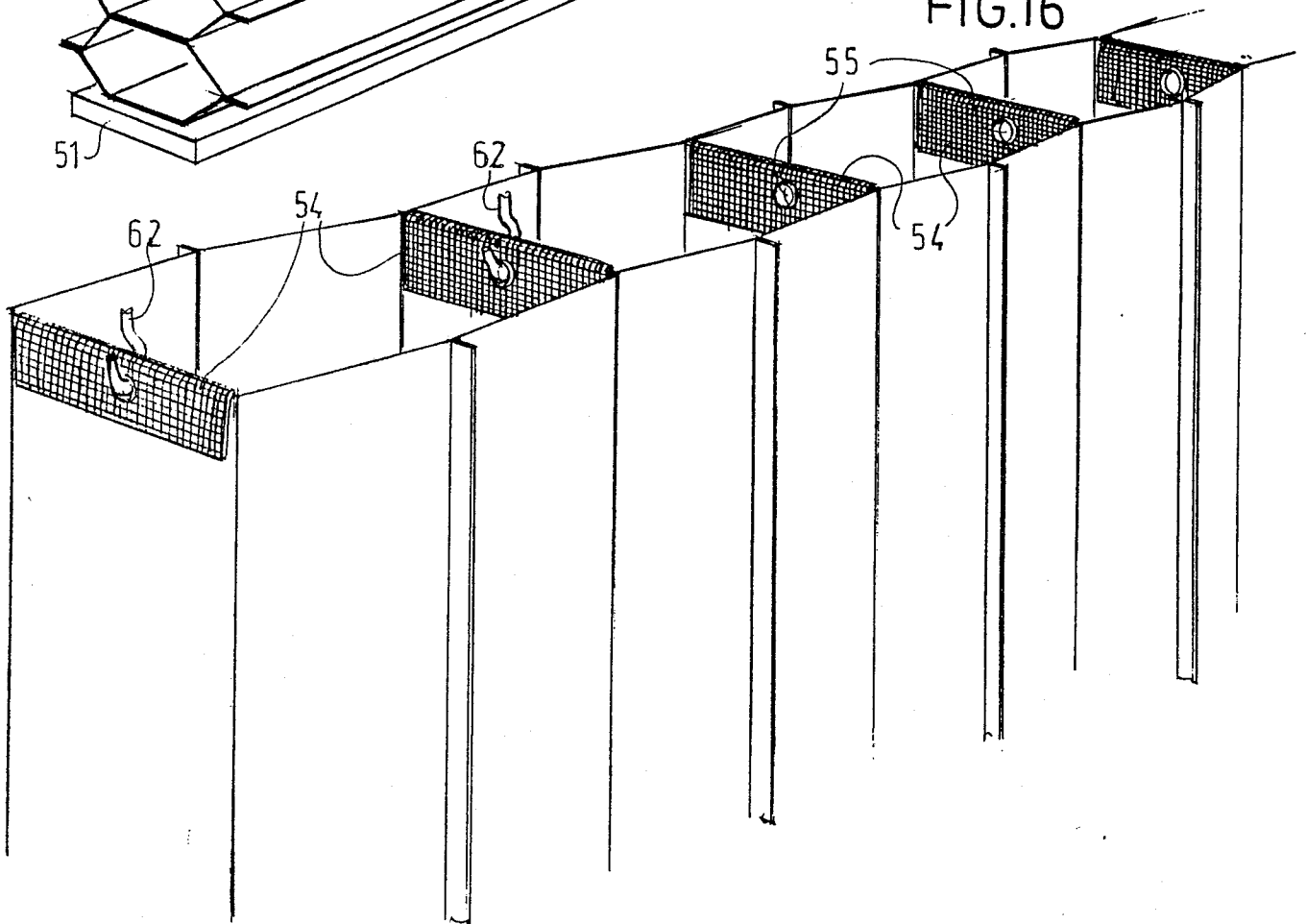


FIG. 16



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FIG. 17

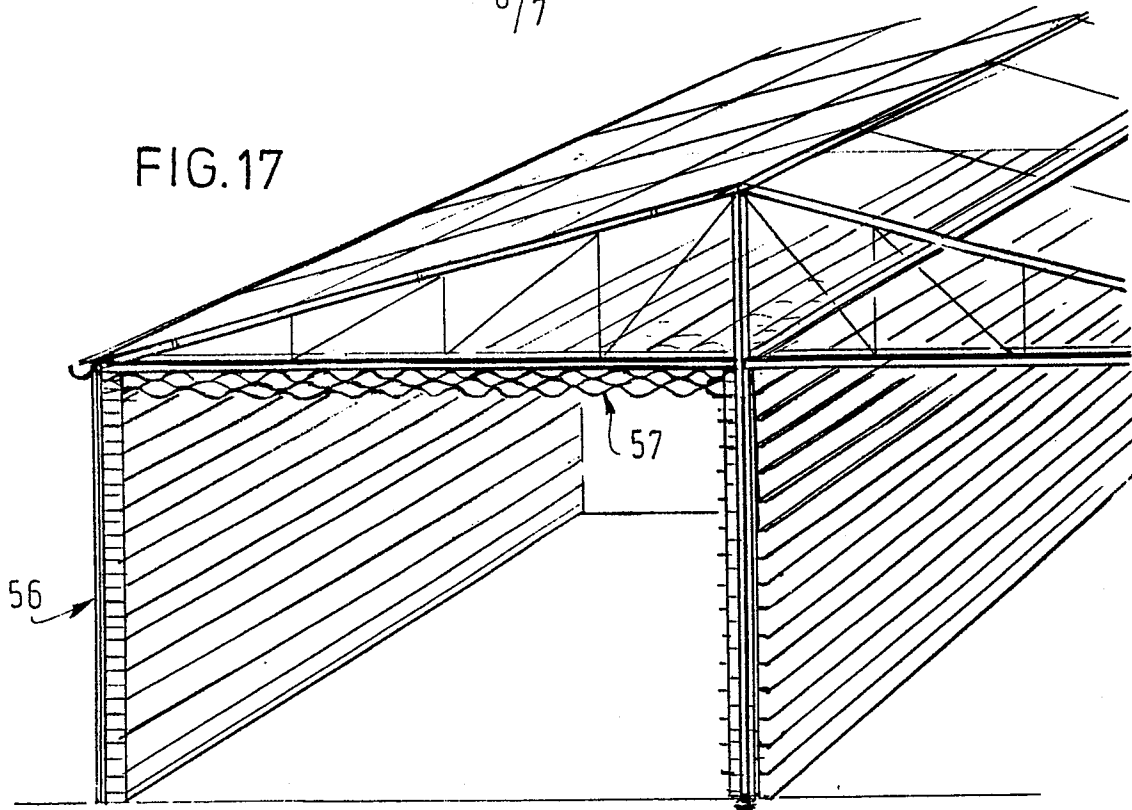
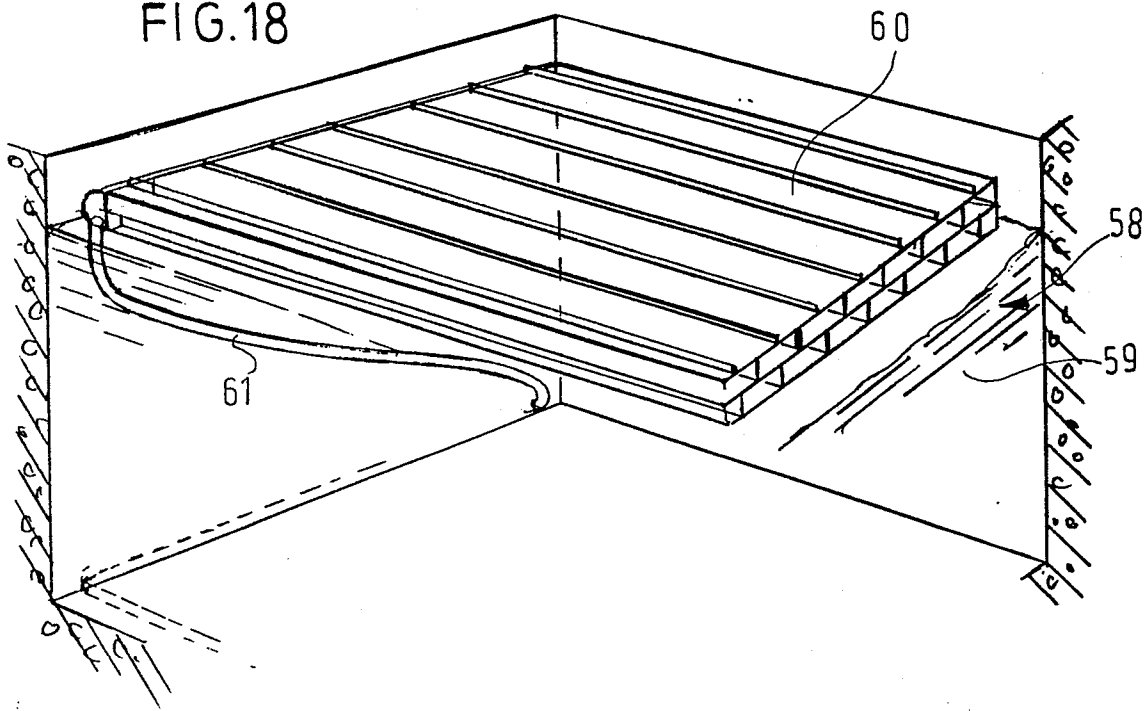


FIG. 18



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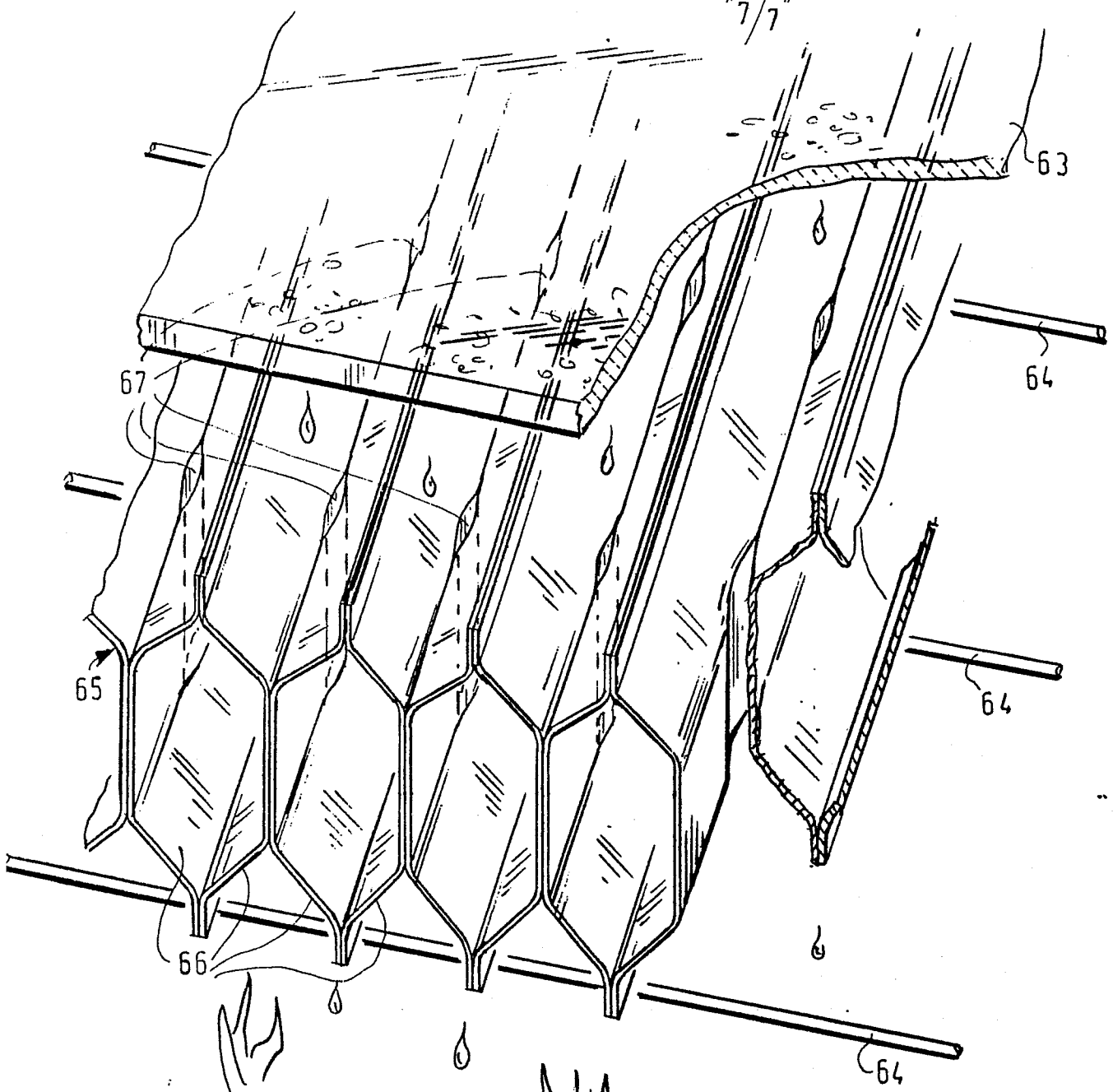


FIG. 19





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. <sup>3</sup> )
X	US-A-4 307 768 (ANDERSON) * Column 11, line 45 - column 15, line 17; figures 10-13 *	1	E 06 B 9/262 A 01 G 9/22
A	--- US-A-4 375 232 (HEESCHER) * Column 2, line 24 - column 4, line 7; figures 1,2 *	2	
P,X	--- EP-A-0 097 051 (DODSON) * Page 6, line 22 - page 18, line 13; figures 1-8 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. <sup>3</sup> )
			E 06 B A 01 G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19-07-1984	Examiner AYITER J.
CATEGORY OF CITED DOCUMENTS		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	
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			