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⑤④ **WALL SLAB.**

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**DE-A-2 636 049**  
**GB-A-1 472 101**  
**SE-A-74 092 701**  
**SE-B- 415 048**  
**US-A-4 109 436**

- ⑦③ Proprietor: **Ekstubbens Fastighets AB**  
**c/o Ingvar Gustafsson Bokföringsbyrå AB**  
**Harpsundsvägen 77**  
**S-124 40 Bandhagen (SE)**
- ⑦② Inventor: **Hellgren, David Alfred**  
**Algrytevägen 17**  
**S-127 32 Skärholmen (SE)**  
Inventor: **Kullberg, Bengt**  
**Storövägen 20**  
**S-141 42 Huddinge (SE)**  
Inventor: **Sundström, Bengt**  
**Nygaards Stuteri**  
**S-155 00 Nykvarn (SE)**
- ⑦④ Representative: **Westerlund, Christer et al**  
**L.A. Groth & Co Patentbyrå AB**  
**Västmannagatan 43**  
**S-113 25 Stockholm (SE)**

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## Description

The invention relates to an assembly for a building structure comprising an outer wall unit of a house having both load-bearing and heat-insulating functions, said wall unit comprising a slab of insulating material to a height of more than one storey and studs rigidly united with the insulating slab.

Such wall units are already known in a variety of embodiments—see for instance SE—B—415 048—although as with outer house walls produced in other ways, they have in common that they are distinctly separated from the foundation wall forming the footing of the house.

The separate erection of foundation wall and outer wall, as well as providing a damp course and air infiltration sealing in joints between them is complicated and laborious.

The object of the present invention is therefore to provide a labour-saving and cheapening simplification of the wall and footing structures.

The intended result is obtained by the assembly being given the characterizing features apparent from claim 1.

Some embodiments of the invention are described in the following in detail and with reference to the accompanying drawings.

Figure 1 is a vertical, partial section through a building without a cellar provided with a wall unit in accordance with the invention.

Figure 2 is a horizontal partial section along the line II—II in Figure 1, at the building footing level through the wall unit and a fixing post included in the foundations of the building.

Figure 3 is a vertical partial section similar to the one illustrated in Figure 1, but with the wall unit also utilized as a cellar wall and supplemented by an interior structural wall.

Figure 4 is a horizontal partial section through the wall unit and the interior structural wall including to IV—IV in Figure 3, and is taken at a level below ground.

Figure 5 is a plan view of a complete structural frame for carrying the wall units.

Figure 6 is a partial section through a beam for carrying the wall unit, when the beam is used as a form for a foundation slab before erecting the wall unit.

Figure 7 is a vertical partial section, similar to the one illustrated in Figures 1 and 3, but with the wall unit clad with facade brickwork.

The exterior wall illustrated in Figure 1 is built up from wall units, each of which primarily consists of a slab 1 of heat-insulating material with vertical recesses for accommodating studs 2, which are firmly united with the insulating material in the slab, e.g. by glueing along the sides and bottoms of the recesses. The slab 1 has sufficient length for extension over more than one storey, and forms with its studs 2 a unit which serves without a break as both exterior wall above the bottom floor structure 3 and also down to the foundation below the latter, under ground level also.

The wall unit is downwardly carried by a hori-

zontal beam 4, which replaces the normal building footing and is fixed to the foundations. In the embodiment according to Figures 1 and 2, this beam is a Z-section and has its web 5 engaging against the inside of the insulating slab 1, in which the studs 2 are accommodated in this case, the web thus engaging against the studs also, and being connected to them with the aid of conventional fixing elements 6. The bottom edge of the wall unit bears against the lower, horizontal, outwardly directed flange 7 of the beam 4. This flange has its end portion upwardly folded to form an end flange 8 for coaction with a slot in the insulating slab 1, in which the end flange 8 thrusts. The slot is situated in relation to the studs 2, the bottom ends of which bear against the flange 7, such that one side is gripped by the end flange 8, whereby the lower portion of the wall unit is effectively fixed.

The wall unit is upwardly provided with a notch for the whole of its width, one surface of the notch being horizontal and provided with a slot running through the insulating slab 1 and the upper end surfaces of the studs. The downwardly directed leg 9 of an angle section 10 thrusts into this slot, the section itself serving as a top plate for supporting roof trusses an attic floor structure 11 or the like, and also for fixing the position of the upper portion of the wall unit. In the illustrated embodiments the studs 2 are situated on the inside of the insulating slab 1, and they extend substantially to the full height of the slab. Figure 1 may be regarded as a depiction of a single-storey building or a building with several storeys. The wall unit serving as a combination of footing and outer wall may extend in height over several storeys, or only up through the bottom storey height, possible upper storeys having their own similar separate wall units.

The insulating slab 1 may suitably be produced from cellular plastics or similar material, particularly foamed styrene plastics, and the studs 2 can be made from wood, metal or plastics with appropriate strength properties. A suitable material is multi-laminated wood.

The wall units consisting of the insulating slab 1 with the studs 2 have low weight even for considerable formats, if they are made from cellular plastics and wood, for example, and are therefore easy to handle. Exterior and interior claddings 12 and 13 are therefore suitably erected after the wall units. To avoid the joints between the wall units coinciding with the joints in interior cladding 13, such as building board, the latter are made at the studs 2 situated at the distance from the side edges of the insulating slab 1.

Figures 1 and 2 give examples on how the beams 4 carrying the wall units are arranged on posts 14, e.g. steel piping, cast into spot foundations 15. The beams 4 are put together from previously determined beam lengths to form a frame structure, such as the one illustrated in Figure 5, representing the building foundation area and configuration in plan. Ready-manufactured coupling elements, e.g. corner elements 16,

are suitably used for putting the structure together. The frame is put into position, and setting-out can be reduced to one reference point and a reference direction, or two reference points, these points or point having counterpart on the frame. In the embodiment according to Figure 1, the posts 14 are also fixed to the beams 4 or the corner elements 16, and the frame adjusted to the right height before the spot foundations 15 are poured around the lower ends of the posts. Suitably, the frame is then finely adjusted before the concrete has set.

The beams carrying the wall units may be incorporated in a structure including a foundation slab, and in this case the beam framework may be used (see Figure 6) as a form when the slab is poured. Here it is suitable to reinforce the frame, e.g. with tension rods 17 provided with threads and nuts 18 at either end, the rods being arranged between opposing beams. The excess portions of the threaded ends can be cut off after the concrete has set in order to minimize the indentations made in the wall unit. The frame is also used first as an aid in setting-out and may have been provided with the wall units as well.

Figures 3 and 4 illustrate the wall unit used in a building with a cellar. The Z beam 4 is here illustrated as placed on a foundation slab, but may of course be placed as illustrated in Figure 6. In order that earth pressure may be taken into account, the wall unit is reinforced with an interior structure which simultaneously affords protection against ground radon. This structure consists, apart from the Z beam 4, of further sheet metal beams 19 having a C-shaped section with mutually opposing end flanges. Between the chief flanges of each such C-beam 19, as well as between the upper flange of the beam 4 and the substructure there are spaced vertical struts, e.g. of wood, plastics or metal, provided as reinforcing. The upper chief flange of the upper beam 19 is used here as bearing for the bottom floor structure 20. The interior wall structure may be used for reinforcing the wall unit to an optional height, e.g. corresponding only to the cellar depth or corresponding substantially to the full height of the wall unit, where the building may be of any kind at all, e.g. an industrial building with great height to its eaves and no basement. Instead of several beams 4, 19, it is possible to use a single high Z beam (not shown), e.g. with a welded-in web, extending up to the desired height. Similarly it is possible to use an entirely optional number of C beams 19.

The portions of the insulating slab 1 (Figures 1—4 and 7) under ground and immediately above ground are provided with a damp insulating exterior layer 22, possibly contoured, for providing an air space between the exterior layer 22 and the insulating slab 1.

Figure 7 illustrates the wall unit clad with facade brickwork. A damp insulating and surface-reinforcing material, e.g. a slab 23 of concrete, is placed against the wall unit 1 such as to form a footing for the brickwork 24.

There is also schematically illustrated in Figure 1 means for the mentioned adjustment in height of the structural frames 4, 16. The spot foundations 15 are poured in tubular forms, down into which the posts 14 are thrust. Adjusting screws 25 bear against the ends of the tubular walls at each foundation, these screws being mounted in a yoke, a plate 26, which is in turn attached to the post 14 or lifts it via the beam 4.

Strips 27 of heat-insulating material are inserted in edge slots in the joints between the wall units, see Figures 2 and 4, covering and sealing the joint.

#### Claims

1. Assembly for a building structure comprising an outer wall unit (1, 2) of a house having both load-bearing and heat-insulating functions, said wall unit comprising a slab (1) of insulating material to a height of more than one storey and studs (2) rigidly mounted with the insulating slab, characterized in that the wall unit extends as an integral unit above a bottom floor structure (3) and also as a footing thereunder down to and under the ground level, the studs (2) extending substantially to the full height of the insulation slab (1) and the wall unit being carried at its bottom edge by a horizontal beam (4) fixed to the foundation (14, 15).

2. Assembly as claimed in claim 1, characterized in that the studs (2) are situated on the inside of the insulating slab (1), that said slab (1) is made with recesses and produced from styrene cellular plastics and that the studs (2) are produced from multiply laminate and glued to the bottoms and sides of the recesses in the slab.

3. Assembly as claimed in any of claims 1 or 2, characterized in that the slab (1) downwardly and on its exterior in a portion of lesser thickness accommodates exterior damp-insulating and surface-protecting cladding (22, 23) at least under ground level.

#### Patentansprüche

1. Baukonstruktionsteil, der ein äusseres Wandelement (1, 2) eines Hauses umfasst und sowohl tragende als auch wärmeisolierende Funktionen aufweist, wobei das Wandelement eine sich über mehr als eine Etage erstreckende Platte (1) aus Isoliermaterial sowie mit der Isolierplatte fest verbundene vertikale Riegel umfasst, dadurch gekennzeichnet, dass das Wandelement sich als einteilige Einheit oberhalb eines Erdgeschossbaus (3) sowie auch darunter als Fussteil bis zur Geländeoberfläche und weiter nach unten erstreckt, und wobei sich die vertikalen Riegel (2) im wesentlichen über die ganze Höhe der Isolierplatte (1) erstrecken und das Wandelement an seiner unteren Kante durch einen am Fundament (14, 15) befestigten horizontalen Träger (4) getragen wird.

2. Baukonstruktionsteil nach Anspruch 1, dadurch gekennzeichnet, dass die vertikalen Rie-

gel (2) auf der Innenseite der Isolierplatte (1) angeordnet sind, dass die Isolierplatte (1) mit Falzen ausgebildet und aus Polystyrol-Schaumstoff hergestellt ist, und dass die vertikalen Riegel (2) aus mehrlagigem Schichtholz bestehen und an den Böden und Seiten der in der Isolierplatte vorgesehenen Falzen angeleimt sind.

3. Baukonstruktionsteil nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass unten auf der Aussenseite der Isolierplatte (1), in einem weniger dicken Abschnitt derselben, eine feuchtigkeitsisolierende und oberflächenschützende Aussenverkleidung (22, 23), zumindest unter der Geländeoberfläche, angeordnet ist.

#### Revendications

1. Ensemble pour une structure de construction comprenant une unité murale extérieure (1, 2) d'une maison ayant à la fois des fonctions de mur porteur et d'isolation thermique, ladite unité murale comprenant un pan (1) en matériau isolant d'une hauteur de plus d'un étage et des renforcements (2) unis de manière rigide au pan

isolant, ledit ensemble étant caractérisé en ce que l'unité murale s'étend d'un seul tenant au-dessus d'une structure de rez-de-chaussée (3) et également comme une assise descendant sous le niveau du sol, les renforcements (2) s'étendant substantiellement sur toute la hauteur du pan isolant (1) et l'unité murale étant portée à sa base par une poutre horizontale (4) fixée à la fondation (14, 15).

2. Ensemble selon la revendication 1, caractérisé en ce que les renforcements (2) sont situés sur l'intérieur du pan isolant (1), en ce que ledit pan (1) présente des évidements et est en mousse plastique de styrène et en ce que les renforcements (2) sont en laminé multicouches et collés aux bases et aux côtés des évidements présents dans le pan.

3. Ensemble selon l'une des revendications 1 et 2, caractérisé en ce que le pan (1) reçoit sur sa face extérieure et en direction de sa base sur une partie moins épaisse un plaquage protecteur de surface hydrofuge (22, 23) au moins en dessous du niveau du sol.

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Fig. 1

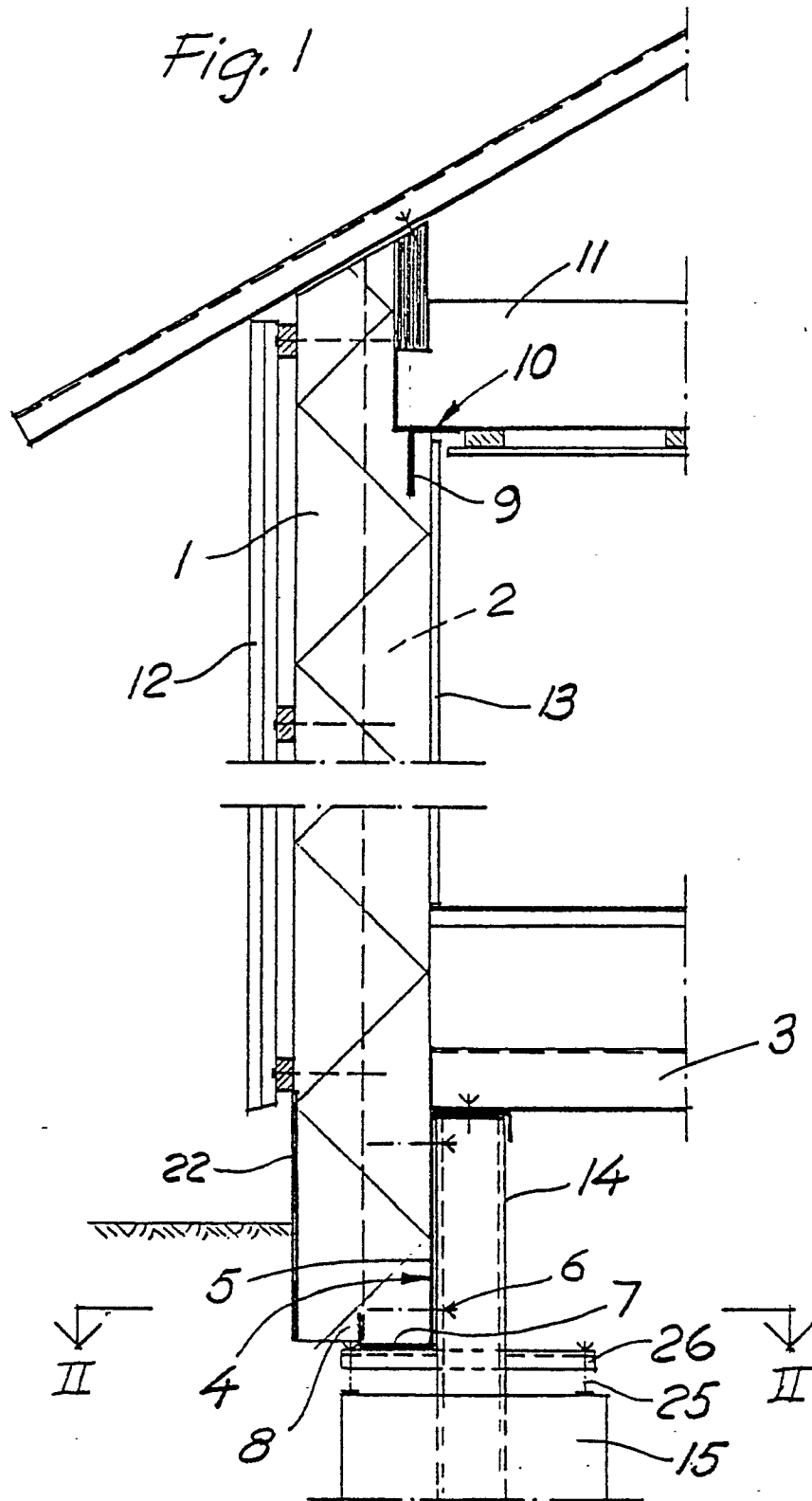


Fig. 2

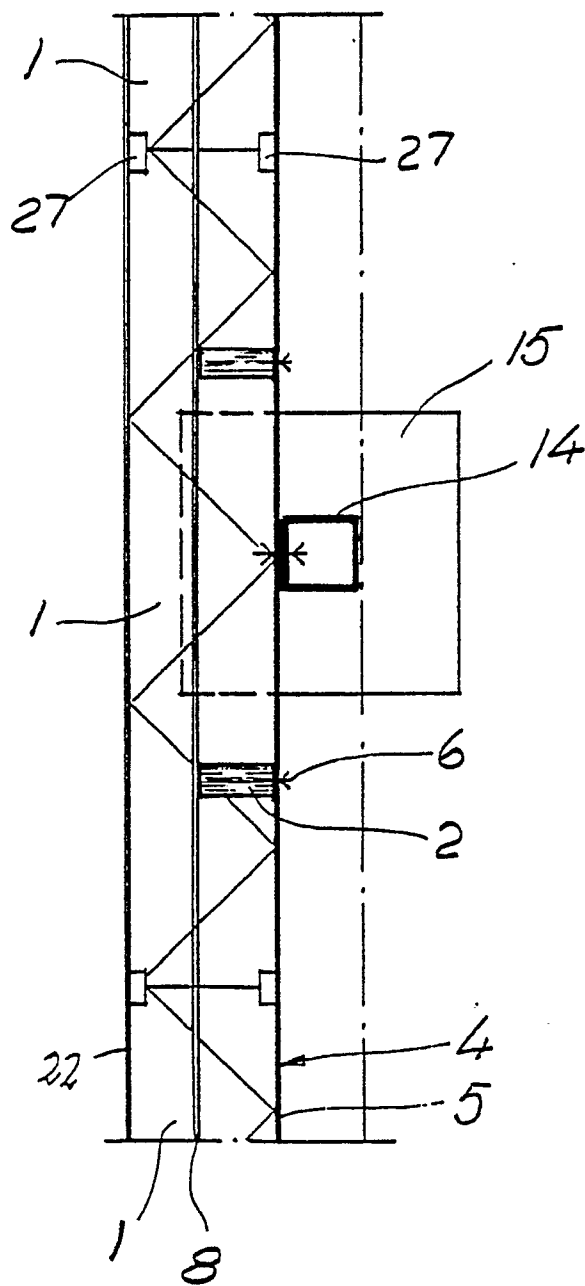


Fig. 3

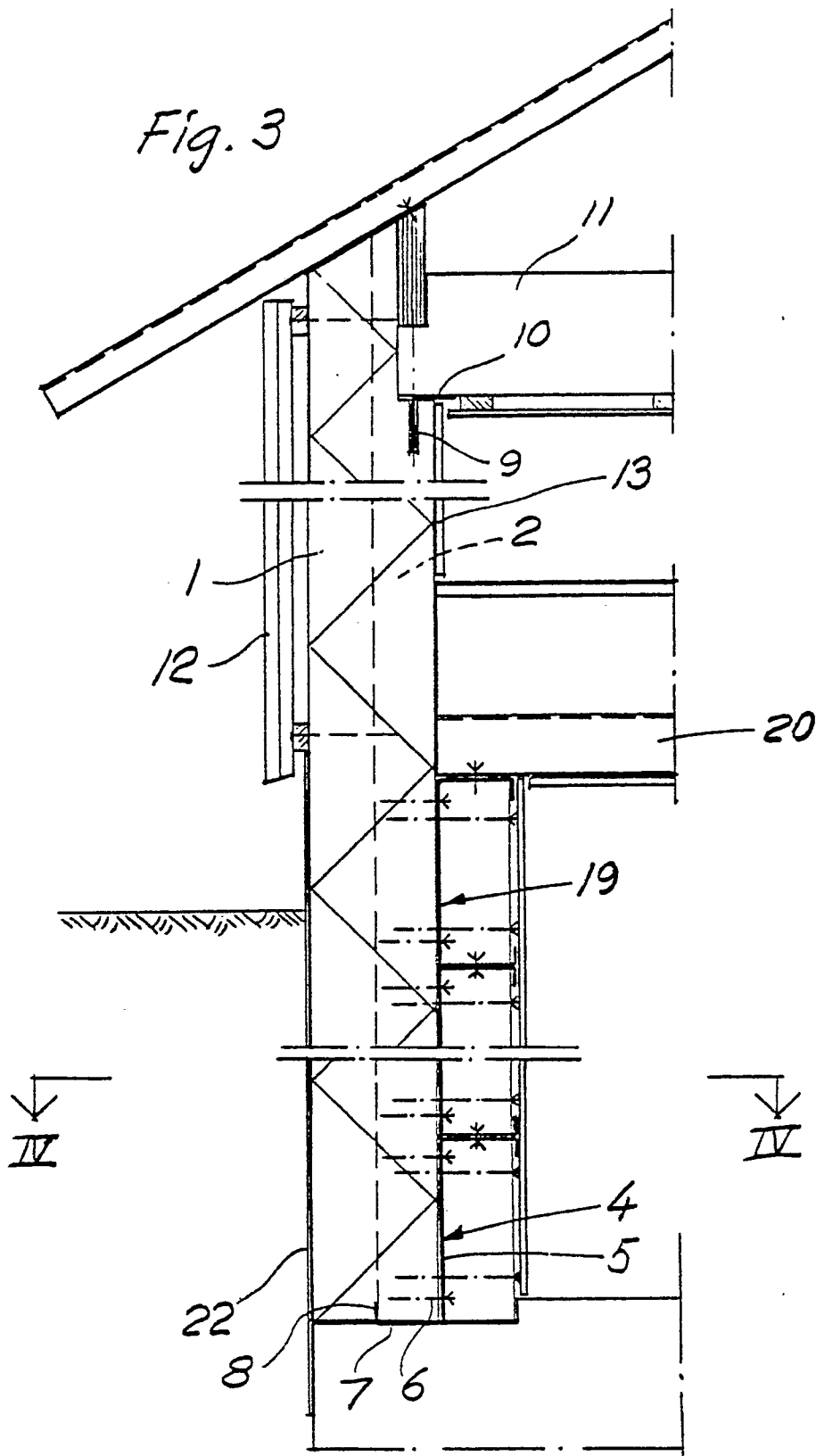


Fig. 4

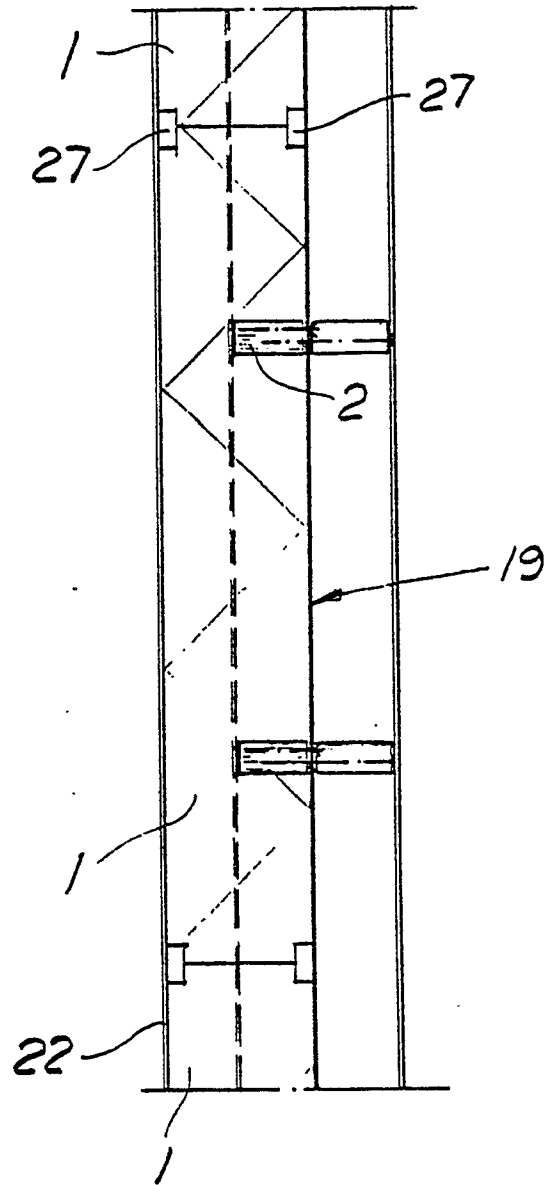


Fig. 5

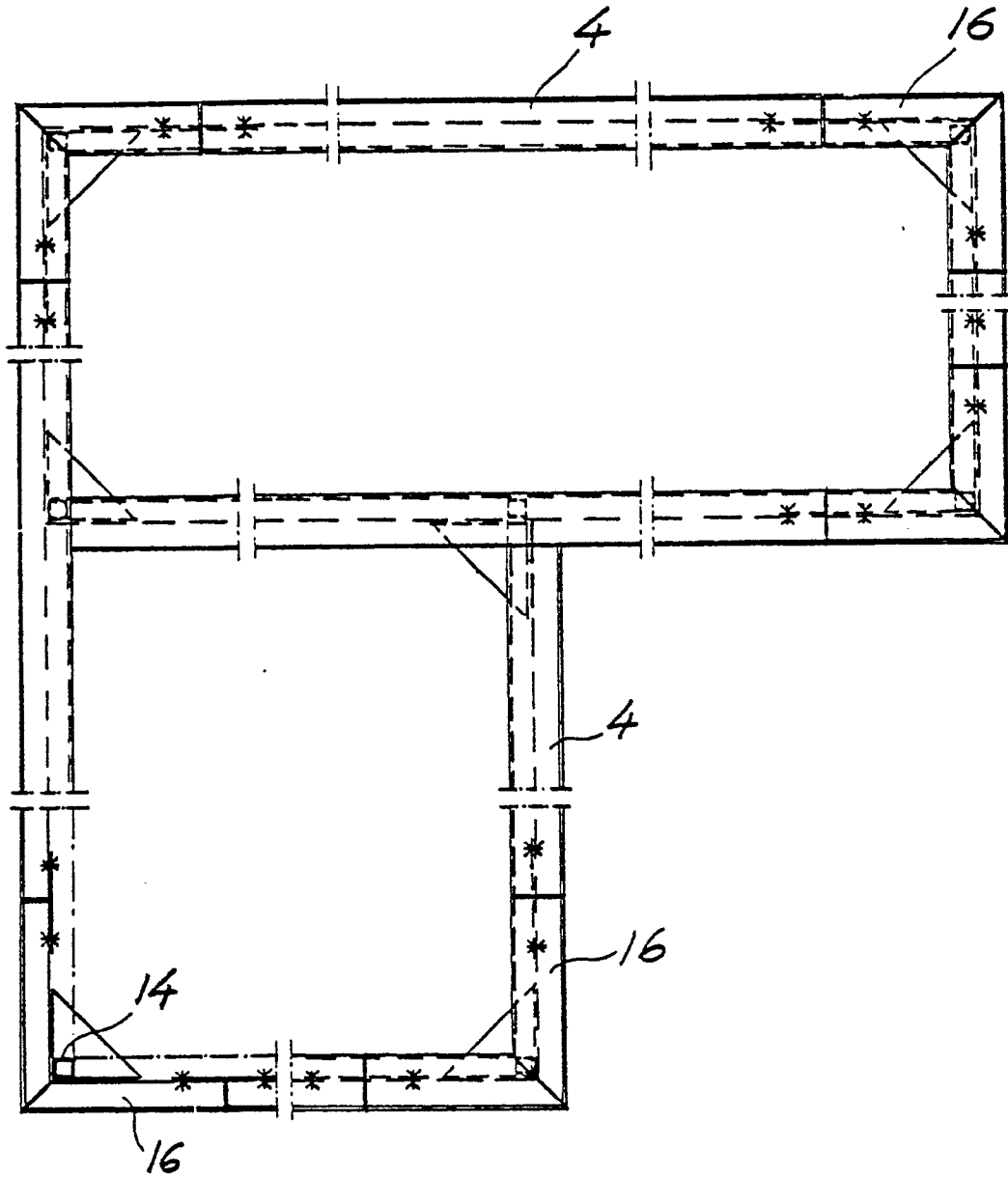


Fig. 6

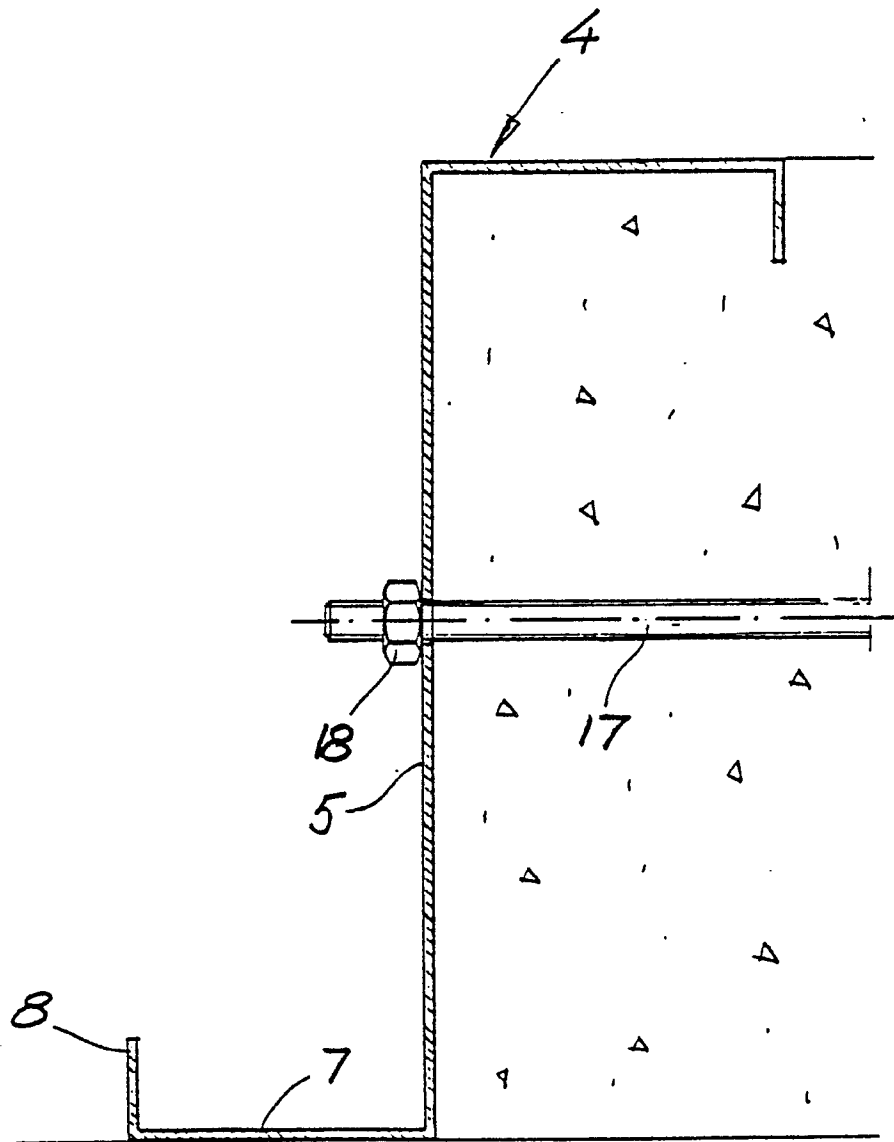


Fig.7

