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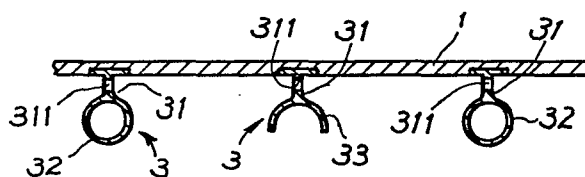
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54 **Inter-reinforced prefabricated insulation wall.**

57 An insulated wall is composed of two outer wall plates each being integrally formed by molding process, a plurality of reinforced elements each connecting the two outer wall plates and an insulated material filled within the two outer plates to form an integrated insulation wall with pre-formed decorative features on the outer plate to have strong interreinforced property prolonged service life and convenient installation.



INTER-REINFORCED PREFABRICATED INSULATION WALL

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This invention relates to an insulation wall, particularly an inter-reinforced prefabricated insulation wall.

Conventional curtain-wall construction is composed of two outer galvanized sheets or aluminum plates sandwiched with cement foam to provide the heat or noise insulation. However, such a curtain-wall construction requires the expensive metal sheets or plates and will increase processing cost if further being decorated by making art features thereon.

Conventional insulated wall is made by finishing the central foaming material such as foamed polystyrene with outer cement mortar. If some decorative features are expected on such an insulated wall, other decorative materials should be further installed on the outer cement mortar to increase cost and cause inconvenience for engineering construction.

The present inventor has found the defects of conventional insulated wall and invented the present inter-reinforced prefabricated insulation wall.

The object of the present invention is to provide an insulated wall composed of two outer wall plates each being integratedly formed by molding process, a plurality of reinforced elements connecting the two outer wall plates and an insulated material filled within the two outer plates so as to form an integrated insulated wall with preformed decorative features on the outer plates, and having strong inter-reinforced property for prolonged service life and convenient installation.

An embodiment of this invention is described by way of example, with reference to the drawings in which:

Figure 1 is a top-view sectional drawing of one outer wall plate of the present invention.

Figure 2 shows another outer wall plate of the present invention.

Figure 3 is a sectional illustration showing the assembly of the present invention.

Figure 4 is an illustration showing another preferred embodiment of the reinforced element of the present invention.

Figure 5 shows still another preferred embodiment of reinforced element of the present invention.

Figure 6 is a perspective illustration of the present invention.

Figure 7 is a sectional drawing showing the fixation of the present invention.

Figure 8 shows another installation method of the present invention.

Figure 9 shows another preferred embodiment of the present invention.

Figure 10 is a top-view sectional drawing when assembling the present invention.

Figure 11 shows another top-view sectional drawing of the present invention having window frame thereon.

Figure 12 shows the application as assembling the present invention of Figure 10.

Figure 13 shows a perspective illustration of the present invention having decorative features and window frame of Figure 11.

As shown in Figures 1, 2, and 3, the present invention comprises two outer wall plates 1, 2 each being integratedly formed by molding process, a plurality of reinforced elements connecting the two wall plates 1, 2 and an insulated material 5 filled within two outer wall plates 1, 2.

The outer wall plate 1, 2 may be made from fiber glass reinforced plastics or other polymer materials by molding process. The outer surface of each plate 1, 2 may be formed with decorative features during molding processing. The reinforced element 3 comprises a base plate 31 formed with several traverse holes 311 thereon and prefixed inside the wall plate 1 or 2, a hollow pipe 32 connected on the base plate 31, and a pipe holding groove 33 connected on another base plate 31 formed on another wall plate.

The hollow pipe 32 is combined with holding groove 33 by adhesive 4

coated therebetween. Insulated material 5 may be chosen from polyurethane, foamed resin, foamed cement or other suitable insulation materials. When making the present invention, two outer wall plates 1, 2 are first combined by binding each hollow pipe 32 with each corresponding pipe holding groove 33 by aid of adhesive 4. Then, the insulated material 5 is filled within the two wall plates 1, 2. If insulated material is polyurethane (PU), it may be filled therein, foamed and cured to bind the two plates. The PU resin may penetrate through holes 311 for homogeneous foaming. If insulated material is foamed cement, the foamed cement may be reinforced by the reinforced elements 3 of steel products. The outer plates 1, 2, the reinforced elements 3 and the insulated material 5 are formed integrately and prefabricated in the factory for ready service.

Figure 4 shows another reinforced element 3a which is made as H shape. Several traverse holes 311a are formed on the central connecting plate 31a which is perpendicularly terminated with two side edges 34. Two side edges 34 are respectively fixed on both outer wall plates 1, 2 by adhesive 4. Figure 5 shows another preferred embodiment of reinforced element 3b in which the central connecting plate 31b is formed with several traverse holes 311b and is centrally formed with a cylindrical jacket 32b jacked with a fixing bolt or pipe 32c therein.

The present invention may be formed with window frame 12, 22 for fixing window as Figure 6 shown. For fixing the present invention between reinforced concrete floor RC and roofing truss A, a fixing bolt 32c having two threaded ends 32d is inserted into jacket 32b and is thus fixed by upper nut 32e and lower nut 32 with aid of adhesive and sealant. Figure 8 shows another installation method by which the outer wall is lowerly cut with several recesses H and bolt B with washer W and adhesive are used to fix the present invention onto floor RC.

For fixing the present invention in several-story building, the

above-mentioned methods may be applied for fixing on concrete floor or concrete layer.

Another preferred embodiment of the present invention is shown in Figure 9 in which the reinforced means is simplified as straight bars or rods 3c. For connecting one wall to another neighbouring wall, each outer wall plate or 2 is respectively formed with side connecting edges 11 or 21 for assembling a plurality of wall units of the present invention.

In Figures 10, 11, 12 and 13, the present invention may be used to embed window or to form a door frame 13, 23 for diversified use of the present invention.

In order to enhance the binding strength between wall plate 1, 2 and insulated foamed cement, plurality of gravels 6 preformed on inside wall plate as shown in Figure 9 may be used for their stronger combination without separation or breakage.

The gravels 6 are bound on plate 1, 2 by a layer of adhesive 4 such as epoxy resin which should allow gravels clutch and bind the cement foam as gravels extending outwards.

The present invention has the following advantages superior to any conventional insulation wall:

1. The outer wall plates can be preformed with decorative feature or preformed with door or window frame or other civil engineering parts without further finishing and decoration to save cost and shorten construction time.

2. The outer plates, inner insulated material and the reinforced elements are integratedly and strongly bound together to have good strength and longer service life, but have the lighter weight for convenient handling and construction.

3. The special reinforced elements within the two wall plates act like steel bar in reinforced concrete and thus have good tensile strength but lighter total weight and good insulation effect either for heat, weather or

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sound insulation.

4. The insulated material, filled within the two wall plates 1, 2 and penetrating through the holes 311 of reinforced elements, diffuses homogeneously to bind the plates 1, 2 and reinforced elements 3 together so as to exert a strong inter-related binding force than any conventional insulation wall.

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Claims

1. An inter-reinforced prefabricated insulation wall comprising:
two outer wall plates each being integratedly formed by molding process;
a plurality of reinforced elements each connecting the two outer wall plates; and
an insulation material filled between said wall plates and through said reinforced elements;
the improvement which comprises:
reinforced elements each comprising a base plate formed with several traverse holes thereon and prefixed inside said wall plate, a hollow pipe connected on said base plate, and a pipe holding groove connected on another base plate formed on another wall plate whereby said hollow pipe is combined with said pipe holding groove by adhesive coated therebetween so as to bind two outer wall plates together for filling said insulated material therein.
2. An insulation wall according to Claim 1, wherein said outer wall plate is integratedly made from fiber glass reinforced plastics or other polymer materials by molding process.
3. An insulation wall according to Claim 1, wherein said insulated material is made from polyurethane or foamed cement.
4. An insulation wall according to Claim 1, wherein said reinforced element is made as H shape and formed with several traverse holes on a central connecting plate which is perpendicularly terminated with two said edges, each side edge being fixed on either wall plate by adhesive.
5. An insulation wall according to Claim 4, wherein said central connecting plate is centrally formed with a cylindrical jacket for jacking a fixing bolt or pipe therein so that said insulation wall can be fixed between reinforced concrete floor and the roofing truss by fixing nuts on

two threaded ends formed on upper and lower portions of said fixing bolt.

6. An insulation wall according to Claim 1, wherein said wall is lowerly cut with recess so that bolt, washer and adhesive can be used to fix on the recess and fix the integrated wall on reinforced concrete.

7. An insulation wall according to Claim 1, wherein said reinforced element is simplified as a reinforced straight bar or rod.

8. An insulation wall according to Claim 1, wherein said wall plates are preformed with window frame, door frame or side edges for connection of neighbouring wall plates.

9. An insulation wall according to Claim 1, wherein said outer wall plate is inner paved with plurality of gravels so as to enhance the binding with insulated material of foamed cement.

10. An insulation wall structure and arranged substantially as herein described with reference to any of the figure of the drawings.

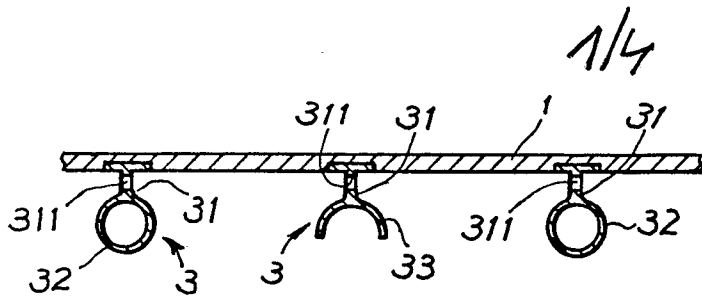


Fig. 1

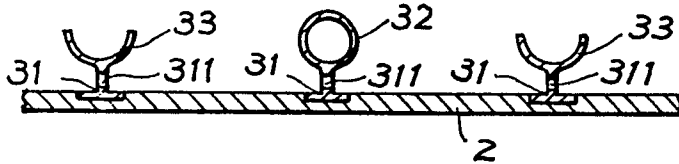


Fig. 2

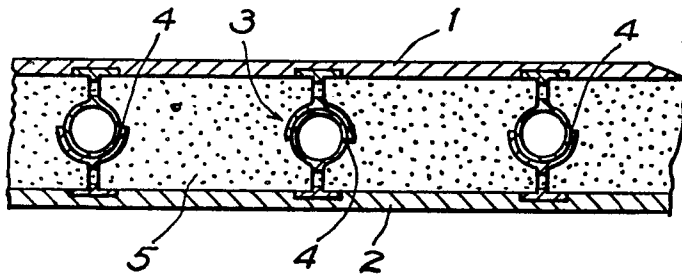
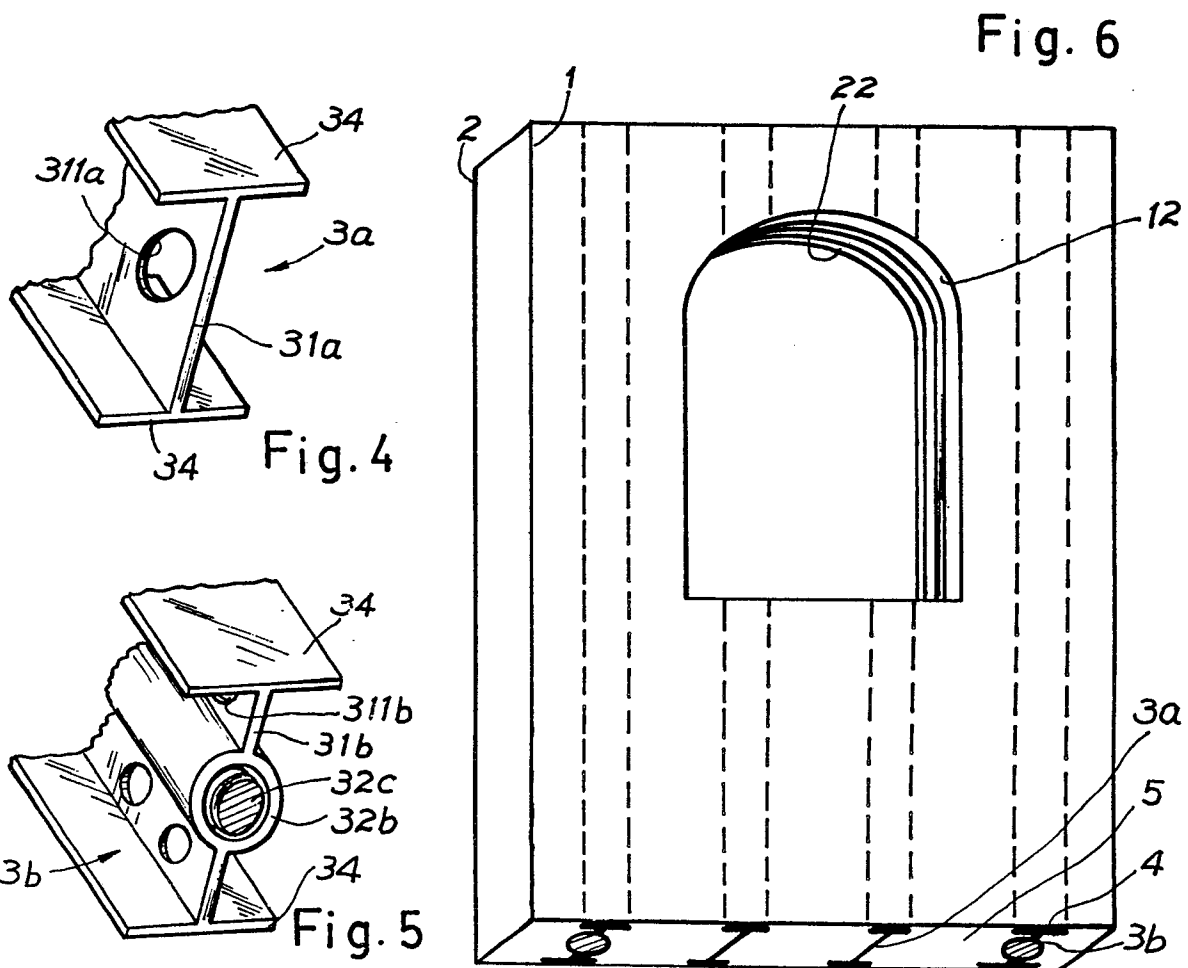


Fig. 3



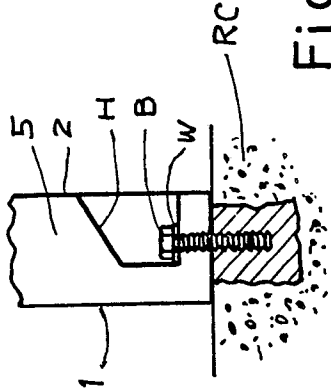


Fig. 8

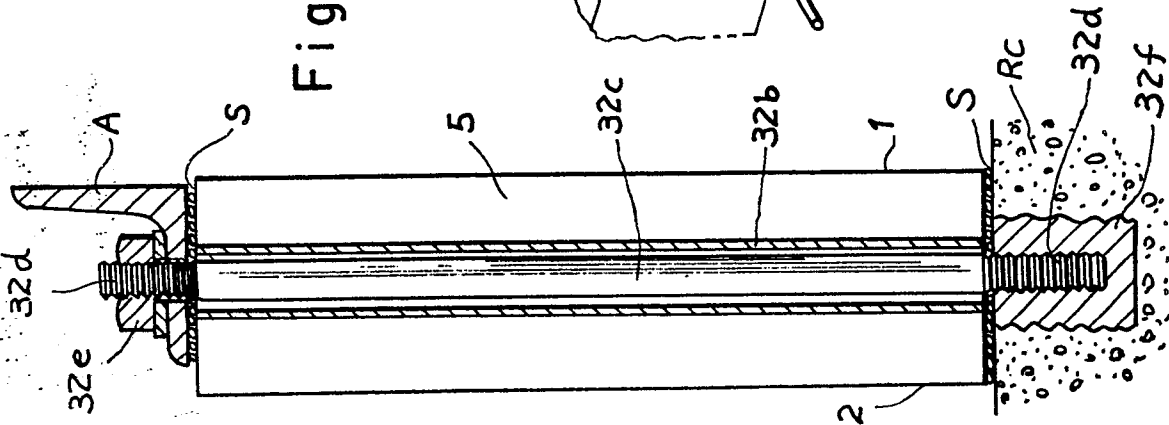


Fig. 7

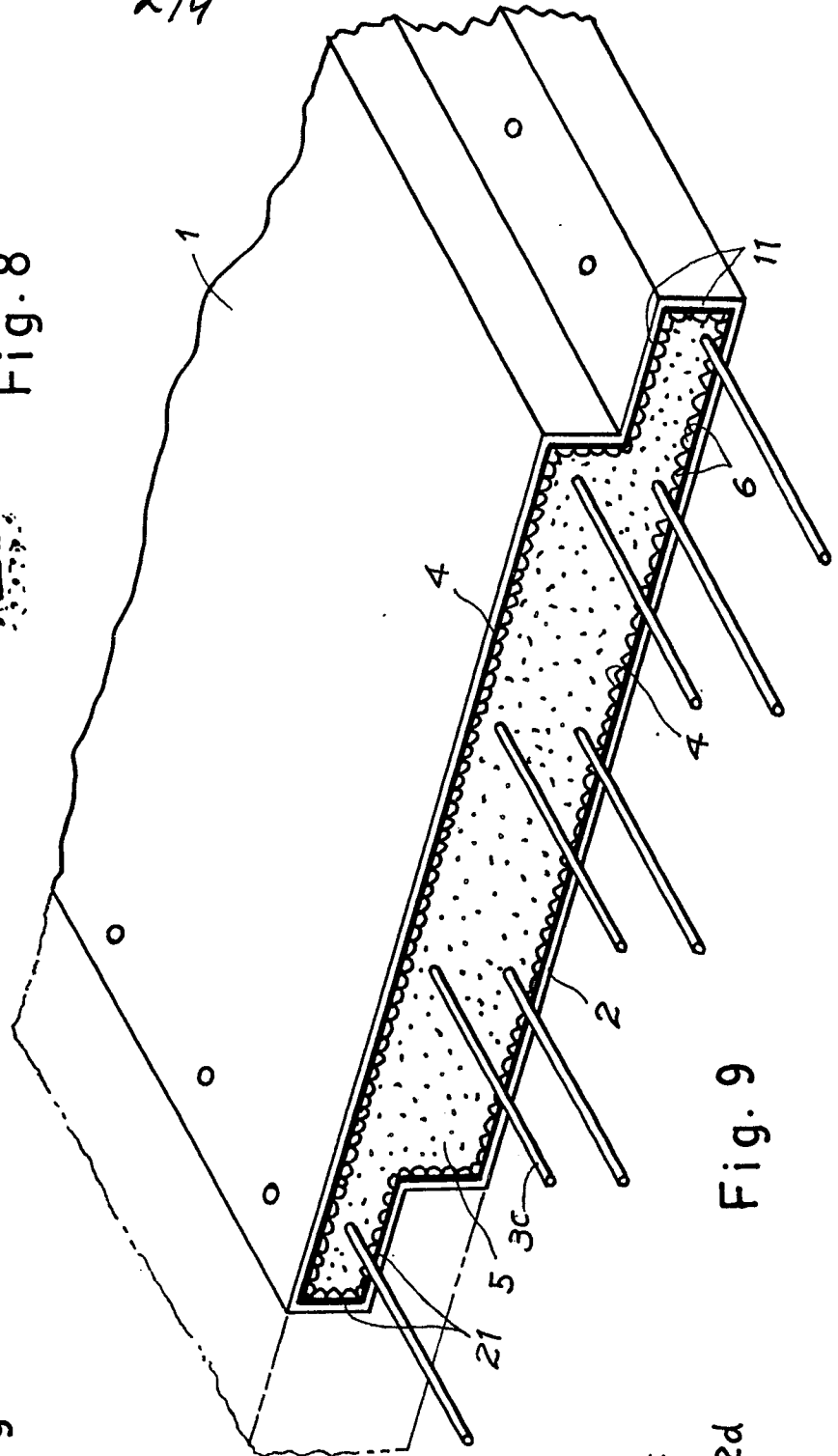
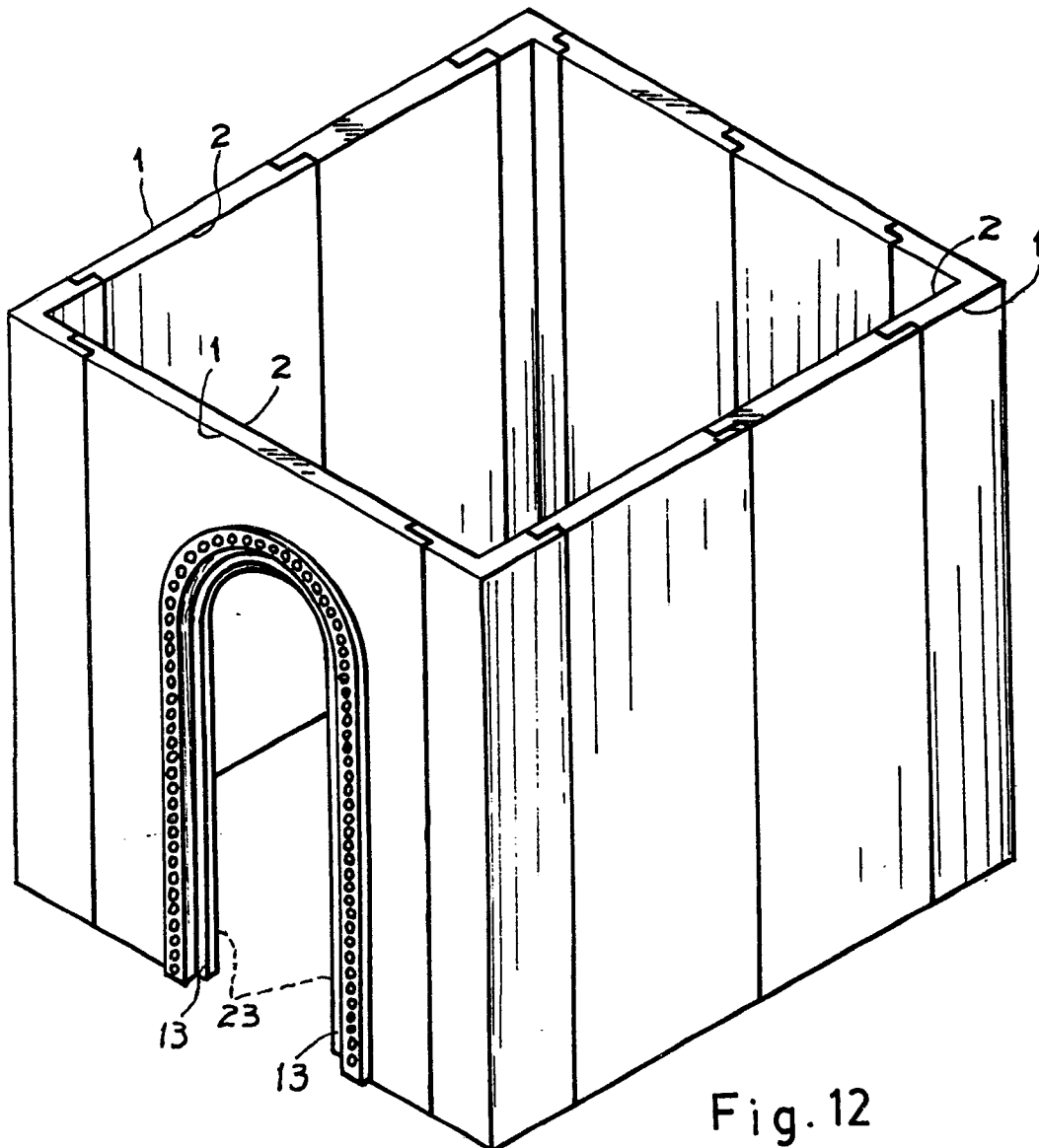
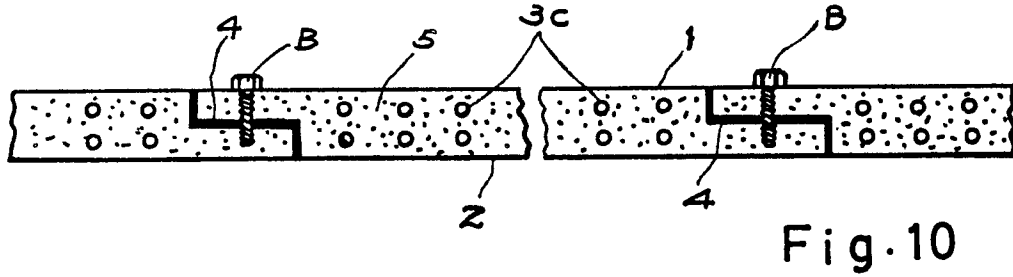


Fig. 9



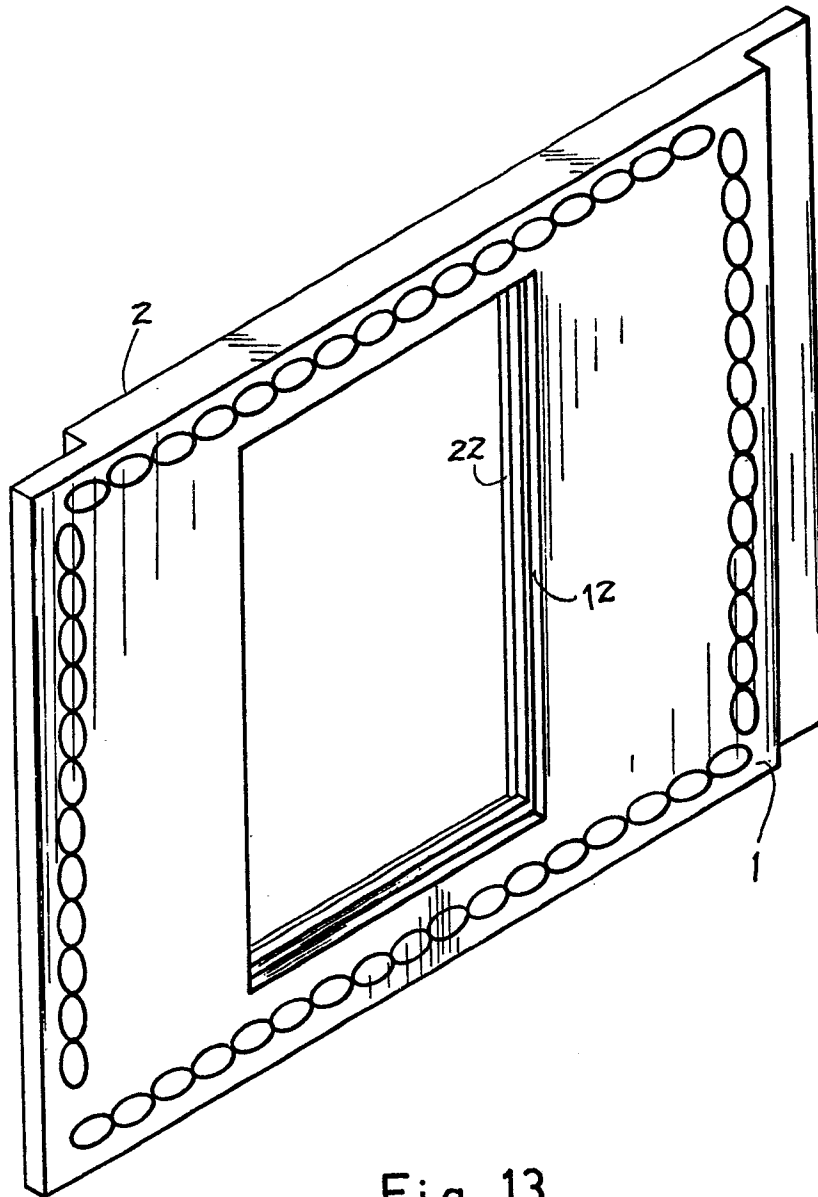


Fig. 13