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(71) Applicant: Cuthbert, James David Rollo
 Amwellbury Farmhouse Walnut Tree Walk
 Great Amwell Hertfordshire(GB)

 (72) Inventor: Cuthbert, James David Rollo
 Amwellbury Farmhouse Walnut Tree Walk
 Great Amwell Hertfordshire(GB)

 (74) Representative: Arthur, George Fitzgerald et al,
 KILBURN & STRODE 30, John Street
 London WC1N 2DD(GB)

(54) Hinge.

(57) This invention is a hinge for joining two panels together edge to edge, for example, in making a folding cabin. The two hinge components (11, 12) each define a panel recess (21, or 22) and a hinge recess (23 or 24) separated by a partition (17 or 18). Scrolls (22 and 26) in the hinge recesses can be fitted together by longitudinal sliding, and then co-operated to form the hinge, and also form a kind of labyrinth seal against moisture penetrating across the hinge. The partitions (17 and 18) protect the edges of panels in the panel recesses from moisture.

The hinge can be used in a method of building a cabin from large but light heat insulating panels (31). Roof ridge panels 41 and 42 are hinged together at 43 and pushed up to the ridge position by being slid along the upper edges 73 of end walls 54 and/or by being guided over and pivoting on the upper edge 72 of a partition 46.

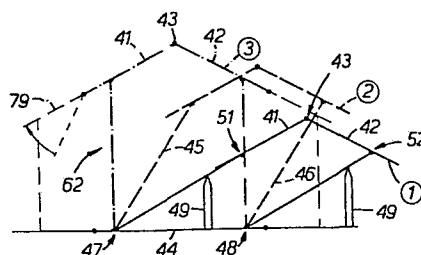


Fig. 6.

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HINGE

This invention relates to a hinge suitable for hinging together edge to edge, two panels, for example for use as walls or floor or roof or ceiling of a foldable cabin. An example of such a cabin

5. is described in British Patent Specification No. 79.30089 and an example of such a hinge is described in British Patent No. 1508122.

10. It is an object of the present invention to provide such a hinge which enables the edges of the panels to be joined to be sealed from the weather and in particular from rain.

- According to the present invention, a hinge comprising two extruded section components, for example of aluminium, each section of which defines
15. a hinge recess housing one of a pair of co-operating scrolls, one on each component, is characterised in that each component section above defines a recess for a panel or the like and a partition separating the two recesses.

- The panel recess can be defined between
20. two opposed parallel side walls, together with the partition joining their interiors, so that the panel can be fitted into that recess, and the edge which would otherwise be exposed is thus protected from the weather. The scroll constituting one component of the
25. hinge is in the hinge recess on the other side of the partition from the panel recess. Thus, even though moisture will be able to enter the hinge recess, that can be completely sealed off from the panel recess by the partition and will not damage either panel.

30. Conveniently the side walls defining the recesses

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can be provided with appropriate shelves, stops or flanges for defining the extreme positions of the hinge, for example, positions in which the panels hinged together are in the same plane, and are at right angles to each other.

5. Conveniently, there are also extruded channel sections capable of fitting over an edge of a panel and of fitting snugly into a hinge recess on a hinge component. One extrusion may consist of two such
10. channels back to back with intermediate connections and there may also be a strengthening extruded section of square or rectangular form which can fit snugly into a channel section where additional strength is needed.
15. Morley's British Patent Specification No. 86.2027 discloses a complete wall structure having co-operating hinge components at opposite edges, but does not deal at all with the problem of pivotally connecting together two special, light panels.
20. The invention includes a method of building a cabin or the like from panels in which a pair of roof ridge panels are hinged together at what will be the ridge and are pushed up to the ridge position while resting on the upper edge of at least one wall, or
25. partition panel. The hinge may be as defined above.

The invention may be carried into practice in various ways, and two embodiments will now be described by way of example, with reference to the accompanying drawings; in which:-

5. FIGURES 1, 2 and 3 show two hinge components coupled together in three different hinge positions, FIGURE 4 shows two extruded section components fitted at opposite edges of a panel to be joined by the hinge of FIGURES 1, 2 and 3;
10. FIGURE 5 shows an additional extruded section component which can be used for strengthening; FIGURE 6 is an end view of a cabin at various stages during lifting the roof by one method; FIGURE 7 is a partial plan view of the cabin
15. before the sides have been lifted into position; FIGURES 8, 9 and 10 are end views of three successive stages in the lifting of the roof by another method.
20. Referring to FIGURES 1, 2 and 3, it can be seen that the two extruded section aluminium hinge components 11 and 12 consist of a pair of opposed spaced parallel side walls, 13 and 14, or 15 and 16, with an intermediate partition 17 or 18, extending between them at an intermediate position, and separating the space
25. between the opposite side walls into a panel recess 21 or 22 and a hinge recess 23 or 24. The two recesses are completely separated from each other by the partition so that moisture in the hinge recess cannot come into contact with a panel in the panel recess.
30. Each hinge recess includes a scroll 26 or 27. The scroll 26 is positioned between the ends of the two side walls 13 and 14, and curves over and backwards

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into the space between them, whereas the scroll 27 is an extension of the side wall 16 turning inwards and towards the partition 18; the edge of the wall 15 is spaced from the scroll 27 to allow a space for the

5. insertion of the scroll 26. A panel 31 (Figure 4) has one edge fitted within an aluminium extrusion component 32 of channel cross section, which is a snug fit in the panel recess 21 or 22. The opposite edge of the panel 31 in the example of FIGURE 4, is

10. in a similar channel section 33 which forms part of a composite extruded component consisting of two opposed channels 33 and 34 back to back with connections 35 between them, and serves to hold the panel 31 rigidly with a neighbouring panel in the

15. channel 34.

Either after the panels (such as 31 with its edge component 32) have been fitted into the two hinge recesses 21 and 22, or preferably before they have been fitted in, the two hinge components 11

20. and 12 are assembled together by longitudinal sliding.

In the position shown in FIGURE 1, with the two panels parallel and edge to edge, a flange 41 extending inwardly from the end of the side wall 13 fits into a corresponding recess between the partition

25. 18 and the side wall 15, the edge 42 of the side wall 14 fits against an external shoulder 43 formed on the side wall 16, and the scroll 27 fits fairly snugly within the part of the scroll 26 formed by the partition 17. There is thus location against any

30. substantial movement between the two components

in the plane of FIGURE 1 except clockwise hinge movement about an axis defined where the two scrolls engage one another. Further clockwise movement of the component 11 is prevented.

5. In the intermediate position shown in FIGURE 2, movement is guided by sliding of intermediate portions of the scrolls in relation to one another and the edge of the side wall 13 locates against the partition 18.
10. In the folded position of FIGURE 3, with the two panels at right angles to each other, the edge of the scroll 27 abuts against an inner surface of the scroll 26, the flange 41 abuts against the inside of the side wall 16, and the edge of the side wall 15
15. abuts against the outer surface of the side wall 11 to provide a positive stop when the components have been turned through 90° .

- It will be observed that in all positions of the hinge, and whether or not the inside or the
20. outside of the right angle shown in FIGURE 3 is exposed to the weather, it is only the hinge recesses that can receive water. Water cannot attack the edges of the panels in the panel recesses, and water can hardly get from the outside to the inside because
25. of the kind of labyrinth seal formed by the co-operating scrolls, while one of the scrolls will always act to hold water. Similarly wind cannot easily penetrate the joint.

- The components can be fairly easily extruded in
30. quantity, and are simple to use because they only

have to be fitted over the panels and then slid together.

Where it is necessary to join extrusions to the panels, self-tapping screws, or screws and bolts

5. can be used.

It may be useful to enable a tube with the square section of FIGURE 5 to be used for transverse reinforcement, and for connection to other aluminium extrusions. It is a snug fit in the section 32.

10. The hinge just described enables panel structures to be very easily built up. A typical panel is shown at 31 in FIGURE 4, and consists of an outer layer 41 of external plywood, a main body of heat insulating urethane foam 42, and an inner vapour impermeable
15. aluminium lining 43. That material can be obtained in preformed rectangles, and has good structural and heat insulating properties, while yet it is very light. It can be fitted at its edges into the panel recess in a hinge member 11 or 12, described
20. above, either directly if it is thick enough after it has been fitted in a channel section 32 (FIGURE 4) which fits the panel recesses, if it is not.

Quite a large rectangular panel can be lifted by two people, and joined to a neighbouring panel
25. by relative sliding of the hinge components along the hinge axis, and then pivoted into position by turning of the hinge.

The method of use can be exemplified with reference to FIGURES 6 and 7, which show how quite
30. a substantial cabin can be quickly and easily erected from such panels by two people.

The cabin is shown diagrammatically in end view in FIGURE 6. The most difficult task is the lifting into position of the two panels 41 and 42 which are hinged together at the apex or ridge 43, but that

5. can be done in the following way

First of all a central floor panel 44 is laid in its proper position on the foundation, and then a pair of fore-and-aft extending partition walls 45 and 46 are hinged to the bottom panel 44, at

10. 47 and 48 by use of hinges described above. Each partition 45 or 46 is lifted by two men and hinged to the base panel 44 by longitudinal sliding. The two partitions are allowed to hinge over near to the ground where they rest on temporary props 49. Then

15. the two roof ridge panels 41, 42 are hinged together at the ridge hinge 43 in a similar manner, and then they are hinged to the upper ends of the partitions 45 and 46 as indicated at 51 and 52. If necessary each of the ridge panels 41 and 42 can be

20. hinged to its partition 45 or 46 in turn, the second ridge panel being simultaneously hinged at the ridge hinge and at the partition hinge 51 or 52.

Then the four panels 45, 46, 41 and 42 are pushed to the erected position by turning about

25. all five hinges, so that they move from the solid line position in FIGURE 6 through the dashed line position to the final position shown in chain lines with the two partitions vertical. During this hinging movement much of the weight is taken on the base

30. panel 44 at 47 and 48 and two men can lift the ridge

panels by pushing. It will be appreciated that the greatest load is experienced at the starting position where it is borne by the temporary props 49.

- Once those components have been erected, they
5. can be easily retained in their final positions by one man, or by props, while a front panel 54 is hinged along the front of the base panel 44 at 55, and base side extension panels 56 are hinged along the sides of the base panel 54. Front panel
10. side extensions 57 are pivoted to the front panel 54 at 58, and side panels 59 are pivoted to the panels 57 at 61, so that all the sides are laid out horizontally, pivoted together around the base panel 44.
15. The panels 54, 57, and 59 are then lifted up by hinging about 55 until the front panel 54 is underneath, and supports, the ridge panels 41 and 42. The sides 59 are hinged about 61 to their correct position above the outer edge of the base sides 56
20. and they are then joined to corresponding side panels joined in a similar manner to the other end of the base panel 44.

- All of the panel components are then in their final positions and can be fixed there by any
25. convenient means.

- It will be appreciated that panels are joined together by sliding hinge components together while the hinge axes are horizontal with only one panel being carried at any time between two men.
30. Assembly of panels side by side is easy because the

hinge components 11 and 12 allow plenty of play other than in the 90° and 180° positions of FIGURES 3 and 1 respectively. Similarly hinging upwards is easy because the components are light, and they

5. do not have to be lifted bodily but are hinged upwards so that the hinges take much of the load. The hinges, being elongate hinges of continuous cross-section, do not get deformed locally.

- Windows, doors, and so on, as indicated at
10. 62 can be included in the various front and side panels and partitions as required. In some circumstances the following method is simpler.

- First of all both of the end panels 54 are pivoted to the base and lifted up to their final
15. position, and then one or both of the partitions, 45 and 46 are similarly pivotted to the base, moved up to the final vertical position, and secured.

- The first roof ridge panel 41 is lifted up by two men, one at each side until its upper edge 71 is
20. resting on the top corner of the/or each end panel 54. Then the roof ridge panel 41 is pushed up towards the position shown in FIGURE 8 by two men, one at each side, using the edge of the panel, or panels 54 as a guide, and possibly also the upper edge 73 of the
25. partition. 46.

- The other roof ridge panel 42 is hinged at 43 to the lower end of the roof ridge panel 41, and then the lower edge 74 of that panel is pushed by the end, shown at 75 in FIGURE 8, so that the two
30. hinged roof ridge panels move up towards the position shown in FIGURE 9. By levering up or down

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- on the edge 74, the two hinged panels can be manipulated about the corner 72 as fulcrum for the panel 42, and the ridge point 76 as fulcrum for the panel 41 so that movement of the two panels can be controlled until
5. with further pushing upwards and pivoting, the panel 41 can be lowered onto the edges 77 of the ends 54, and the panel 42 lowered onto the edges 78.

- Once the roof ridge panels are in position and hinged together, they can be fixed to neighbouring
10. vertical walls or partitions by any convenient brackets and indeed at any stage in the operation a panel can be supported by a strut having one hinge component at one end co-operating with the other hinge component on the panel, and after the roof is in the position
15. shown in FIGURE 10, four or perhaps more such struts can be connected to roof panels and base, possibly through such hinges to retain the roof firmly in position against winds.

- Once the two roof ridge panels are in position,
20. the lower panels as indicated at 79 in FIGURE 6 can be hinged to the lower ends of the roof panels 41 and 42 in both methods of erecting, and secured in position by conventional means. It will be appreciated that those panels do not have to be lifted very high
25. because they only have to be connected to the lower edges 43 of the roof ridge panels.

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CLAIMS

1. A hinge comprising two extruded section components each of which sections defines a hinge recess including a different one of a pair of co-operating scrolls (26,27), characterised in that each section also defines a recess for a panel or the like, and a partition separating the two recesses
2. A hinge as claimed in Claim 1 in which the sections of the two components are formed with shelves, stops or flanges, to define two limiting positions of the hinge.
3. A hinge as claimed in Claim 2 in which in the limiting positions, panels in the respective recesses are at 90° , and in the same plane with, each other.
4. A hinge as claimed in any preceding claim in which the scrolls co-operate one inside the other to define a hinge axis and to act as a kind of labyrinth seal against the penetration of moisture from one side of the hinge to the other.
5. A hinge as claimed in any of the preceding claims in combination with at least one additional extruded section (3) defining channel (33,34,45) which are a snug fit in the panel recesses or in which panels (31) are a snug fit, the additional section defining at least two such channels at a fixed angle to each other.

6. A hinge as claimed in any preceding claim in which each section has two spaced flat, parallel walls (13, 14, 15, 16) defining the panel recess between them with no part substantially outside the parallel walls.

7. A hinge as claimed in Claim 6 in which, in the limiting positions, the flat walls of the components are in contact with each other.

8. A method of building a cabin or the like from panels in which a pair of roof ridge panels (41, 42) are hinged together at what will be the ridge (43) and are pushed up to the ridge position while resting on the upper edge of at least one wall, or partition panel (46, 54, 72).

9. A method as claimed in Claim 8 in which one of the roof ridge panels is pushed over the upper edge of a vertical partition or wall panel parallel with the ridge, while it is hinged to the other roof ridge panel.

10. A method of building as claimed in either of Claims 8 and 9, in which the roof ridge panels are hinged together by a hinge as claimed in any of Claims 1-7.

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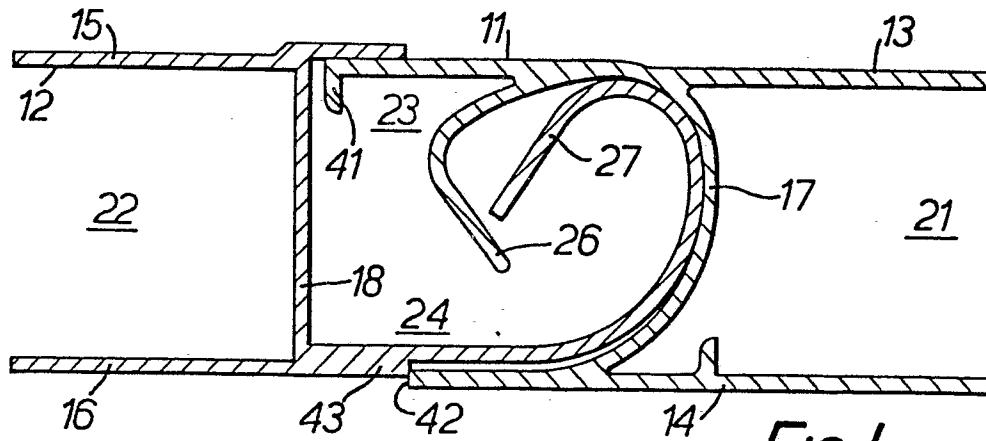


FIG. 1.

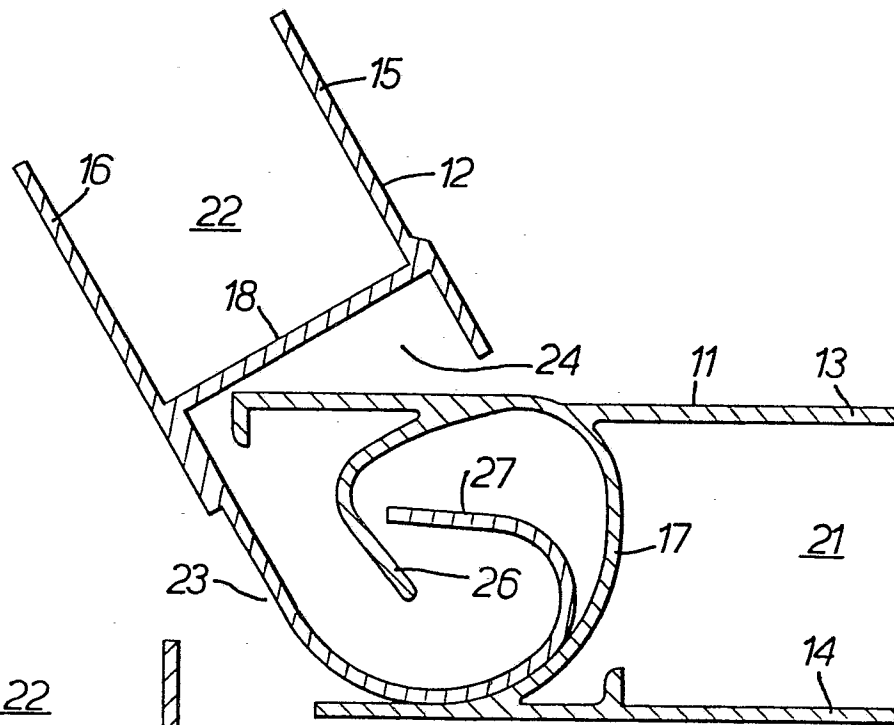


FIG. 2.

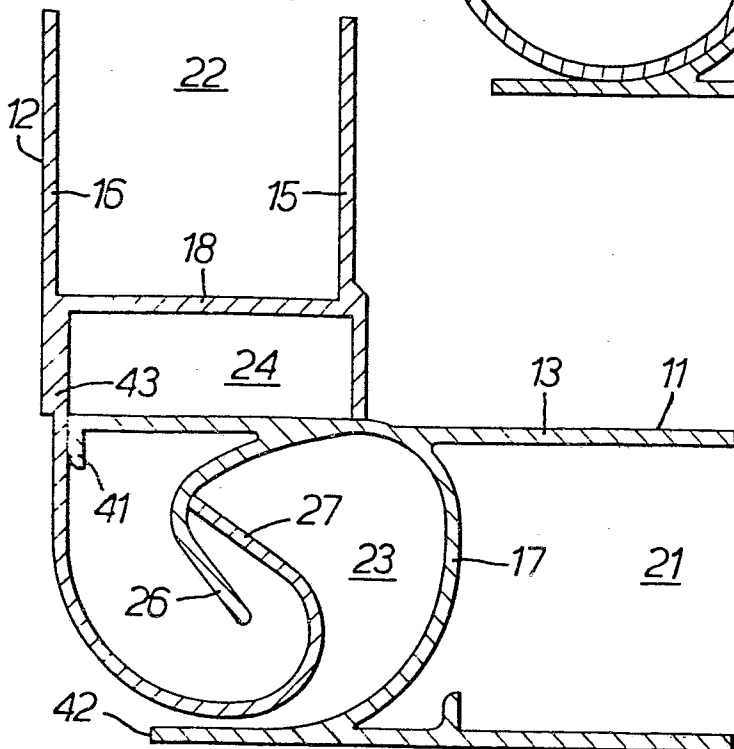


FIG. 3.

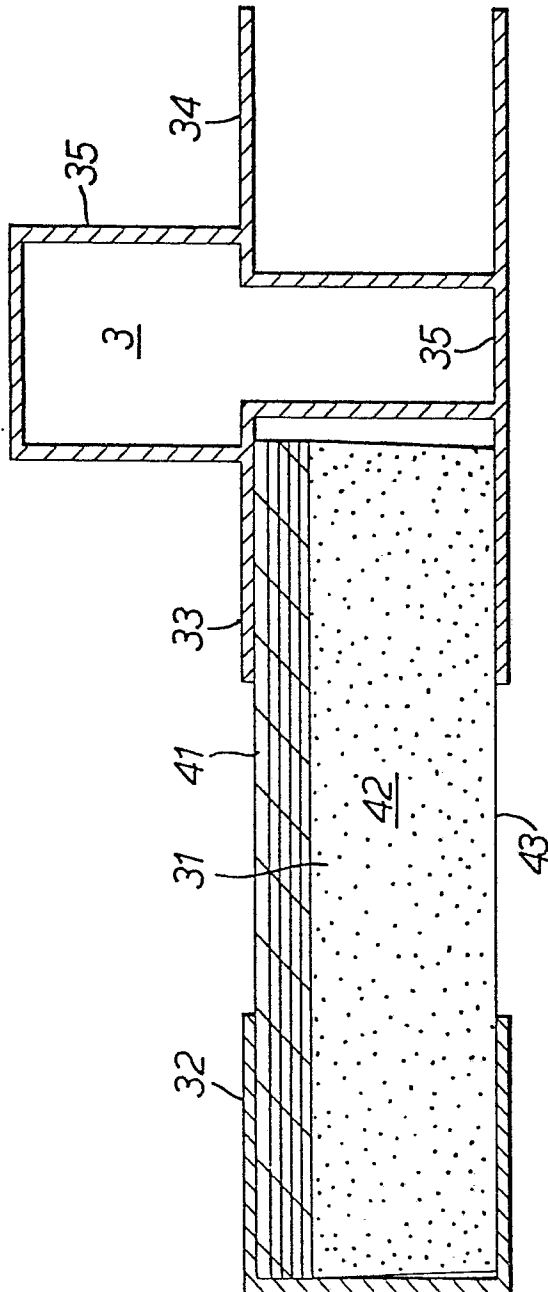


FIG. 4.

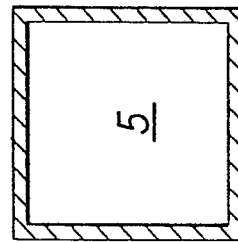


FIG. 5.

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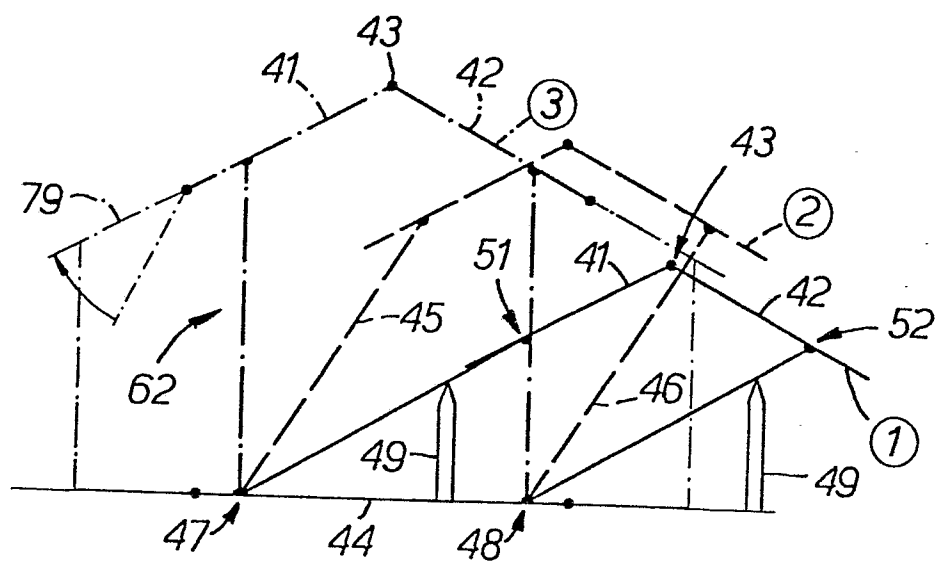


FIG. 6.

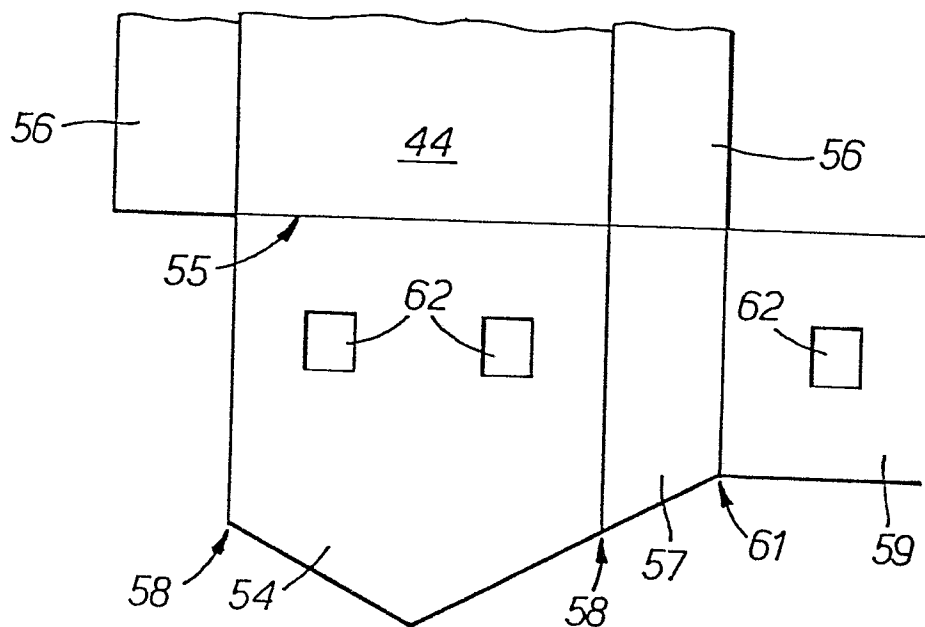


FIG. 7.

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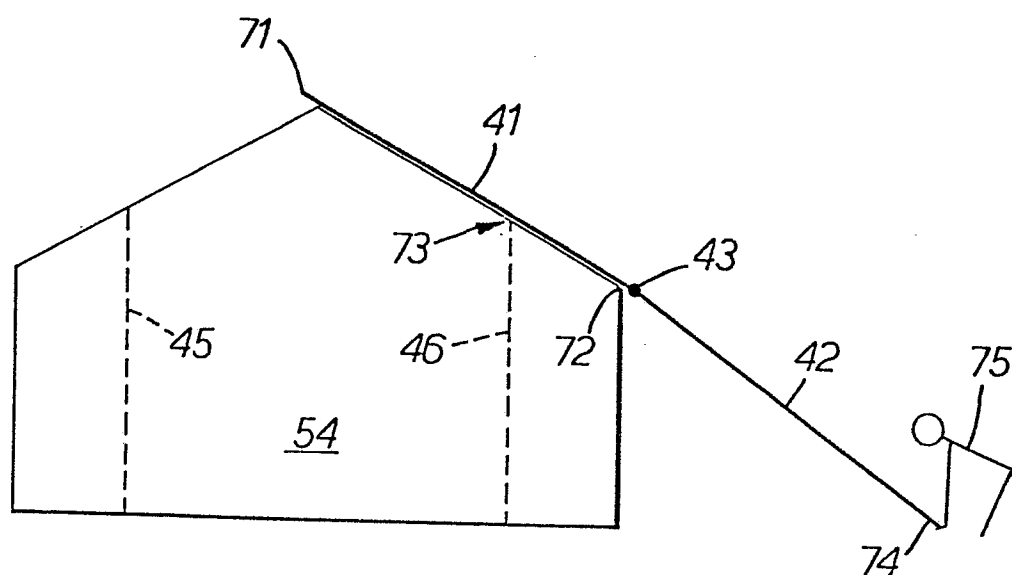


FIG. 8.

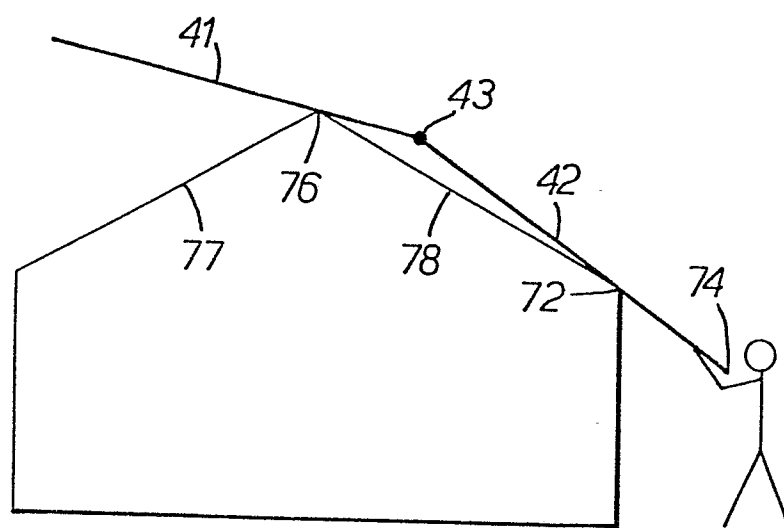


FIG. 9.

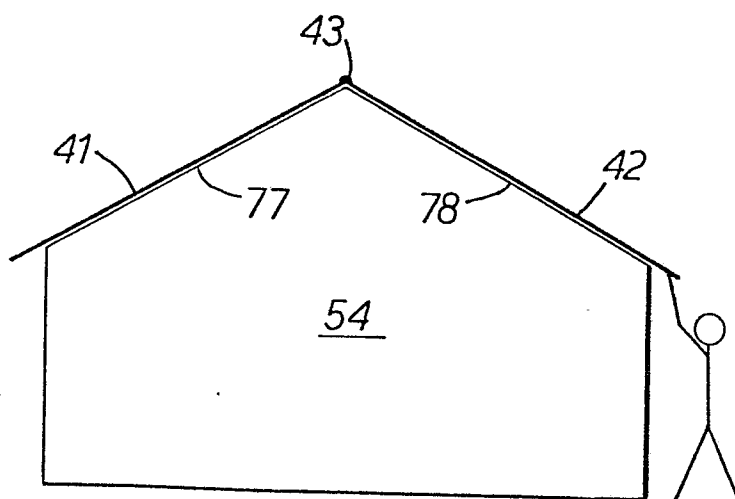


FIG. 10.