# United States Patent

[11] **3,589,084**


[72] Inventor **George P. Reed, III**
**Manchester, N.H.**



[21] Appl. No. **813,265**
[22] Filed **Apr. 3, 1969**
[45] Patented **June 29, 1971**



[73] Assignee **Kalwall Corporation**
**Manchester, N.H.**


[54] **TRANSLUCENT WALL-PANEL ENCLOSURE**
**7 Claims, 12 Drawing Figs.**


[52] **U.S. Cl.** ..... **52/90,** 52/64, 52/731
[51] **Int. Cl.** ..... **E04b 7/16**
[50] **Field of Search** ..... 52/1, 64, 66, 72, 90, 19, 93, 657, 731



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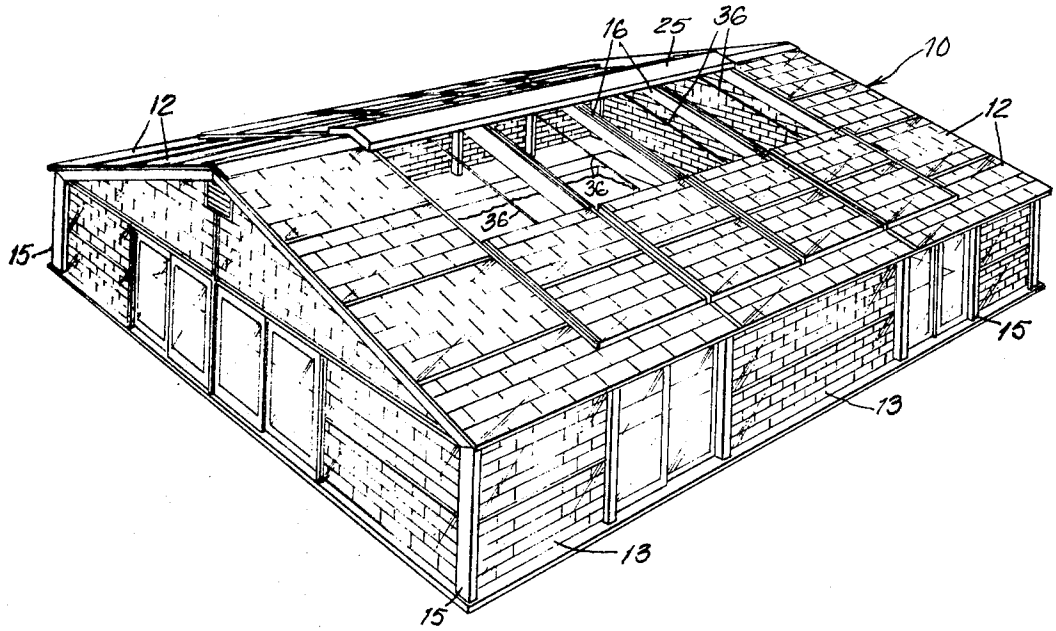
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*Primary Examiner*—Henry C. Sutherland
*Attorney*—Frederick D. Goode



**ABSTRACT:** This invention relates to a translucent wall-panel enclosure of panel and beam construction with movable roof sections for use, for example, over a swimming pool, or other desired area.

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Fig. 1.

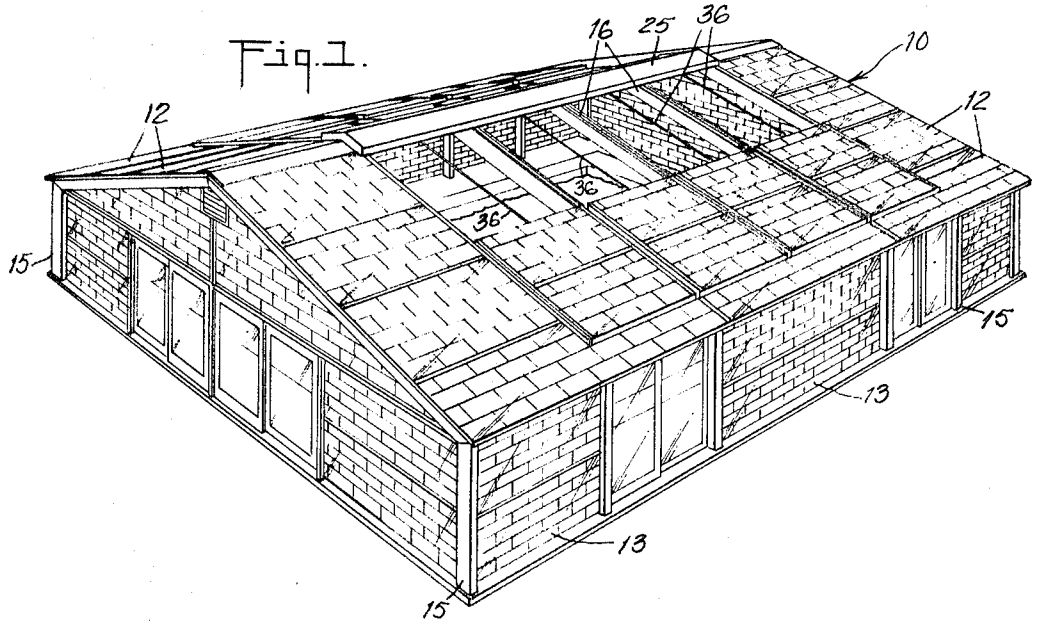
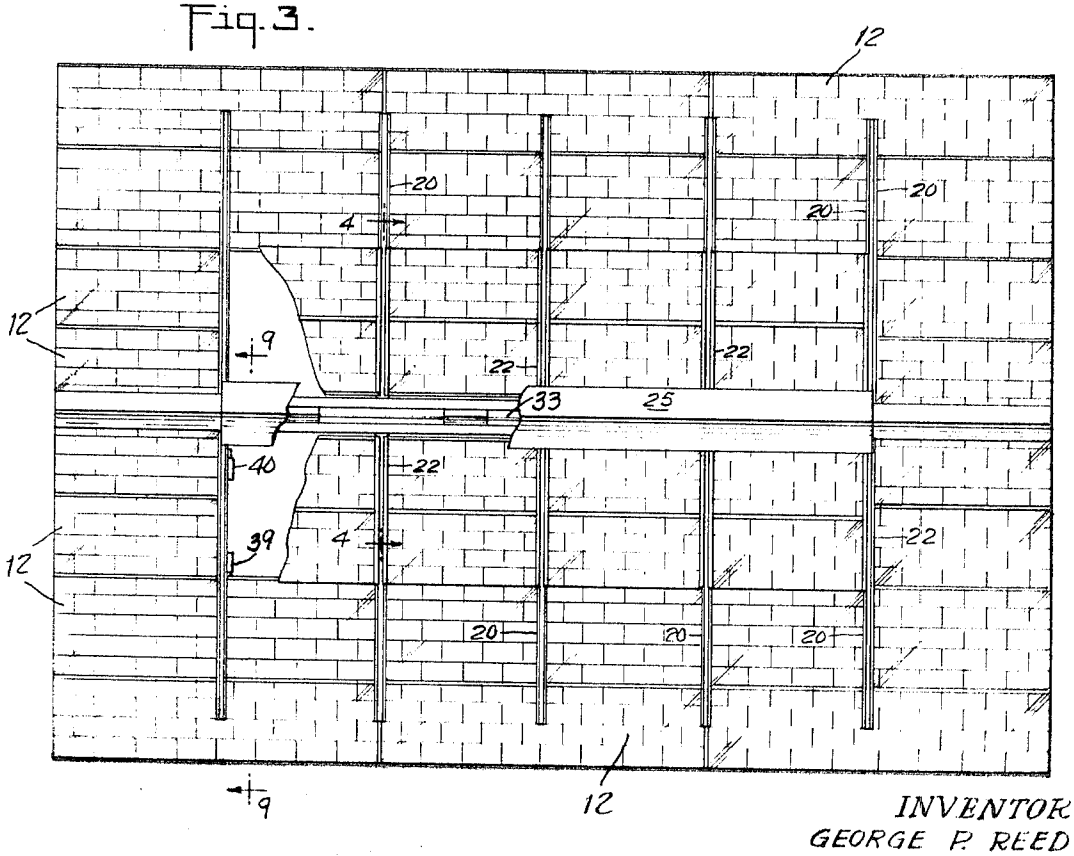



Fig. 3.




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GEORGE P. REED

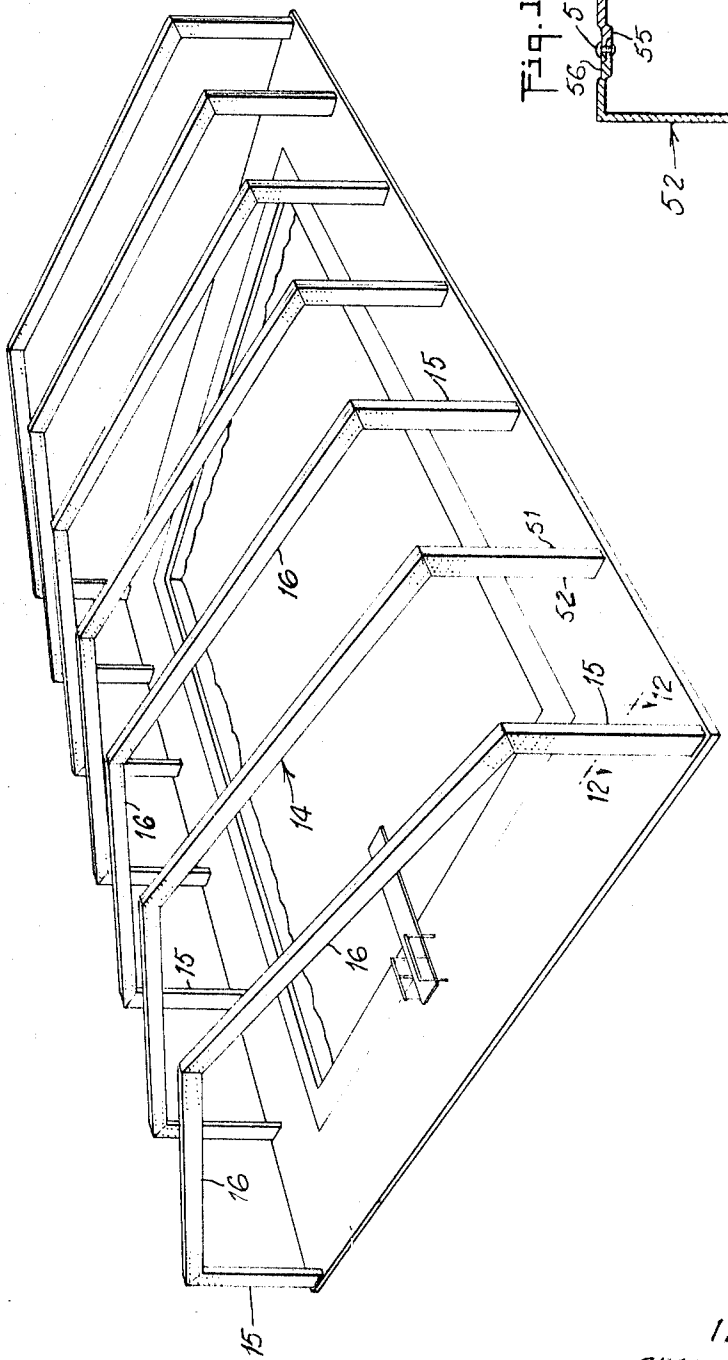



Fig. 2.

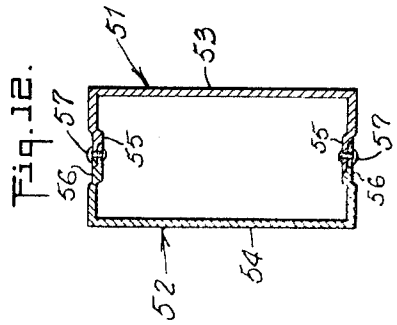



Fig. 12.

INVENTOR.
GEORGE P. REED

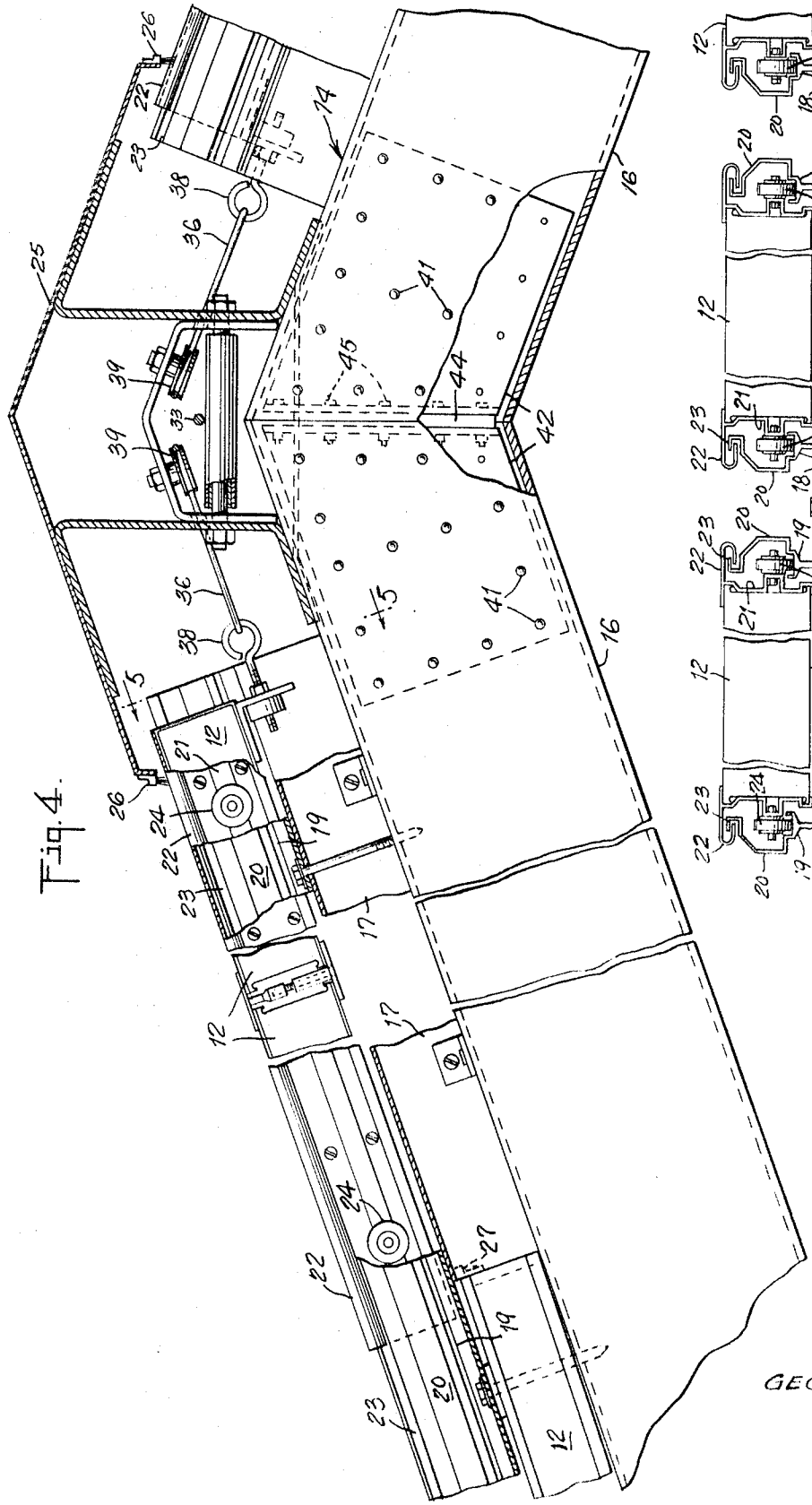


Fig. 4.

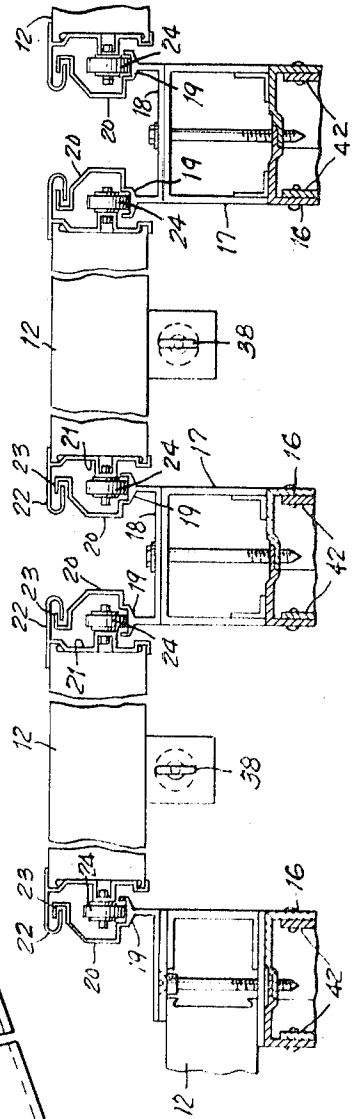


Fig. 5.

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GEORGE P. REED

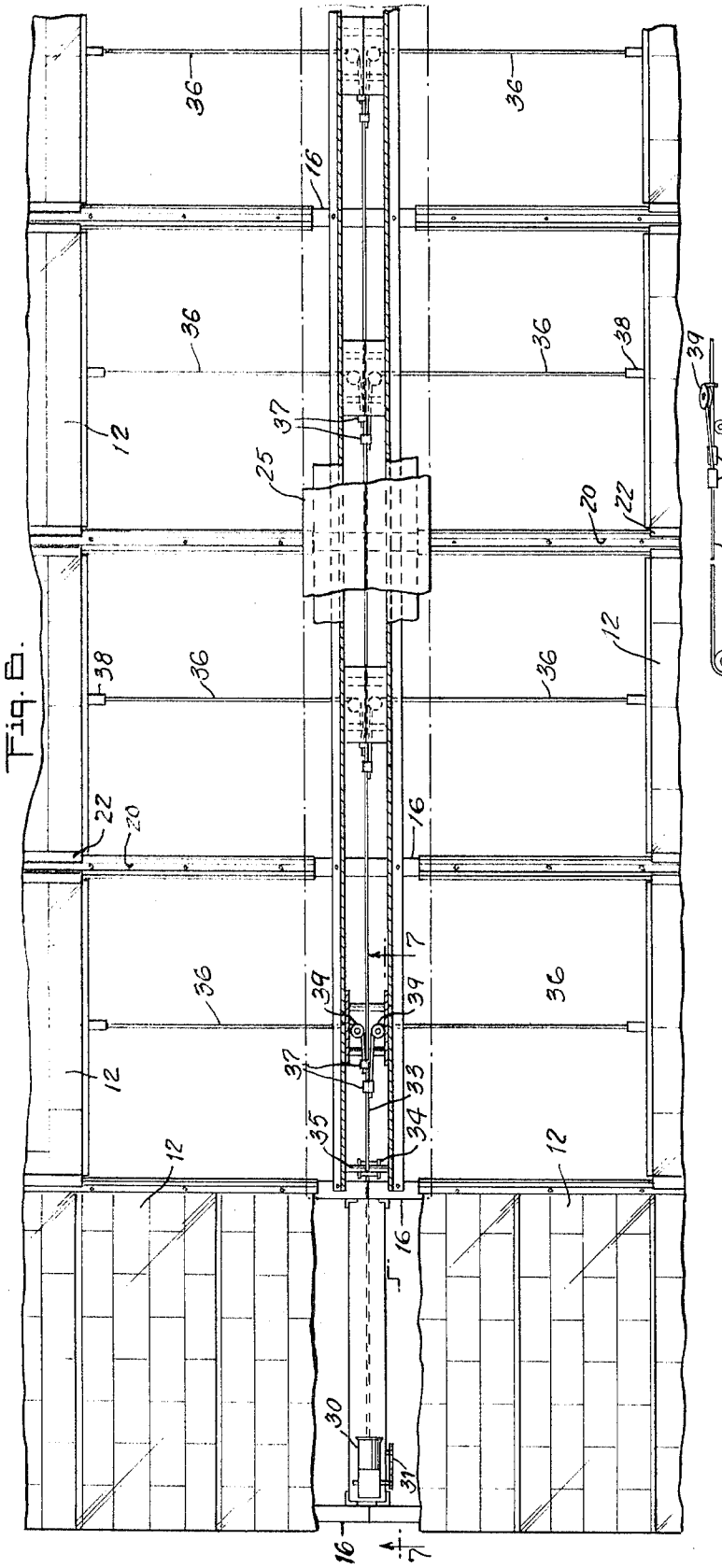



Fig. 6.

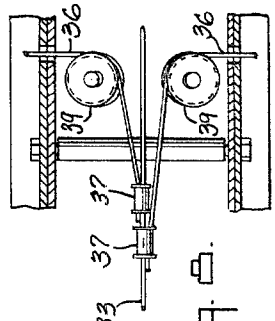



Fig. 8.

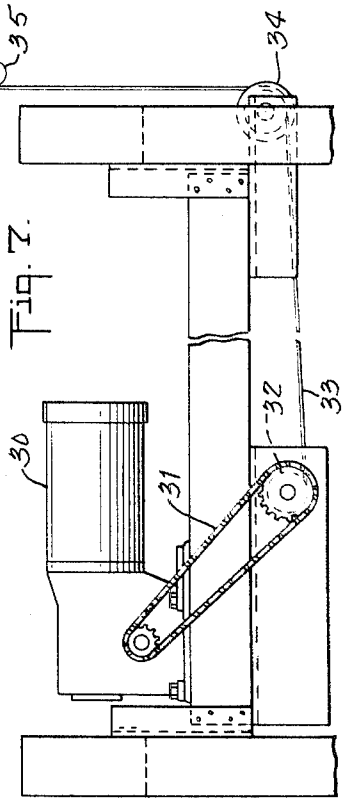



Fig. 7.

INVENTOR.
GEORGE P. REED

Fig. 9.

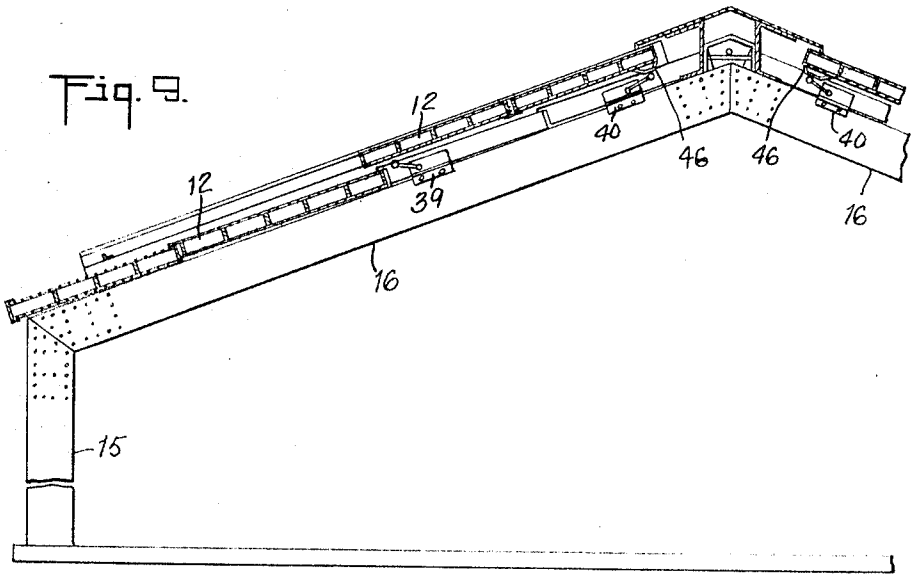



Fig. 10.

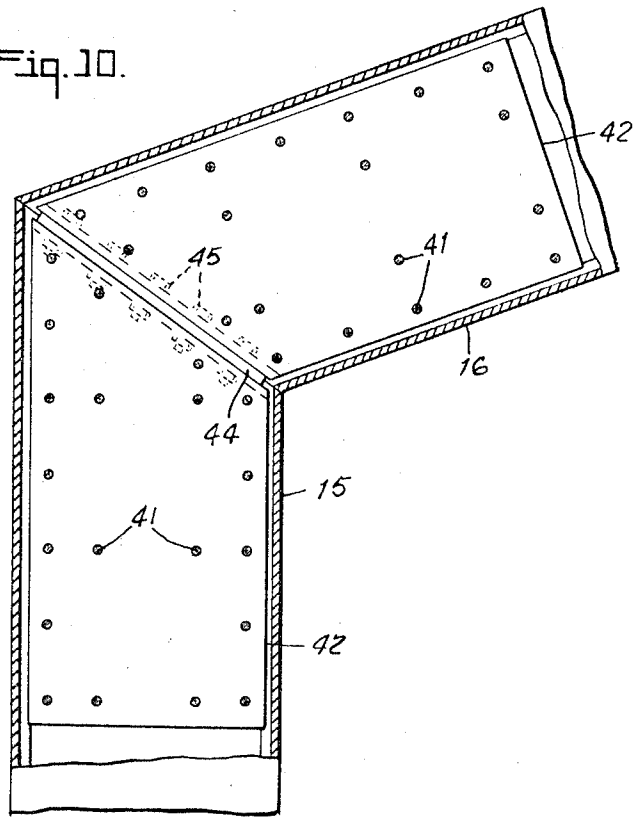
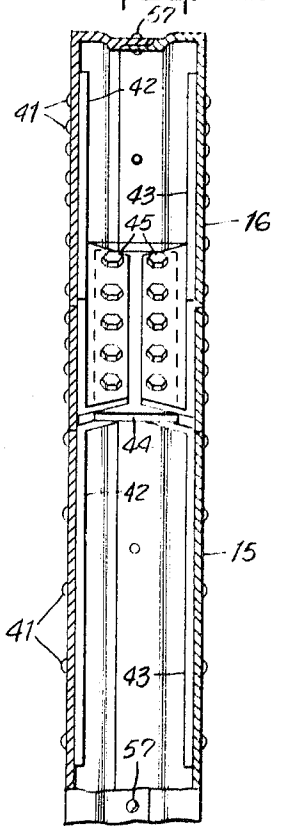



Fig. 11.




INVENTOR.
GEORGE P. REED

# TRANSLUCENT WALL-PANEL ENCLOSURE

This invention relates to a translucent wall panel enclosure, and more particularly relates to a weatherproof translucent enclosure of panel and beam construction with movable roof sections for use, for example, over a swimming pool or other desired area.

In an effort to extend the outdoor swimming pools in the northern regions, thereby making them a more practical investment, attempts have been made to provide suitable enclosures which would provide not only the necessary features of weather protection at the seasonal extremes, but also maintain characteristics of being "opened-up" enough during the mid-summer months to effectively be an outdoor pool. Conventional construction techniques in erecting an enclosure to meet these requirements carry fabrication difficulties and cost factors which normally outweigh the benefits to be derived from such a structure. In view of the prior art difficulties, I have developed a novel enclosure and component assembly which materially advances the state of the art of prefabricated wall-type enclosures.

Generally my enclosure comprises a panel and beam construction consisting essentially of a plurality of laterally unconnected preferably hollow frame members of aluminum or other lightweight material, to which is secured in structural load-bearing and lateral bracing relation a plurality of translucent wall panels generally fabricated in accordance with the techniques disclosed in my U.S. Pat. No. 2,931,468. The resultant structure thus formed is a rigid, integral unit which is adapted to provide for the slidability of one or more roof sections thereby opening up to one-half of the roof of the enclosure to the outdoors.

In conventional hip roof construction techniques employing frames or arches, it has in the past been necessary, particularly for unsupported span widths of over 20 feet, to use a truss or joist assembly laterally braced with purlins or girts to adequately support anticipated roof loads. The present invention makes such trusses, joists, girts and purlins unnecessary.

It is, accordingly, among the various objects of this invention to provide a structurally self-supporting weatherproof clear span enclosure fabricated of lightweight, translucent material.

It is a further object of this invention to provide a clear span enclosure in which one or more roof sections are selectively movable so as to expose the interior of the enclosure to the outdoors.

It is yet another object of this invention to provide the movable roof portion with a novel weatherproof track system which assures positive operation regardless of weather conditions.

An important feature of this invention is that the frame members which are preferably hollow do not require any strengthening or reinforcing members such as purlins or girts to support vertical loads along their unsupported span widths, since this will now be done by the affixed translucent stressed skin or other forms of suitable panels.

A further feature of this invention is that the panel components, when secured to the entire frame structure, offer sufficient cross bracing so that the entire enclosure becomes essentially a rigid, unitized body able to withstand not only vertical snow loads, but also lateral wind loads.

With these and other objects and features in mind, this invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a perspective view of an enclosure built in accordance with this disclosure, with the movable roof sections in an open position;

FIG. 2 illustrates the enclosure framework members preparatory to applying the wall panels;

FIG. 3 illustrates a top plan view of FIG. 1 in which the roof sections are closed;



FIG. 4 illustrates a partial cross-sectional view taken on line 4–4 of FIG. 3;

FIG. 5 illustrates a partial cross-sectional view taken on line 5–5 of FIG. 4;

FIG. 6 illustrates a partial enlarged top plan view of the open roof portion depicted in smaller scale in FIG. 1;

FIG. 7 a cross-sectional view taken on line 7–7 of FIG. 6 illustrates the motor mechanism and driving assembly for actuating the movable roof sections;

FIG. 8 is an enlarged detail of the cable arrangement connecting to the individual movable roof sections;

FIG. 9 illustrates in enlarged detail a cross-sectional view of the roof portion taken on line 9–9 of FIG. 3;

FIG. 10 illustrates a side elevation view of typical box-beam knee joint;

FIG. 11 illustrates a front elevation view of the interior of the box-beam knee joint shown in FIG. 10; and

FIG. 12 illustrates a cross-sectional view taken on line 12–12 of FIG. 2.

Referring now with greater particularity to the drawings, FIG. 1 illustrates an overview of my translucent enclosure generally designated 10, comprised of a plurality of structural hollow box-beam support or frame members 14 (as shown in FIG. 2) overlayed with a plurality of translucent roof panels 12 and translucent or glass siding panels 13.

Certain of the translucent roof panels are adapted for sliding operation whereby substantial portions of up to one-half the roof may be opened. Such opening is controlled in the disclosed embodiment by the use of a motor driven cable system by which all movable panels may be moved in unison.

As seen in FIG. 2, the supporting framework for this enclosure consists essentially of a series of frame sections 14 each of which is comprised of a pair of opposed vertical hollow column portions 15 joined together by a pair of hollow roof rafters 16. Though the illustrated embodiment depicts the roof rafters as forming a low pitch conventional hip-roof, it is to be understood that these construction techniques could also be employed for a shed-type roof construction also. In practice, the span between columns portions may be anywhere from 24 to 80 feet or more in width, and the lateral distance from frame to frame is generally in the order of 8—12 feet. The total number of such frames is, of course, limited only by the length of building desired.

Referring now to FIG. 1 and particularly to the roof and sidewall portion, a plurality of light-diffusing structural panels 12, 13 as disclosed in my U. S. Pat. No. 2,931,468, are rigidly attached to the frame sections 14 in a horizontal orientation so that the end portions thereof terminate respectively on a respective frame section. The lower longitudinal edge portion of each panel member carries a structural channel for receiving, locating, and maintaining the upper edge of the adjacent panel whereby the upper panel overlaps the lower panel much like a conventional shingle. This overlapping relation eliminates the use of any batten system for holding the panels in relative position, as is conventionally done, and is more fully disclosed in my copending patent application , Ser. No. 784,512, filed Nov. 20, 1968 and now abandoned.

As shown in FIGS. 1 and 3, the panels are typically placed in position course by course starting from the bottom roof edge or sidewall and going up. The end edges of each panel, as it is implaced, are conventionally fastened at selected points by self-tapping metal screws or the like into the respective supporting frame member.

As also seen in FIG. 1, portions of the roof are adapted for sliding movement, the structural details of which are illustrated in FIGS. 3 and 5. As seen in these figures, especially FIG. 5, each frame member 14 which supports the sliding roof portion carries on top thereof a spacer channel member 17 of a thickness approximating that of the permanently installed roof panels 12. Mounted on top of each of these spacer channels is a generally U-shaped channel 18 having upwardly facing track portions 19 and an integral upstanding angular wall portion 20.

Referring further to FIG. 5, each slidable roof panel 12 spanning adjacent frames 14 and corresponding spacer channels has fixed along its edge portion a structural plate 21 preferably carrying two or more wheels 24 rotatably disposed on each side thereof and adapted for rolling engagement in their respective track portions 19 of U-shaped channel 18. Each movable roof panel 12 also carries on its top surface along its tracking edges a substantially rigid sheath member 22 of aluminum or other suitable material which has its outer portion bent in such a way that it rides in a corresponding groove portion 23 of wall 20. Plate number 21 and sheath member 22 are preferably of integral construction in the form of an aluminum extrusion. Thus, it is now fairly obvious in light of this disclosure and FIG. 5, each movable roof portion has its tracking components adequately protected from weather environments, and is designed in such a fashion that the weather integrity of this moving joint is maintained under virtually all weather conditions.

Referring to FIG. 4, the ridge portion of the roof is provided with a weather shield 25 of such extent that when the roof panels are in the fully closed position (as shown), the uppermost edge of each sliding roof panel 12 is carried beneath the shield. A flexible barrier 26 of felt, rubber, or other suitable composition carried at the lower edge of this shield is in wiping relation to the panel surface in order to provide further assurance of weather integrity when the panel is in the closed position. A similar barrier 27 maintains a wiping relation with the lower surface of each such movable panel thus providing for weather integrity along this panel edge.

Referring now to FIGS. 6, 7 and 8, there is provided at a convenient location immediately under the ridge portion of the roof an electric motor 30, connected by a chain drive 31 or other suitable means, to a drum 32 carrying a main cable 33. This cable 33 extends from drum 32 around pulley 34 and pulley 35 underneath the roof ridge as far as the most distant movable roof panel, as shown in FIG. 6. A series of auxiliary cables 36 are connected by suitable clamping blocks 37 to the main cable 33, each auxiliary cable having its other end connected respectively to a screw eye 38, which is in turn fixed to the top edge of each movable roof section. A conventional pulley arrangement 39 is employed in connection with these auxiliary cables as shown in FIG. 8. There are, accordingly, as many sets of auxiliary cables as there are movable roof portions. Thus, as motor 30 is actuated, all movable roof portions are raised or lowered simultaneously. Referring to FIG. 9, there are shown a pair of limit switches 39 and 40 located under one movable roof section and electrically connected, in a conventional manner to motor 30. As seen in this figure, the roof section carries a triggering toggle 46 adapted to ride over the respective limit switch, effecting an open circuit condition and thus automatically stopping the motor actuation whenever the roof section reaches its full open, or full closed position.

FIGS. 10 and 11 illustrate a novel joint construction of a typical box-beam or hollow frame between the column 15 and the roof rafter portion 16. As shown in these figures, the interior of each column and rafter has fastened thereto by screws, rivets or other fastening means 41 two reinforcing angle plates 42, 43 which are held in opposed face-to-face relation against the intermediate structural plate 44 by a series of bolts 45. This novel knee joint has been found to possess great strength, and since it is located interiorly of the hollow box-beam, this enhances the aesthetic appearance of the entire supporting structure thus providing smooth columnar surfaces for interior, nonindustrial uses. This same joint technique is also employed at the ridge section where the roof rafters are joined to one another.

FIG. 12 illustrates a cross-sectional view of a typical column of box-beam construction taken on line 12–12 of FIG. 2. This box-beam member is comprised of two-channel members generally designated 51, 52 connected along their longitudinal edge portions. Each channel member is comprised of a web portion 53, 54, respectively. The terminal edge of each flange portion is stepped so as to provide an overlapping relation when joined together, and subsequently fastened by screws 57 or other means.

I do not intend to be limited to the details shown and described, since modifications and alterations within the scope of the invention as defined in the appended claims will occur to those skilled in the art. Particularly, I do not intend the dimensions to be limiting, but as illustrative of the disclosed concept.

I claim:

1. A structurally self-supporting enclosure of panel and beam construction comprising:
   a. a plurality of laterally unconnected frame members in spaced-apart parallel relation;
   b. a first plurality of translucent panel members rigidly fastened to selected exterior portions of said frame members in structural load bearing relation thereto, thereby leaving openings between certain of the frame members;
   c. a second plurality of translucent panel members;
   d. support means connected to two opposed edges of each of said second plurality of panel members;
   e. means carried by said frame members and coacting with said support means for movably supporting said second plurality of panel members over said openings, wherein these means comprise
   f. upstanding track portions securely connected to corresponding frame member;
   g. an upstanding wall portion, with a groove at its uppermost end and integrally formed as a part of each such track portion, and wherein said support means comprises;
   h. a longitudinal plate carrying at least two rotatably disposed wheel members; and
   i. a sheath member integrally connected with said longitudinal plate, and having its outer portion thereof bent into cooperative relation with the aforesaid groove.

2. The structure of claim 1 wherein said frame members are of box-beam construction and comprised of longitudinal lengths of channel members secured opposed relation forming a substantially hollow enclosure.

3. The structure of claim 2 wherein each said frame member is comprised of a pair of vertical columns interconnected by at least one rafter member.

4. The structure of claim 3 wherein:
   a. the interior of each column and rafter member in the area of connection with one another carries in secured relation a pair of reinforcing angle plates in opposed face-to-face relation;
   b. a structural plate member carried intermediate the face-to-face portions of the aforementioned angle plates; and
   c. fastening means securing said face-to-face angle plates and intermediate structural plate member together in rigid relation.

5. The structure of claim 1 wherein there is further provided:
   a. power means secured interiorly of said frame members; and
   b. cable means connecting said power means with selected ones of said second plurality of panel members for traversing said panel members between an open and closed position.

6. The structure of claim 5 further comprising:
   a. limit switch means operatively connected to said power means for automatically governing the extent of travel of the respective movable panel members; and
   b. means carried by said movable panel members for actuating each respective limit switch.

7. The structure of claim 5 further comprising flexible closure means operatively coacting with at least one surface of said movable panel when said panel is in either an open or closed position.