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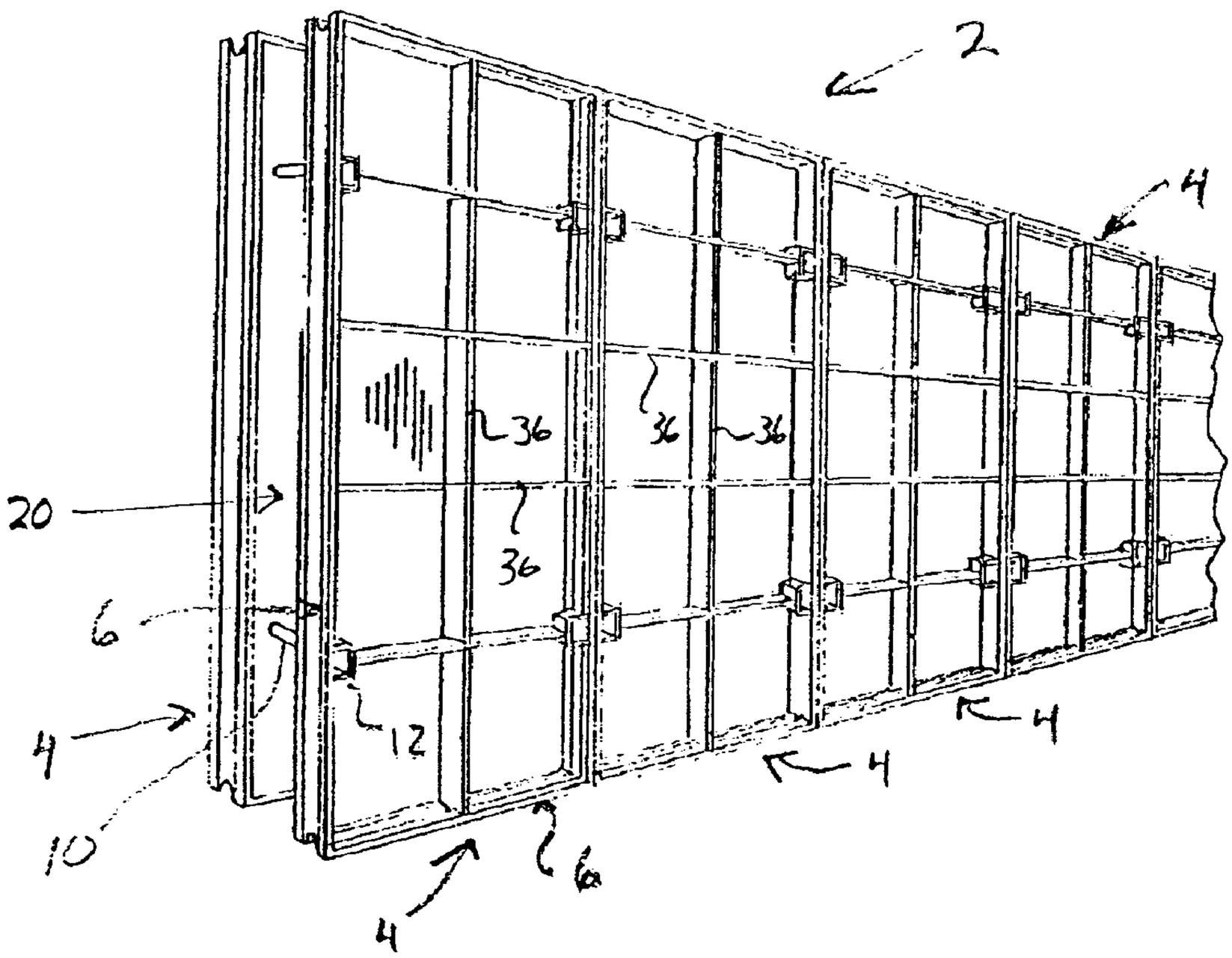
(54) Title: WALLFORM PANEL AND SIDE RAIL



(57) Abrégé/Abstract:
The present invention discloses a wallform panel which is designed to support different thicknesses of substrate to opposite sides thereof. This arrangement allows the wallform panel to have the type of substrate thereof changed, if necessary. The design, in a preferred embodiment, allows wallform panels with different substrates to be used together while still defining a desired concrete face. The invention is also directed to a side rail which is nontubular and can be made in a more cost effective manner.

WH-9678

ABSTRACT OF THE DISCLOSURE

The present invention discloses a wallform panel which is designed to support different thicknesses of substrate to opposite sides thereof. This arrangement allows the wallform panel to have the type of substrate thereof changed, if necessary. The design, in a preferred embodiment, allows wallform panels with different substrates to be used together while still defining a desired concrete face. The invention is also directed to a side rail which is nontubular and can be made in a more cost effective manner.

WH-9678

TITLE: WALLFORM PANEL AND SIDE RAIL

FIELD OF THE INVENTION

The present invention relates to wallform panel systems for use in forming concrete, and in particular relates to a wallform panel having side rails preferably formed from plate material.

BACKGROUND OF THE INVENTION

Modular wallform systems for defining a form for receiving concrete or cement have proven extremely popular, particularly in Europe. Many wallform systems have separate wallform panels which abutted in a side to side manner to define a continuous surface of the wallform. The wallform panels are often interconnected to opposed wallforms by tie bars. These panelling systems, once assembled in the correct configuration, are moved to a new location for forming the next section of the wall.

The individual wallform panels typically have a perimeter frame which is adapted to receive a substrate to one side of the frame and generally flush with the edge of the frame. In this way, the frame provides protection to the substrate and the frames abut. The substrates of the panel align such that the junction of the panels is not particularly noticeable. Each wallform panel can be easily lifted by one worker.

The sheet substrate located within the perimeter frame conventionally has been plywood and, if damaged, this substrate is replaced. Plywood is an effective, generally low cost substrate, however, more recently, improved

finishes can be obtained by using other sheet substrate materials. Other wallform panels have used a metal perimeter frame with a metal skin secured across the frame to define the forming surface. These panels, if damaged, are expensive to repair. The metal skin is vulnerable to damage and these wallform panels tend to be more expensive.

At the present time, there are many competing systems, and each system is designed for use with a particular substrate.

The wallform panels are typically subject to considerable abuse and the systems have used specialized tubular side rail members to provide a strong perimeter frame and to form an edge profile which can easily be clamped, allowing two panels to be brought into and held in tight abutment. These tubular side rails are expensive to manufacture and the corner connection of one side rail to a perpendicular side rail is somewhat complicated.

There remains a need to provide a wallform system which is more flexible and is cost effective to produce.

SUMMARY OF THE INVENTION

A wallform panel according to the present invention comprises an exterior frame which provides a first notched recess about the interior of the frame which receives and protects the edge of a first sheet substrate within said frame. The exterior frame includes a second notched recess on an opposite side of said frame to the first notched recess, for protecting the edge of a second sheet substrate. A support arrangement is provided within the frame for supporting the backface of the substrates and positions the substrates to be flush with the exterior frame. The support arrangement is positioned to support

the first sheet substrate of a first thickness and to support the second sheet substrate of a second thickness which second thickness is different than the first thickness such that the wallform panel can be used to support either substrate.

A wallform panel according to an aspect of the invention comprising an exterior frame includes side rails having an outwardly opening channel shaped center section with abutment flanges either side thereof generally perpendicular to the plane of the sheet substrate.

A wallform panel according to a further aspect of the invention comprising the side rails are made up of plate members which have been formed into the channel shaped center section and abutment flanges.

A wallform panel according to a further aspect of the invention has rails made of elongated steel plate which has been roll formed to define said channel shaped center section.

A wallform panel according to a further aspect of the invention has the first substrate of plywood and the second substrate as a non plywood substrate having a thickness less than half the thickness of the plywood substrate.

According to a preferred aspect of the invention, the frame is made of plate members which have a 'U' shape located between opposed outwardly extending flanges which form part of the notched recesses. The opposed side rails of adjacent panels form a tube-like cavity, which tube resists deformation during clamping of adjacent wallforms. Preferably, the side walls of the 'U' shaped channels are angled slightly outwardly. This is advantageous for a clamping member which is secured at the back of the adjacent wallforms. Holes in the side rails are punched

when the side rails are flat plate which is subsequently bent.

According to a further aspect of the invention, the frame is a made of elongate steel plate side rails which have been roll formed or bent to define the first and second notches which have outer coplanar faces perpendicular to the sheet substrate.

According to a further aspect of the invention, one of the notched recesses of the wallform is sized to receive a plywood substrate and the other notched recess is sized to accommodate a sheet substrate having a thickness less than half the thickness of the plywood substrate.

A wallform according to the present invention comprises a metal rectangular frame with the sheet substrate located within the frame and defining a form face. The frame comprises side rails where each side rail defines one side of the frame, and in section has two coplanar faces separated by an inwardly extending intermediate portion. The faces and the intermediate portion cooperate to define a first notched region to one side of the rectangular frame and a second notched region to the other side of the frame. The first notched region is sized to provide a protective edge for the sheet substrate and the face terminates at the front face of the sheet substrate. The second notched region is sized to accommodate, in a like manner to said first notched region, a sheet substrate of a thickness significantly less than the sheet substrate received in the first notched region. A wallform as set out above allows the frame to be used to change the wallform system from a wallform system which has a plywood face to a wallform system having a different sheet substrate. This allows the contractor improved flexibility with respect to the system and the ability to completely depart from a plywood system if desired at a later point in time. It can also be appreciated that it

allows for cooperation between different wallforms of a system. The side rails are such that the front face of either substrate is equidistant from a clamping portion on the side rail such that the front face is in the same plane, regardless of which substrate is being used.

According to an aspect of the invention, the wallform is designed to accommodate a plywood sheet substrate in one of the notches and a thinner plastic composite substrate in the other notch. It can be appreciated that only one substrate will be located in the frame at any one point in time to allow access to the side portions of the side rails.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are shown in the drawings, wherein:

Figure 1 is a partial perspective view showing two wallforms defining a cavity;

Figures 2 and 3 are partial cutaways showing the side rails of opposed wall panels having different substrates;

Figures 4 and 5 are side elevations showing three panels connected in an offset manner in Figure 4 and in an aligned manner in Figure 5;

Figure 6 is a perspective view of two abutting side rails showing the cooperation therebetween;

Figure 7 is a sectional view of with a clamping Figure 8 is a rear perspective view of a wallform panel member abutting two opposed side rails; and

Figure 9 is a partial perspective view showing four panels in abutment defining a column form.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The wallform system 2 is defined by a series of interconnected wallform panels 4 which cooperate to define the concrete receiving cavity, generally shown as 20. Tie bars 10 can pass between opposed panels to maintain the desired separation of the panels. The panels 4 of Figures 1, 4 and 5 are shown side by side, however, the panels can also be stacked one on top of the other. Each panel includes reinforced support points 12 for engaging a clamp used to engage the tie rods and hold the spacing between panels.

Each wallform panel 4 includes a perimeter frame 30 having side rails 32. The side rails can be extruded (see side rail of Fig. 8), roll formed or pressed, for example, to define a recessed cavity for receiving a sheet substrate 34 or a thinner sheet substrate 35. Stiffeners 36 are located intermediate the perimeter frame to support the back face of either sheet substrate and maintain it in its planar state within the perimeter frame.

The stiffeners 36 are located within the perimeter frame to support the plywood substrate 34 (normally 1/2 inch thick) to one side of the frame or the panel can be reversed and support a thinner substrate 35, such as a phenolic resin, to the opposite side of the perimeter frame. With this arrangement, the same perimeter frame can support either substrate and the contractor can use a frame with a pholic resin substrate immediately adjacent a frame with a plywood substrate. Furthermore, the substrates from time to time, require replacement and a different substrate

can be inserted (i.e. a phenolic resin substrate can be installed in the perimeter frame instead of a plywood substrate or vice versa).

Corner gussets 90 (see (Fig. 9) are provided at the corners of the perimeter frame to provide appropriate substrate support. Each corner has two gussets, one for each substrate. The gussets and the stiffeners 36 are preferably welded to the side rails 32.

As shown in Figures 4 and 5, the wallform panels can be connected in an offset manner, shown in Figure 4, or in an aligned manner, as shown in Figure 5. It is preferred that fast acting clamps 70 are used to maintain adjacent panels in an abutting configuration. Details of the clamp will be explained with respect to Figures 6 and 7.

The wallform panel 4 includes a unique perimeter frame made up of the side rails 32. Each side rail is adapted to abut with an opposed side rail of an adjacent wallform to continue the forming face to one side of the frame and to interconnect the panels.

Details of the cooperation between side rails 32 adjacent panels and the clamp 70 are shown in Figures 6 and 7.

The clamp 70 has a female part 72 and a male part 74. Each of these parts has clamping jaws 78 and 80 respectively, which draw the side rails 32 into abutment. The clamp serves to align the channels of each side rail as will be subsequently described.

As shown in Figure 6, the clamping arm 80 has angled surfaces 80a and 80b which contact the opposed outwardly diverging walls 84 and 85 of the side rail. These outwardly diverging walls are connected by a base 83.

The opposite side rail is engaged by the female part 72 in a like manner, and the clamp then serves to align the channels of each side rail. This in effect, aligns the side rails and there is abutting contact along abutment flanges 86 and 87. Thus, the clamp serves to align the side rails to provide a generally planer forming face and also applies pressure to the side rails to assure tight abutting contact. The clamp is brought into clamping engagement by driving the wedge 76 into the slots provided in the male and female component and provides a strong clamping force. It can also be seen from Figure 6 that the clamp is easily loosened from a gripping engagement merely by striking of the wedge which is captured within the clamp. It has been found that this shape of side rail in combination with the particular clamping arrangement allows the use of a steel side rail 32 appropriately deformed. When two side rails are brought into opposed relationship as shown in Figure 6, they essentially define a tube and a strong structural support at that point.

It can be seen from Figures 6 and 7 that the side rail is symmetrical and the provision for the substrates of different thicknesses either side of the side rail is provided by the corner gussets 90 and the intermediate support members 36. Each side of the perimeter frame can be used for supporting a different substrate and this allows flexibility for the purchaser at a future point in time where replacement of the substrate may be required.

Figure 7 also shows the modified extruded aluminum side rail 32a. In this case, the side rail has the same type of clamping surfaces as with the opposed side rail 32 and it can be seen that the abutment flanges 86a and 87a are slightly thicker due to the change in material. The center of the side rail 32a has the enclosed hollow cavity 39 defined by the additional member 41. This combination provides the required strength for the change to the aluminum material. With this arrangement, wallpanel frames

having side rails of aluminum or an aluminum composite can be used in combination with wallpanels with steel side rails, such as side rail 32. This side rail is manufactured from plate steel and can be roll formed in a series of steps to the particular section shown.

Figure 8 shows the rear face of the wallform panel with a plywood substrate secured within the perimeter frame. Each side rail has a plurality of ports 31 distributed along the length of the side rail for securing with adjacent panels as required for the column form assembly of Figure 9. The wallform panel of Figure 8 has a longitudinal stiffener 107 and two horizontal channel stiffeners 109 and a center stiffer 111. The channels 109 have a series of holes 113 for allowing tie bars to pass therethrough and engage an opposed wall form panel. In addition, it can be seen that one side of the channel 109 is open to allow access to the center of the channel as required in the Figure 9. The corner gussets 90 and the intermediate supports 109 and 111 can be provided with securing holes for securing the substrate to the perimeter frame. Any suitable securing mechanism can be used.

In Figure 9, a column wallform assembly is shown where 4 wallform panels are positioned in overlapping relationships and are held together by a tie securing arrangement shown as 120. This includes a hand turn nut 122, a tie rod 124 which passes through one wallform and into the interior cavity of an adjacent wallform. The tie rod 124(a) of Figure 9 passes into the "U" channel 109 and a bolt is provided in the interior of this channel. In this way, the wallform panels are held in engagement and the intermediate supports 109 provide a face for drawing two panels into engagement which are at 90° one to the other.

Figure 7 shows two panels with different substrates used in combination for defining a wallform section. For

example, the plywood substrate 34 forms part of the forming face with the phenolic resin substrate 35 attached to the right wallform panel. This provides greater flexibility to the contractor using panels with different substrates and also allows for changing of the wallform panel at different points depending upon the particular contracts he has obtained. Basically, the perimeter frame allows a choice for the contractor in refurbishing the substrate with either a plywood substrate or a different substrate. Furthermore, the contractor can mix or form panels with aluminum side rails with wallform panels having steel side rails. The clamp works with either side rail.

The particular shape of the side rails 32 to have an outwardly diverging channel at the center thereof defined by the base 83 and the walls 84 and 85, provide alignment with the clamp and also provide a very strong clamping force to be used maintaining the opposed side rails in abutment. This clamping force is distributed along the length of the side rails and simplifies installation.

It has been found that the wallform panel as shown can be made from rolled steel or can be of a high strength extruded material. The strength of the system and in particular, the strength of two abutting wallform panels is quite high. Basically, the side rails of the wallform panels define a tubular type cavity between the opposed side rails. This provides a strong clamping force at the abutting edges and also allows the abutting flanges to determine the abutment between two wallform panels. If any concrete adheres to the interior of the channel, it does not cause a problem as it is not on the abutting faces.

The wallform system as described above provides greater flexibility with respect to refurbishing of the substrate and can also be manufactured in a cost effective manner. The side rails can be formed from plate steel and

appropriately shaped by a roll forming operation. Prior to the roll forming operation, various notching of the end of the side rails and punching of holes can be accomplished.

Although preferred embodiments of the invention are described here in detail and understood by those skilled in the art, the variations may be made thereto without departing from the spirit of the invention of the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A wallform panel comprising an exterior frame which provides a first notched recess about the interior of the frame and receives and protects the edge of a first sheet substrate located within said frame, said exterior frame including a second notched recess on an opposite side of said frame to said first notched recess, for protecting the edge of a second sheet substrate, and a support arrangement within said frame for supporting the backface of said substrates and positioning said substrate to be flush with said exterior frame, said support arrangement being positioned to support said first sheet substrate of a first thickness and to support said second sheet substrate of a second thickness which second thickness is different than said first thickness such that said wallform panel can be used to support either substrate.

2. A wallform panel as claimed in claim 1 wherein said exterior frame includes side rails having an outwardly opening channel shaped center section with abutment flanges either side thereof generally perpendicular to the plane of the sheet substrate.

3. A wallform panel as claimed in claim 2 wherein said side rails are made of plate members which have been formed into the channel shaped center section.

4. A wallform as claimed in claim 2 wherein said side rails are made of elongate steel plate which has been roll formed to define said channel shaped center section.

5. A wallform panel as claimed in claim 3 wherein said channel shaped center section of said plate side rails defines an outwardly opening recess with a generally flat base.

6. A wallform panel as claimed in claim 5 wherein said first substrate is a plywood substrate and said second substrate is a non plywood substrate having a thickness less than half the thickness of the plywood substrate.

7. A wallform as claimed in claim 2 wherein said side rails are of extruded aluminum.

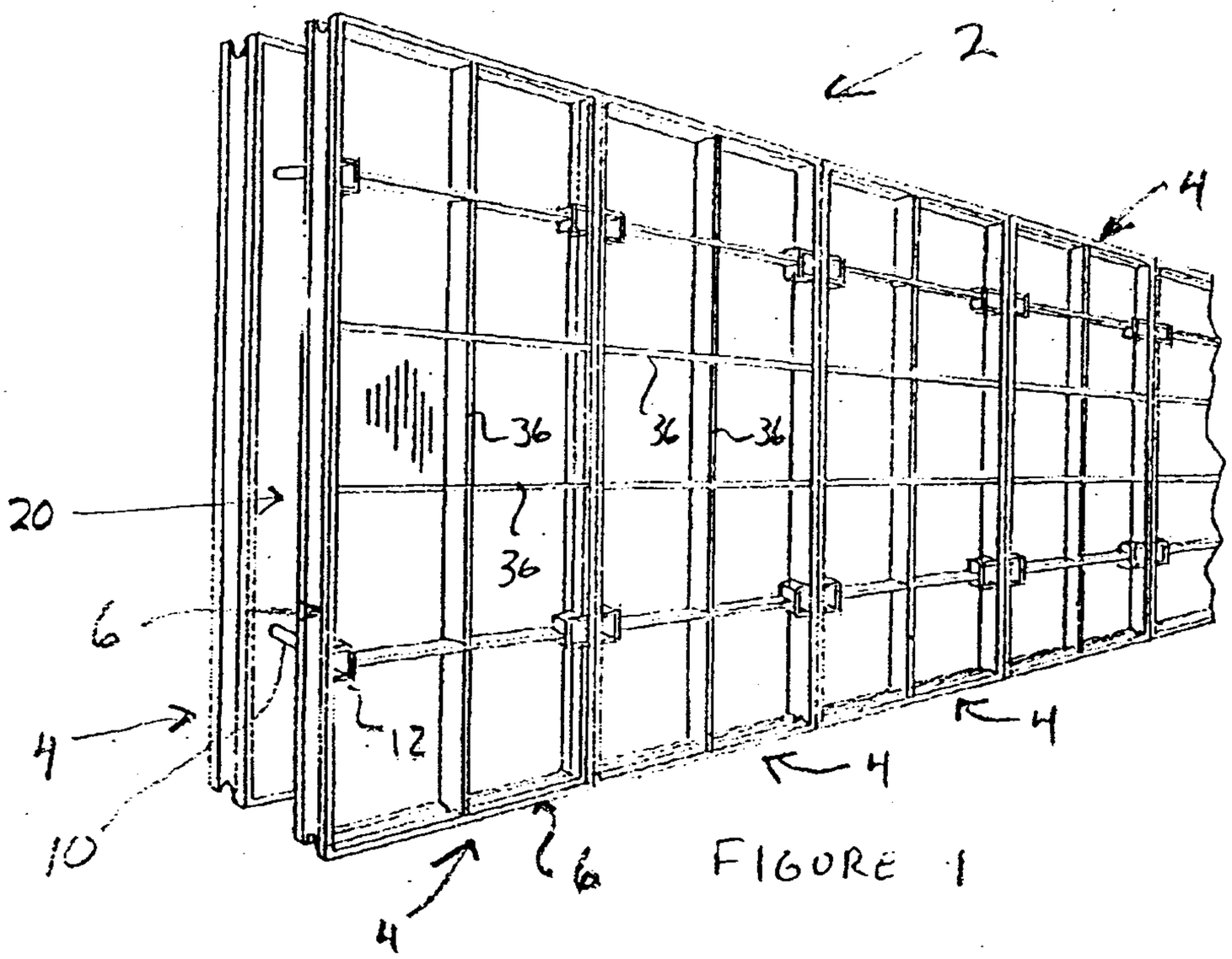
8. A wallform comprising a metal rectangular frame with a sheet substrate located within said frame and defining a form face, said frame comprising side rails where each side rail defines one side of said frame and in section has two coplanar faces separated by an inwardly extending intermediate portion, said faces and said intermediate portion cooperating to define a first notched region to one side of said rectangular frame and a second notched region to the other side of said frame, said first notched region being sized to receive and support said sheet substrate at the edge thereof with said face terminating at the front face of the sheet substrate, and said second notched region being sized to accommodate in a like manner to said first notched region a sheet substrate of a thickness different than the substrate received in said first notched region.

9. A wallform as claimed in claim 8 wherein said frame can accommodate a plywood sheet substrate in one of said notches and a thinner substrate in the other notch.

10. A wallform as claimed in claim 9 wherein each side rail in section is of an outwardly opening channel section.

11. A wallform as claimed in claim 10 wherein each side rail includes in section spaced coplanar faces for engagement with other wallform panels which faces are separated by the channel section.

12. A wallform as claimed in claim 9 wherein said thinner substrate is a plastic or phenolic resin material.



FIGORE 1

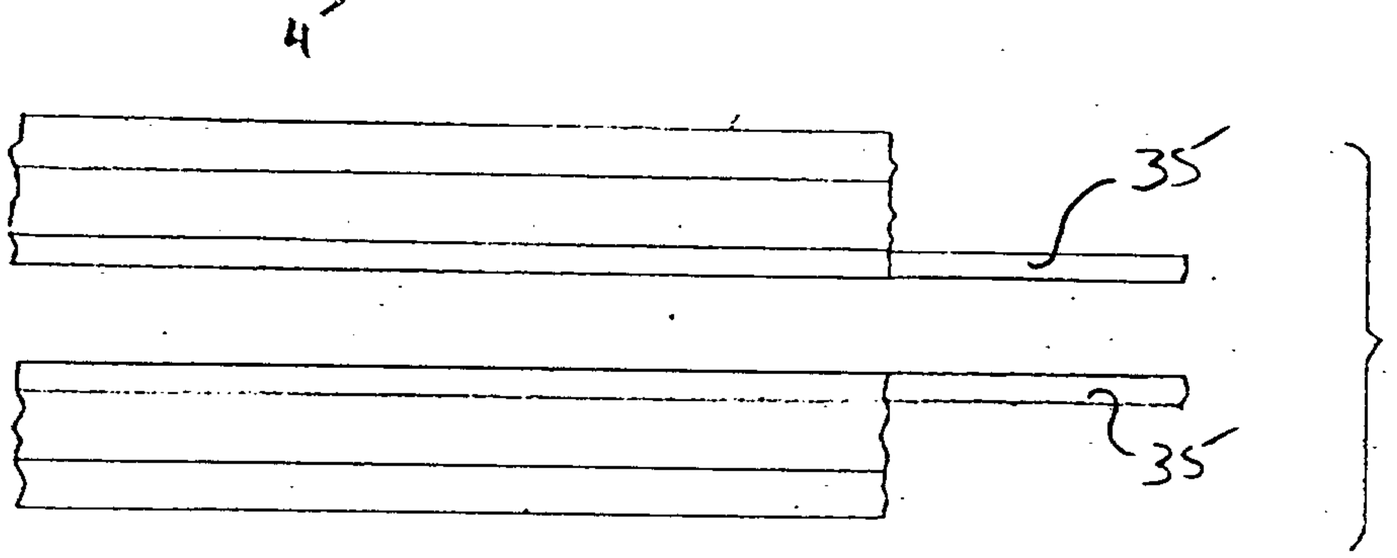


FIGURE 2

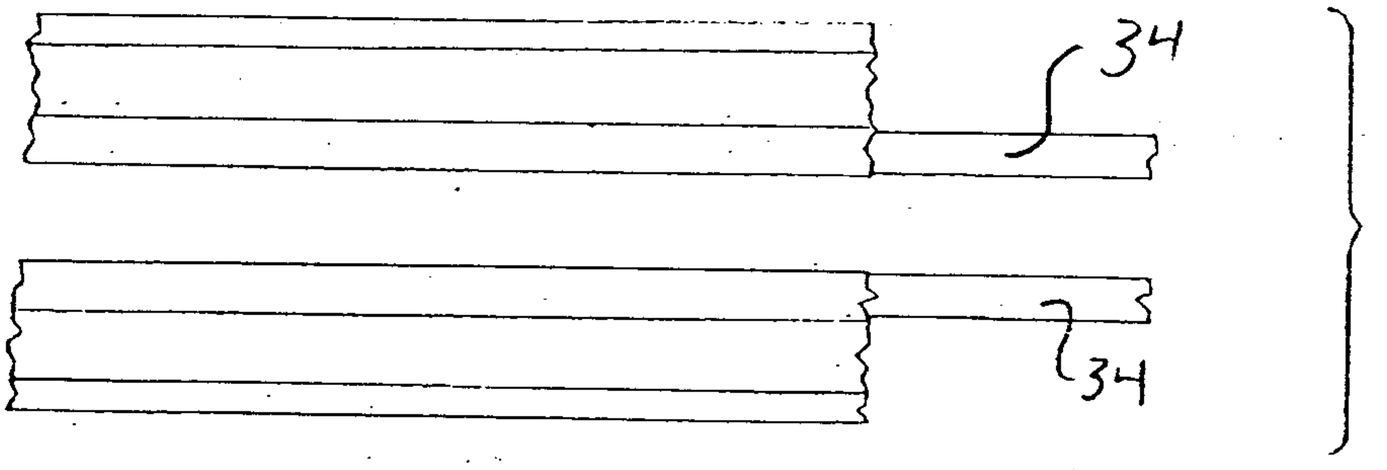


FIGURE 3

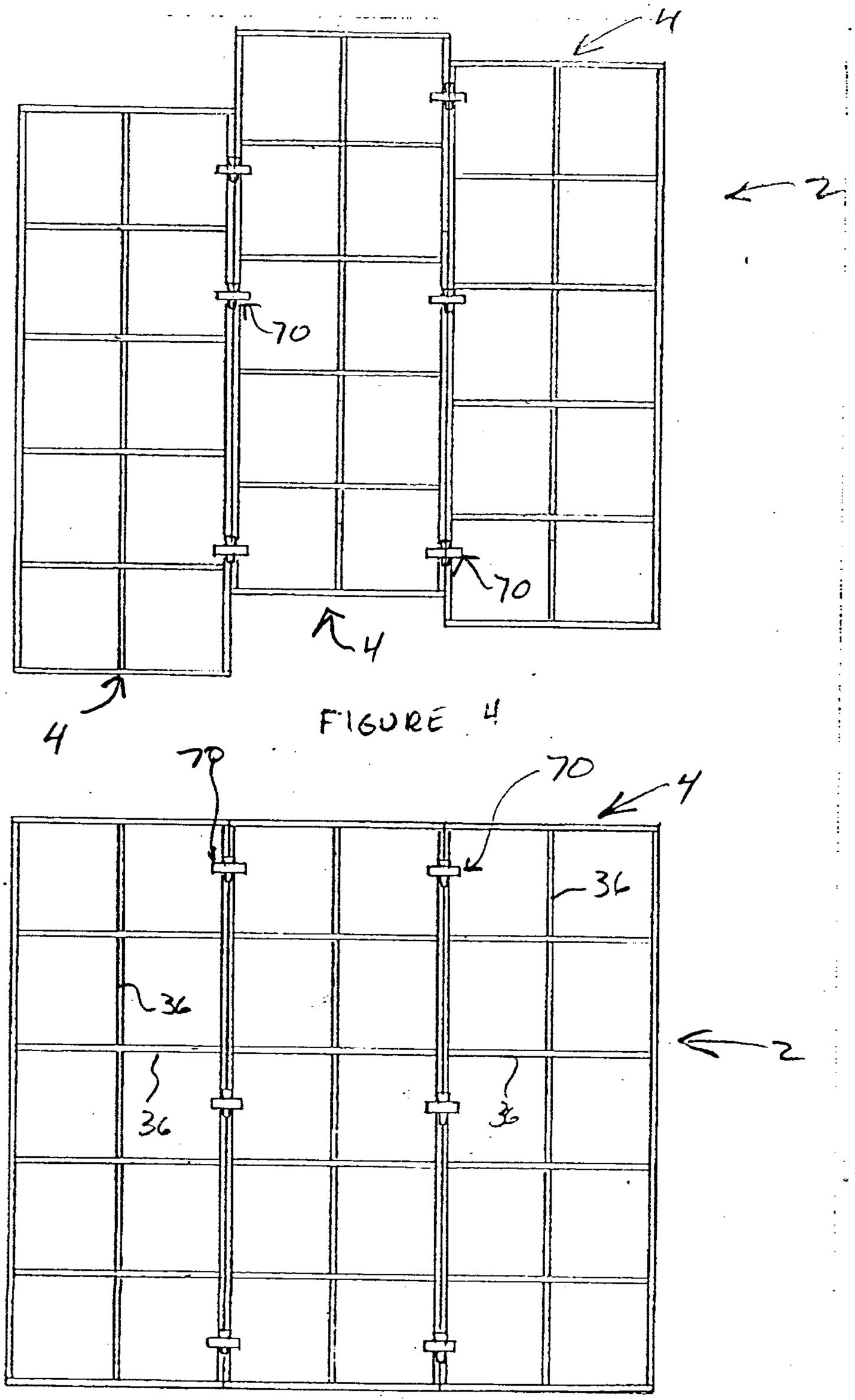


FIGURE 4

FIGURE 5

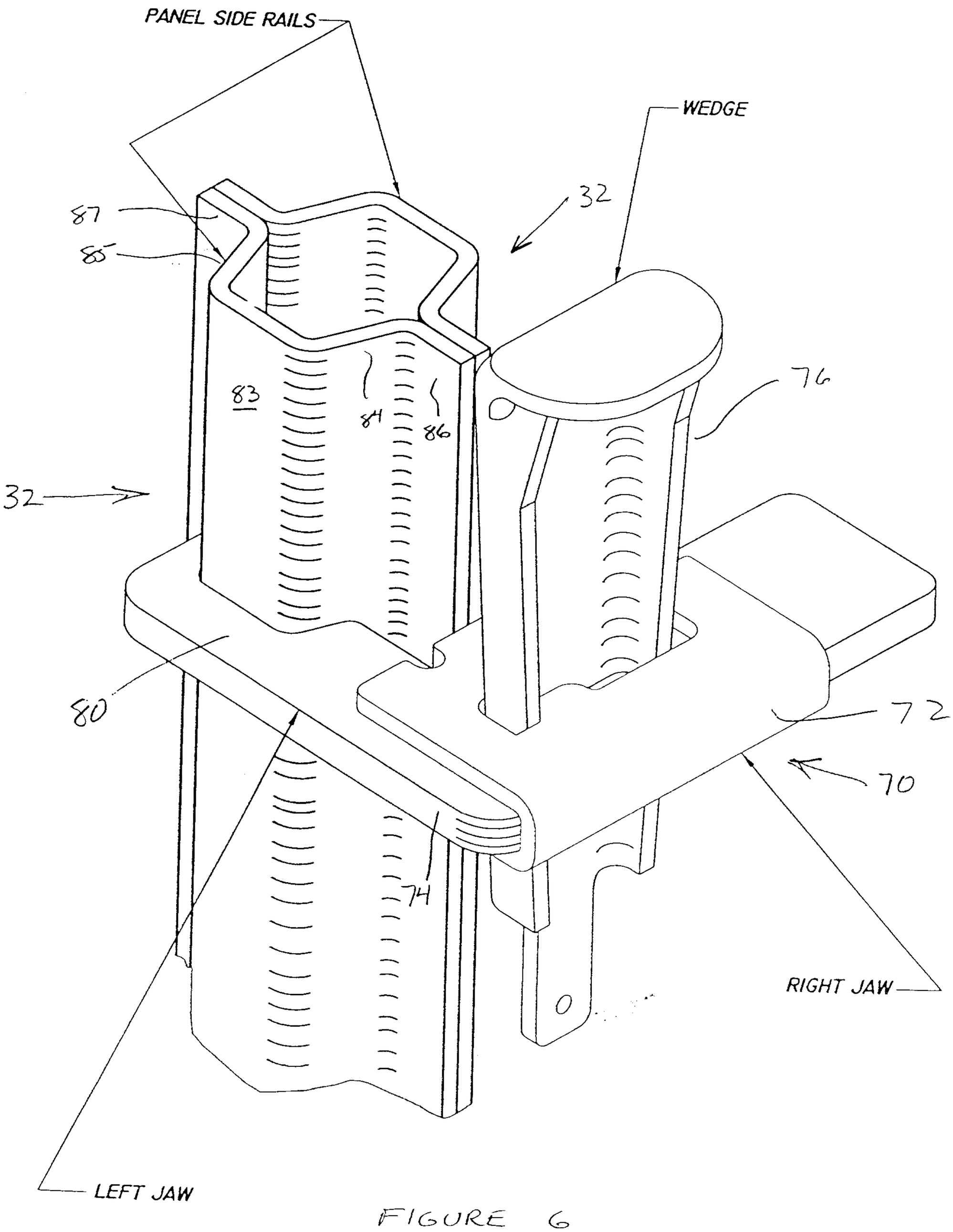

PANEL SIDE RAILS
WEDGE
87
85
32
83
84
86
76
32
80
72
70
74
RIGHT JAW
LEFT JAW

FIGURE 6

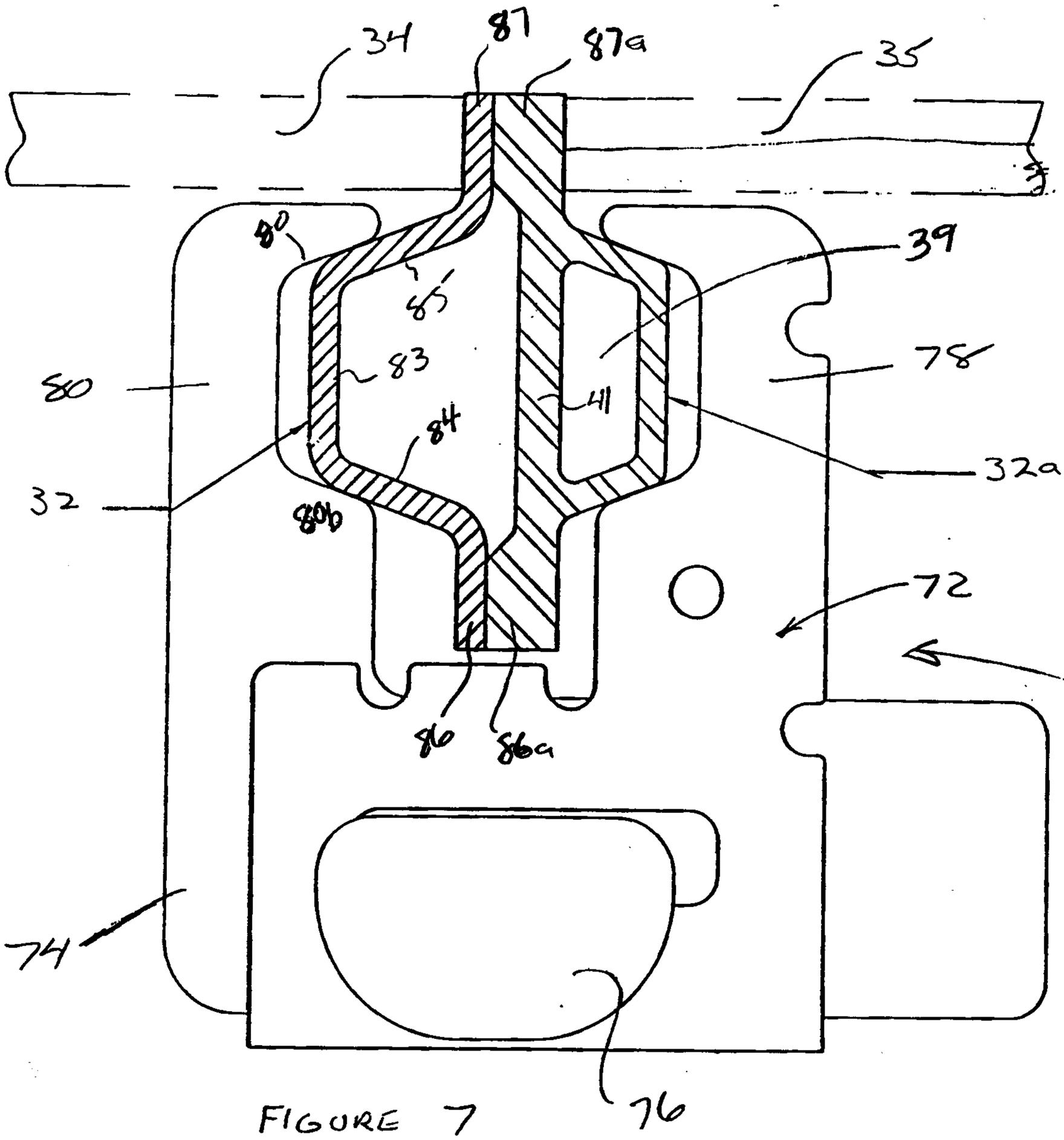


FIGURE 7

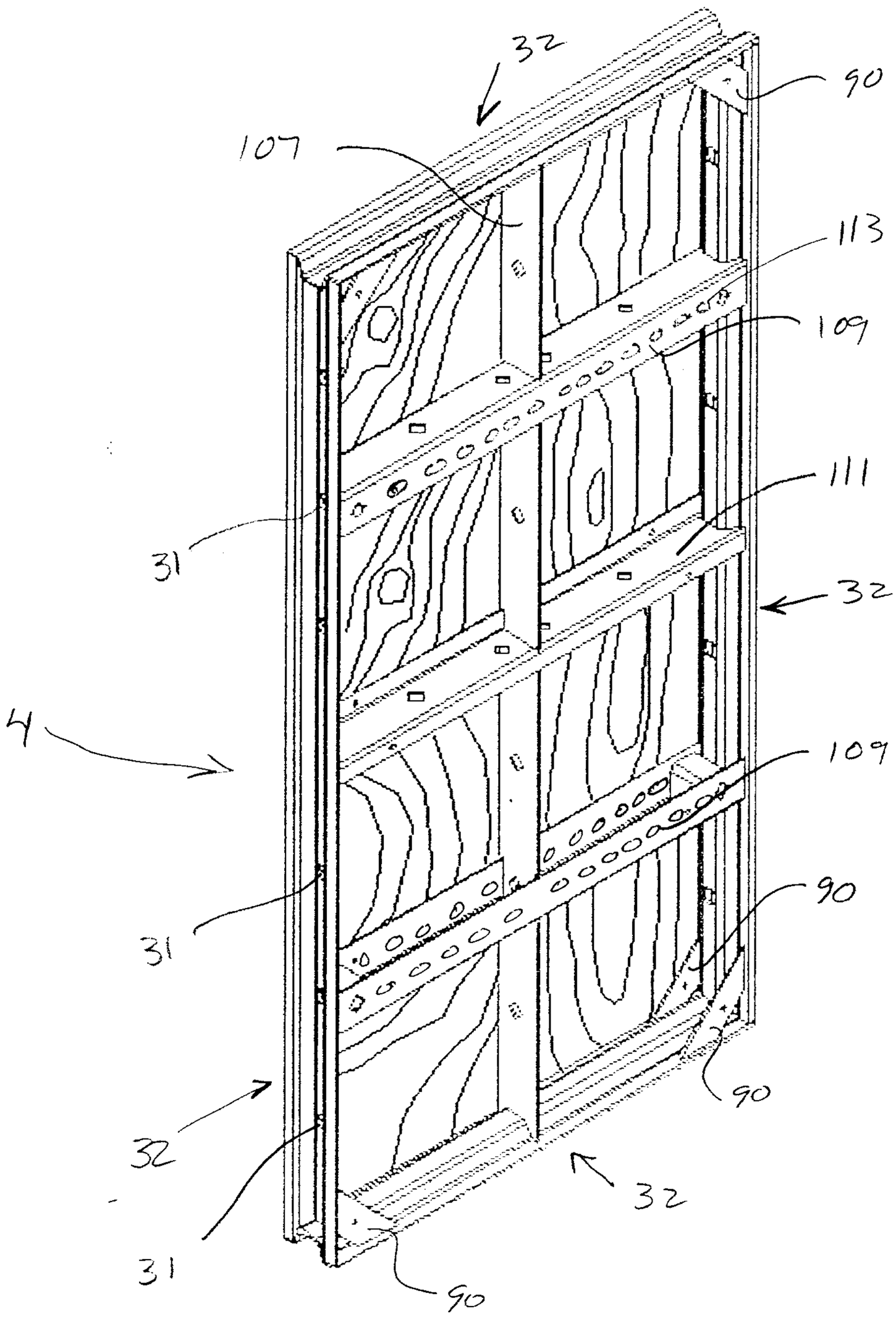


FIG. 8

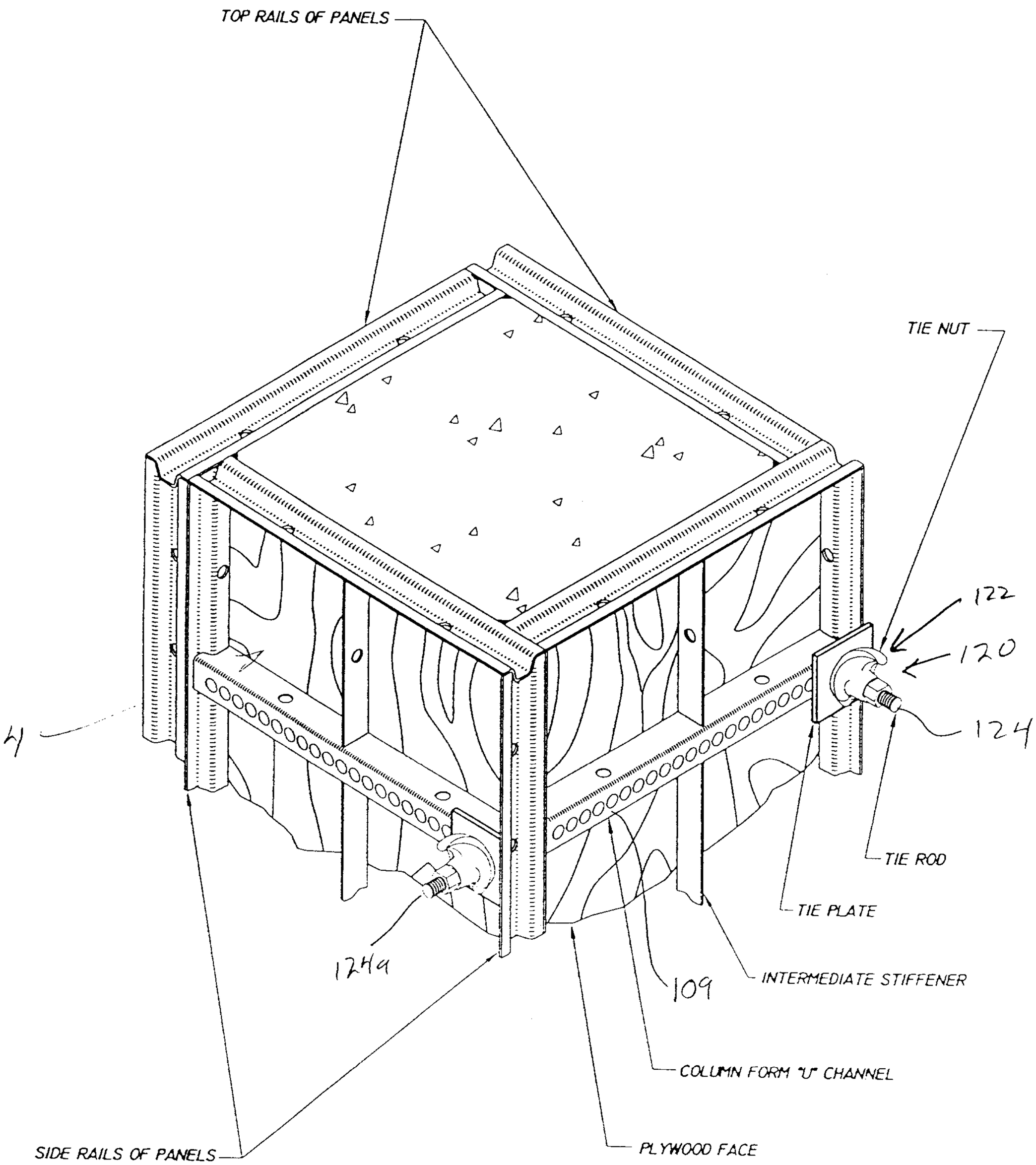
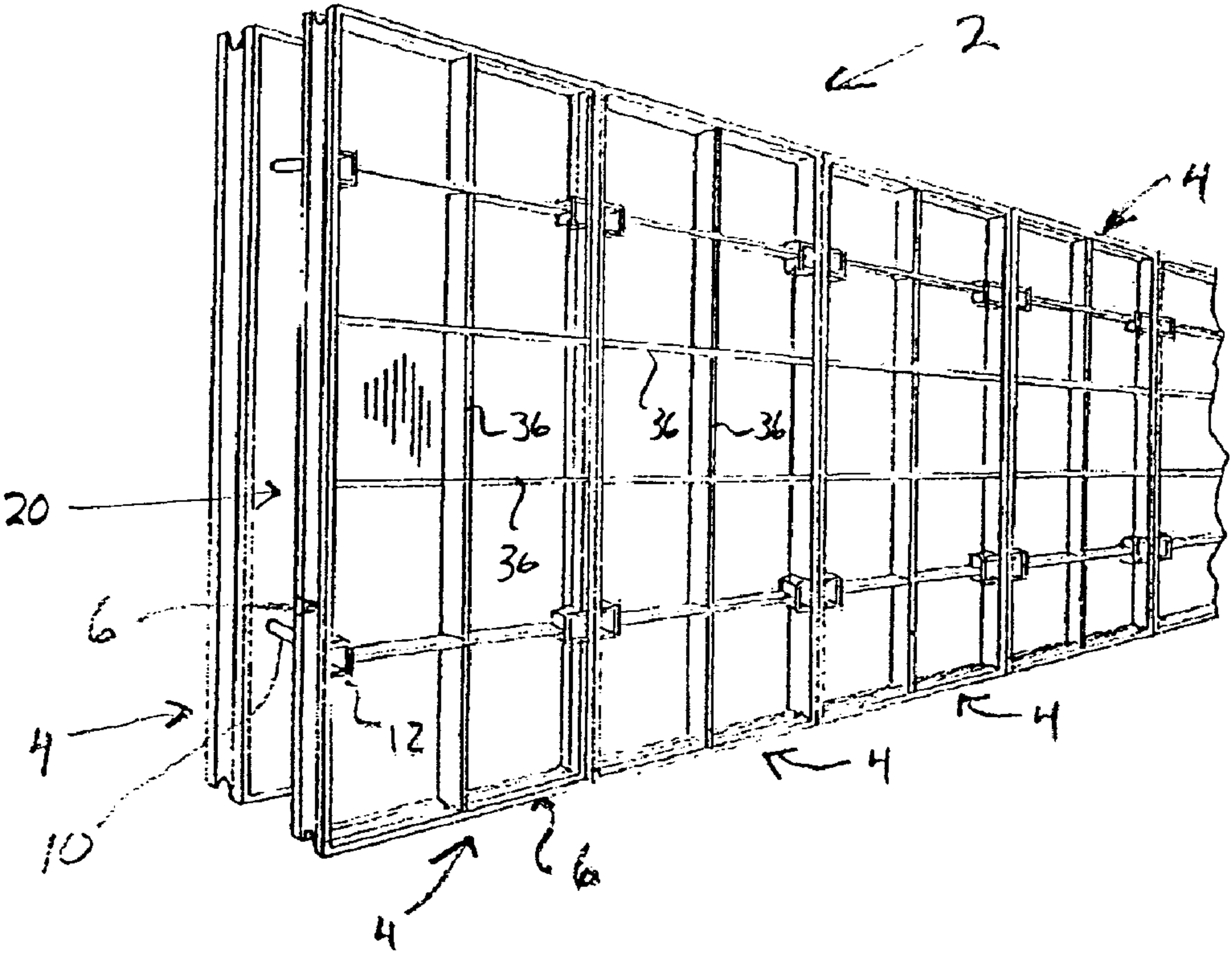

TOP RAILS OF PANELS
TIE NUT
122
120
124
4
124a
109
TIE ROD
TIE PLATE
INTERMEDIATE STIFFENER
COLUMN FORM "U" CHANNEL
PLYWOOD FACE
SIDE RAILS OF PANELS

FIGURE 9


2
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12
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