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(54) **COMPLEX OF STRUCTURAL ELEMENTS FOR FORMING GLASS BRICK WALLS**

BAUSATZ VON BAUELEMENTEN ZUR HERSTELLUNG VON WÄNDEN AUS GLASBAUSTEINEN
COMPLEXE D'ELEMENTS STRUCTURELS PERMETTANT DE FORMER DES MURS EN BRIQUE
DE VERRE

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Description

[0001] The present invention relates to a complex of structural elements for forming glass brick walls.

[0002] PVC frames for glass brick walls are known consisting of a perimetral structure supporting a plurality of horizontal stringers connected together vertically by upright pieces which engage therein by snap-fitting or insertion, to form a lattice which embraces the four edges of each glass brick inserted into it and provides formworks in which cement mix is cast.

[0003] These known frames present however certain drawbacks and in particular: an unpleasant outer appearance due to the presence of the PVC stringers and upright pierces which remain visible covering the spacings,

- the impossibility of modifying or relocating the structure once assembled and the cement has been added,
- limited use because of its weight.

[0004] An object of the invention is to eliminate these drawbacks by providing a complex of structural elements for forming glass brick walls which, besides solving the appearance problem, presents reliable immobility characteristics even in walls of large dimensions.

[0005] Another object of the invention is to provide a complex of structural elements which can be demounted and remounted if required.

[0006] WO 97106322 refers to a structure consisting of modules that fit into each other, and which can be used for constructing glass block walls that can be removed or remodeled with total recycling of the material.

[0007] These and other objects which will be apparent from the ensuing description are attained according to the invention by a complex of structural elements for forming glass brick walls as described in claim 1.

[0008] A preferred embodiment of the present invention together with some modifications thereto are described in detail hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is an exploded interrupted perspective view of a complex of structural elements according to the invention assembled with glass bricks, particularly for interiors,
- Figure 2 is a perspective view of the perimetral profile bar,
- Figure 3 is a perspective view of an aluminium profile bar forming the horizontal stringer,
- Figure 4 is a perspective view of a vertical connecting divider,
- Figure 5 shows in the same view as Figure 1 a complex of elements in the form using dividers with a plastic core,
- Figure 6 shows the intermediate divider,
- Figure 7 shows the end divider,

- Figure 8 is a front view of the system for connecting the stringers to the vertical profile bars, with the top free and the bottom locked,
- Figure 9 is a perspective view showing an expansion joint for large-width walls (greater than 6 metres),
- Figure 10 is a perspective view showing an accessory for fixing and bracing against the thrust of the wind,
- Figure 11 shows the complex in the same view as Figure 1, in the form for constructing outside walls, and
- Figure 12 shows the aluminium profile bar forming the stringers and dividers of this complex.

[0009] As can be seen from the figures, the complex of structural elements according to the invention comprises substantially a perimetral C-shaped aluminium profile bar 2, a plurality of intermediate horizontal stringers 4 formed from aluminium profile bars and a plurality of vertical dividers 6 also of aluminium.

[0010] The perimetral profile bar 2 is provided, on each inner surface of the side walls 8, with two pairs of ribs 10, each rib comprising on that surface facing the other rib an engagement tooth 12.

[0011] The horizontal stringer comprises a central web 14 which is provided at its ends with cylindrical portions resp. cavities 16 and from which two substantially T-shaped flanges resp. appendices 18 extend. The central web is provided at regular intervals with through holes 20.

[0012] The divider 6 is substantially equal in form to the horizontal stringer but without the holes 20.

[0013] The complex also comprises a coupling element 22 consisting of a substantially rectangular element consisting of a substantially rectangular element which has its minor sides 24 faceted and comprises two slotted holes 26 of curved extension. The sides 24 consist of a flat portion 28 and a curved portion 30, the distance between the flat portions being substantially equal to the distance between the facing cavities formed by the ribs 10 of the profile bar 2.

[0014] To form a glass brick wall, the complex of structural elements of the invention is assembled in the following manner.

[0015] Firstly the retaining half-frame is formed by resting a C-shaped perimetral profile bar 2 on the ground and preferably fixing it with screws or pins, then placing C-shaped perimetral elements 2 vertically against the sides thereof. If lateral retaining walls for the frame are available, the two perimetral profile bars are fixed to these by screws or pins, alternatively if these walls are not available the vertical profile bars are fixed to the floor and ceiling.

[0016] The first row of glass bricks 32 is rested on the upper ribs 10 of the horizontal C-shaped profile bar, with each brick separated from the adjacent brick by interposing a divider 6.

[0017] The coupling elements 22 are then applied to the ends of the horizontal stringer 4 by screws which pass through the slotted holes 26, to engage in the cylindrical cavities 16 in the stringers. The stringer 4 is then applied to the vertical C-shaped profile bars 2 while maintaining its web inclined to the horizontal such as to insert the curved edges 30 of the coupling elements 22 between the ribs 10 of the C-shaped profile bar 2.

[0018] The stringer 4 is then rotated so that its central web 14 lies horizontally. This configuration is maintained stable by forcibly rotating the element 22 so that its flat portions 28 engage between the ribs 10 of the C-shaped profile bar 2. When the stringer has been applied, pins 34 are inserted through its holes 20 to engage the cylindrical cavities 16 of the underlying dividers 6.

[0019] The second row of glass bricks is then applied to the stringer in the aforesaid manner.

[0020] When the required height has been reached, a further profile bar 2 is applied with its cavity facing downwards, to form the upper closure element of the frame.

[0021] In the embodiment illustrated in Figures 11 and 12, a complex of structural elements mainly for external walls is shown.

[0022] In this embodiment the stringers and dividers have only one T-shaped appendix, namely that facing inwards. In this embodiment the stringer also comprises a longitudinal groove 64 housing a rubber gasket which also performs the function of retaining the glass brick.

[0023] In the case of large-dimension walls the invention also uses a bar 36 of substantially rectangular cross-section provided in one of its minor sides with slotted holes 38 terminating with an eyelet 40 through which threaded pins 42 are inserted to axially engage said holes by means of nuts 44, and are locked with their ends in holes provided in the edges of the horizontal stringer 4.

[0024] By virtue of the slotted holes 38, the structure can undergo small movements, so making it independent of the main structure of the building.

[0025] In the case of large-width walls, for which stringers longer than six metres have to be used, the invention also uses a further H-shaped profile bar 46, the flanges of which embrace two back-to-back C-shaped profile bars 2, and which is also provided with two U appendices 48 which when assembled form a seat 50 for the insertion of a head 52 provided at the end of a pin 54 engagable in the aforescribed profile bar 36. This form of assembly also constitutes an expansion joint for absorbing temperature swings.

[0026] In the embodiment shown in Figures from 5 to 7, the divider consists of ladder-shaped plastic spacers provided at their ends with coupling elements 58, which engage in the horizontal perimetral profile bars. The spacers present vertical portions 60 suitably shaped to snap-engage in a continuous aluminium profile bar 62 which hence provides continuity and a pleasant outer appearance.

[0027] From the aforestated it is apparent that the complex of structural elements according to the invention

presents numerous advantages, and in particular:

- it presents a pleasant outer appearance because of the presence of the aluminium profile bars,
- it presents reliable immobility characteristics because of the presence of the bracing elements,
- it can be easily and comfortably demounted and re-mounted because of the elimination of cementitious assembly material.

[0028] In a further embodiment not shown in the drawings each divider and/or each stringer are made of wood and are provided at their ends with two seats for the snap engagement of an aluminium T-shaped appendix.

Claims

1. A complex of structural elements for forming glass brick walls, comprising in use:

- a substantially C-shaped aluminium profile bar (2) for perimetally bounding the wall, said profile bar (2) having side walls (8),
- a plurality of vertical dividers (6) performing the function of horizontally separating each glass brick (32) from the adjacent one and having at least their exposed longitudinal edges of aluminium,
- a plurality of horizontal aluminium stringers (4) consisting of a horizontal central web (14) provided at least along one longitudinal edge with a T-shaped appendix (18), said web (14) being provided at regular intervals with seats for fixing said dividers (6), said stringers (4) being provided at their ends with coupling elements (22) to be removably coupled to the interior of the vertical C-shaped profile bars (2),

characterised in that the central web (14) of each horizontal stringer (4) is provided at its ends with cylindrical portions (16) for fixing the coupling elements (22) by screws.

2. A complex as claimed in claim 1, **characterised in that** the side walls (8) of the C-shaped profile bars (2) present an inner surface provided with two pairs of ribs (10), each rib (10) being provided on that surface facing the other rib (10) with an engagement tooth (12).
3. A complex as claimed in claim 1, **characterised by** comprising a bar (36) of substantially rectangular cross-section provided in one of its minor sides with slotted holes (38) terminating with an eyelet (40) through which pins (42) are inserted, in order to be axially engaged in said holes (38) by nuts (44), and are locked by their threaded ends in holes provided

in the edges of the horizontal stringers.

4. A complex as claimed in claims 1 and 3, **characterised by** comprising an H-shaped profile bar (46), the flanges of which embrace two back-to-back C-shaped profile bars (2), and which is also provided with two U-shaped appendices (48) which when assembled form a seat (50) for the insertion of a head (52) provided at the end of a pin (54), said pin (54) engaging with the slotted holes (38) of the bar (36). 5 10
5. A complex as claimed in claim 2, **characterised in that** the coupling elements (22) consist of a substantially rectangular element which has its minor sides (24) faceted and comprises slotted holes (26) of curved extension, said minor sides (24) consisting of a flat portion (28) and a curved portion (30), the distance between the flat portions (28) being substantially equal to the distance between the facing cavities formed by the ribs (10) of the profile bar (2). 15 20
6. A complex as claimed in claim 1, **characterised in that** the stringer fixing seats consist of holes (20) for engagement by pins (34) which also engage the ends of the dividers (6). 25
7. A complex as claimed in claim 1, **characterised in that** the divider (6) consists of ladder-shaped plastic spacers (56) with vertical portions (60), said spacer (56) provided at their ends with coupling elements (58), said vertical portions (60) being shaped to snap-engage in an aluminium profile bar (62). 30
8. A complex as claimed in claim 1 **characterised in that** each divider (6) and/or each stringer (4) are made of wood and are provided at their ends with two seats for snap engagement of an aluminium T-shaped appendix. 35
9. A complex as claimed in claim 1 **characterised in that** the stringers (4) comprise a longitudinal groove (64) housing a rubber gasket in order to retain the glass brick (32). 40

Patentansprüche

1. Komplex aus Strukturelementen zum Bilden von Glasbausteinwänden, der bei seiner Verwendung umfasst: 50
 - einen im Wesentlichen C-förmigen Aluminiumprofilstab (2), um die Wand in Umfangsrichtung zu begrenzen, wobei der Profilstab (2) Seitenwände (8) besitzt, 55
 - mehrere vertikale Teiler (6), die die Funktion der horizontalen Trennung jedes Glasbausteins (32) von einem benachbarten erfüllen und bei

denen wenigstens ihre freiliegenden longitudinalen Kanten aus Aluminium sind,

- mehrere horizontale Aluminiumlängsträger (4), die aus einer horizontalen Mittelbahn (14) bestehen, die wenigstens längs einer Seitenkante mit einem T-förmigen Ansatz (18) versehen ist, wobei die Bahn (14) in regelmäßigen Intervallen mit Sitzen für die Befestigung der Teiler (6) versehen ist, wobei die Längsträger (4) an ihren Enden mit Kopplungselementen (22) versehen sind, um in dem Innenraum der vertikalen C-förmigen Profilstäbe (2) in lösbaren Eingriff zu gelangen,

dadurch gekennzeichnet, dass die Mittelbahn (14) jedes horizontalen Längsträgers (4) an ihren Enden mit zylindrischen Abschnitten (16) versehen ist, um die Kopplungselemente (22) durch Schrauben zu befestigen.

2. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** die Seitenwände (8) der C-förmigen Profilstäbe (2) eine innere Oberfläche aufweisen, die mit zwei Rippenpaaren (10) versehen ist, wobei jede Rippe (10) auf jener Oberfläche, die der anderen Rippe (10) zugewandt ist, mit einem Eingriffszahn (12) versehen ist.
3. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** er einen Stab (36) mit einem im Wesentlichen rechtwinkligen Querschnitt besitzt, der auf einer seiner kleinen Seiten mit Schlitzlöchern (38) versehen ist, die in einer Öse (40) enden, durch die Stifte (42) eingeschoben werden, damit sie in den Löchern (38) durch Muttern (44) axial in Eingriff sind und durch ihre Gewindeenden in Löchern verriegelt sind, die in den Kanten der horizontalen Längsträger vorgesehen sind.
4. Komplex nach den Ansprüchen 1 und 3, **dadurch gekennzeichnet, dass** er einen Stab (46) mit H-förmigem Profil umfasst, dessen Flansche zwei Rückseite an Rückseite angeordnete C-förmige Profilstäbe (2) umgeben und der außerdem mit zwei U-förmigen Ansätzen (48) versehen ist, die, wenn sie zusammengefügt sind, einen Sitz (50) für die Einführung eines Kopfes (52) bilden, der am Ende eines Stifts (54) vorgesehen ist, wobei der Stift (54) mit den Schlitzlöchern (38) des Stabs (36) in Eingriff ist.

5. Komplex nach Anspruch 2, **dadurch gekennzeichnet, dass** die Kopplungselemente (22) aus einem im Wesentlichen rechtwinkligen Element bestehen, dessen kleine Seiten (24) facettiert sind und das Schlitzlöcher (26) mit gekrümmter Ausdehnung umfasst, wobei die kleinen Seiten (24) aus einem ebenen Abschnitt (28) und aus einem gekrümmten Abschnitt (30) bestehen, wobei der Abstand zwischen

den ebenen Abschnitten (28) im Wesentlichen gleich dem Abstand zwischen den einander zugewandten Hohlräumen ist, die durch die Rippen (10) des Profilstabs (2) gebildet werden.

6. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** die Längsträger-Befestigungssitze aus Löchern (20) bestehen, mit denen Stifte (34) in Eingriff sind, die auch mit den Enden der Teiler (6) in Eingriff sind.
7. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** der Teiler (6) aus leiterförmigen Kunststoff-Abstandshaltern (56) mit vertikalen Abschnitten (60) besteht, wobei die Abstandshalter (56) an ihren Enden mit Kopplungselementen (58) versehen sind, wobei die vertikalen Abschnitte (60) so geformt sind, dass sie in einem Aluminiumprofilstab (62) in einen Einrasteingriff gelangen.
8. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** jeder Teiler (6) und/oder jeder Längsträger (4) aus Holz hergestellt ist und an seinen Enden mit zwei Sitzen für einen Einrasteingriff eines T-förmigen Aluminiumansatzes versehen ist.
9. Komplex nach Anspruch 1, **dadurch gekennzeichnet, dass** die Längsträger (4) eine longitudinale Nut (64) aufweisen, in die eine Gummidichtung eingesetzt ist, um den Glasbaustein (32) zu halten.

Revendications

1. Complexe d'éléments structurels pour former des murs en brique de verre comprenant à l'utilisation :
 - une barre profilée en aluminium (2) sensiblement en forme de C pour délimiter le périmètre du mur, ladite barre profilée (2) ayant des parois latérales (8),
 - une pluralité de diviseurs verticaux (6) assurant la fonction de séparation de chaque brique de verre (32) par rapport à une brique adjacente et ayant au moins leurs côtés longitudinaux découverts en aluminium,
 - une pluralité de longerons horizontaux en aluminium (4) comprenant une âme centrale horizontale (14) pourvue d'un appendice en forme de T (18) au moins le long d'un bord longitudinal, ladite âme (14) étant munie à intervalles réguliers de sièges pour fixer lesdits diviseurs (6), lesdits longerons (4) étant munis à leurs extrémités d'éléments de couplage (22) pour être couplés de manière amovible à l'intérieur des barres profilées verticales en forme de C (2),

caractérisé en ce que l'âme centrale (14) de cha-

que longeron horizontal (4) est pourvue à ses extrémités de parties cylindriques (16) pour fixer les éléments de couplage (22) par des vis.

2. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce que** les parois latérales (8) des barres profilées en forme de C (2) présentent une face interne (10) pourvue de deux paires de nervures (10), chaque nervure (10) étant pourvue d'une dent de contact (12) sur la face en regard de l'autre nervure (10).
3. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce qu'il** comprend une barre (36) de section transversale sensiblement rectangulaire pourvue sur ses petits côtés de trous en fente (38) se terminant par un oeillet (40) à travers lequel des chevilles (44) sont insérées, de manière à s'engager axialement dans lesdits trous (4) par des écrous (44), et sont bloquées à leurs extrémités filetées dans des trous ménagés dans les bords des longerons horizontaux (4).
4. Complexe comme revendiqué dans les revendications 1 et 3, **caractérisé en ce qu'il** comprend une barre profilée en forme de H (46) dont les flancs embrassent deux barres profilées en forme de C (52) dos à dos et qui est également pourvue de deux appendices en forme de U (48) qui lorsqu'ils sont assemblés forment un siège (50) pour l'insertion d'une tête (52) prévue à l'extrémité d'une cheville (54), ladite cheville (54) s'engageant dans les trous en fente (38) de la barre (36).
5. Complexe comme revendiqué dans la revendication 2, **caractérisé en ce que** les éléments de couple (22) consistent en un élément sensiblement rectangulaire qui a ses petits côtés (24) avec des facettes et comprend des trous en fente (26) s'étendant en courbe, lesdits petits côtés (24) consistant en une partie plate (28) et une partie courbe (30), la distance entre les parties plates (28) étant sensiblement égale à la distance entre les cavités en regard formées par les nervures (10) de la barre profilée (2).
6. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce que** les sièges fixant les longerons comprennent des trous (20) pour recevoir des chevilles (34) qui s'engagent également dans les extrémités des diviseurs (6).
7. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce que** le diviseur (6) consiste en des espaceurs en matière plastique (56) formant une échelle avec des parties verticales (60), les espaceurs (56) étant pourvus à leurs extrémités d'éléments de couplage (58), lesdits parties verticales (60) étant adaptées pour s'engager par enclenche-

ment rapide dans une barre profilée en aluminium (62).

8. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce que** chaque diviseur (6) et/ou chaque longeron (4) sont fabriqués en bois et sont pourvus à leurs extrémités de deux sièges pour un engagement par enclenchement rapide d'un appendice en forme de T en aluminium. 5
- 10
9. Complexe comme revendiqué dans la revendication 1, **caractérisé en ce que** les longerons (4) comprennent une rainure longitudinale (64) logeant un joint en caoutchouc de manière à retenir la brique de verre (32). 15

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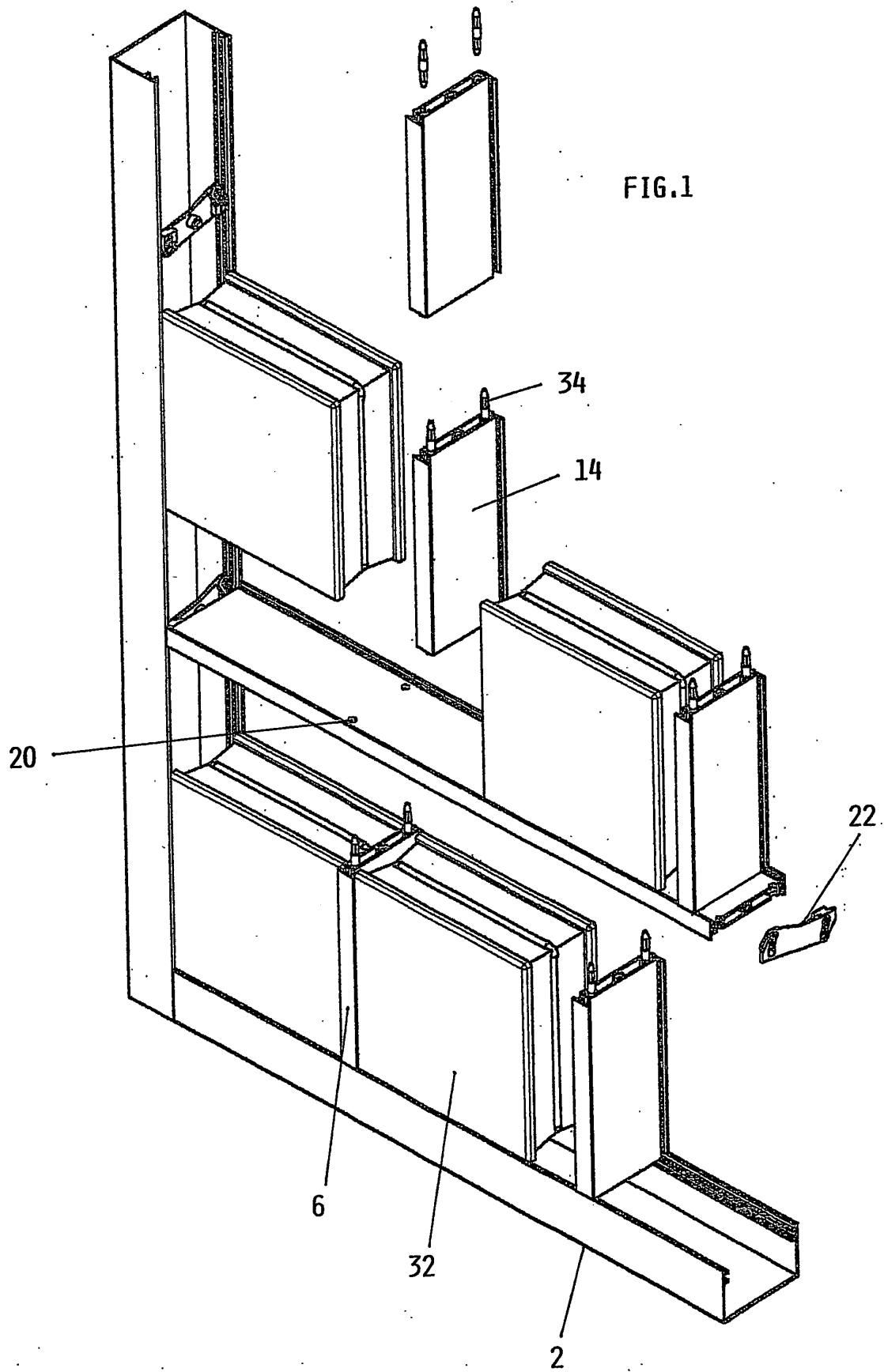
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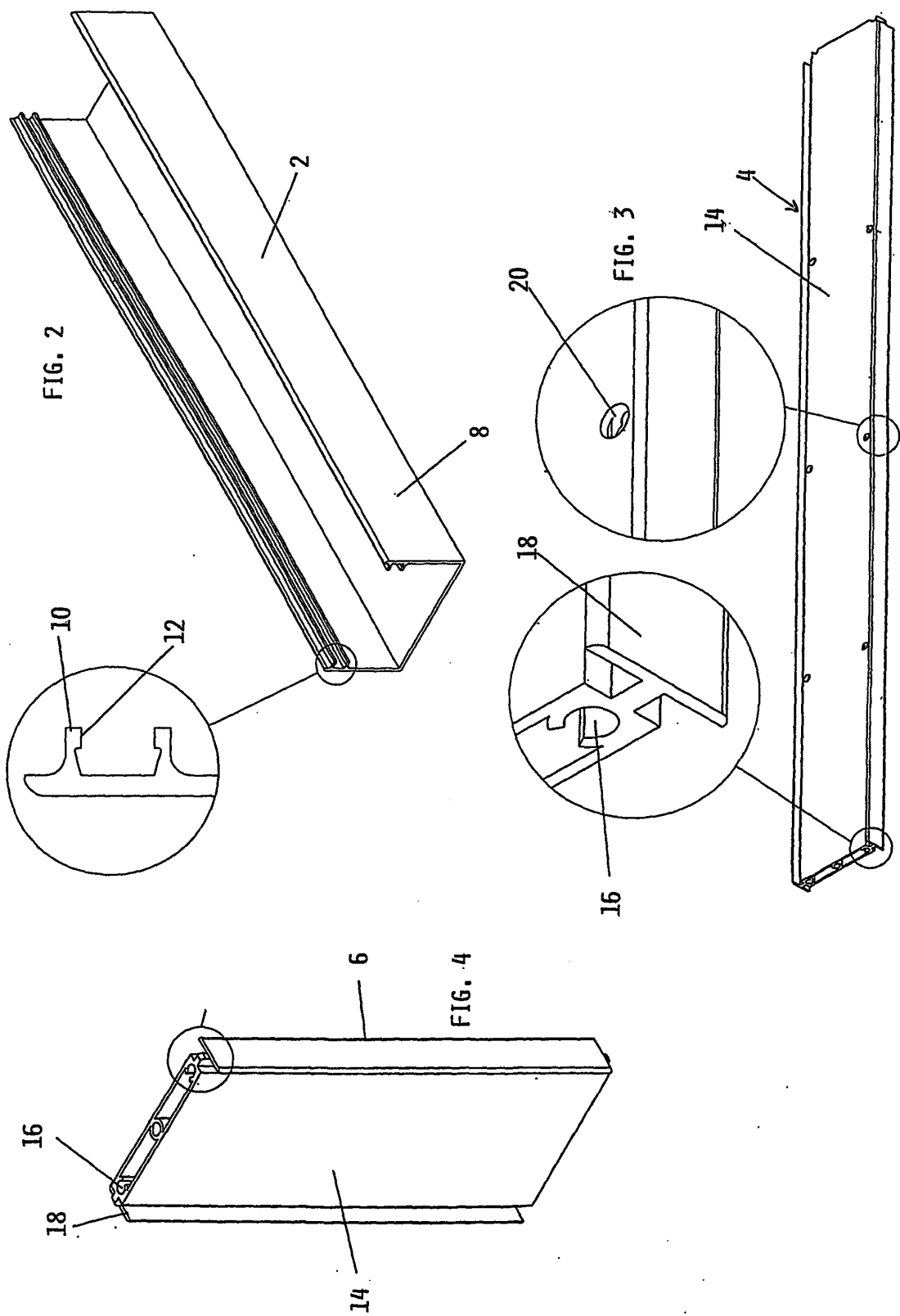
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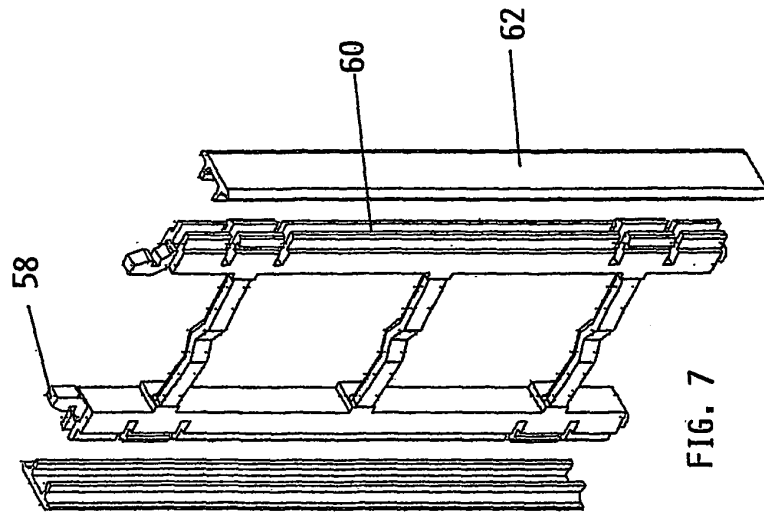
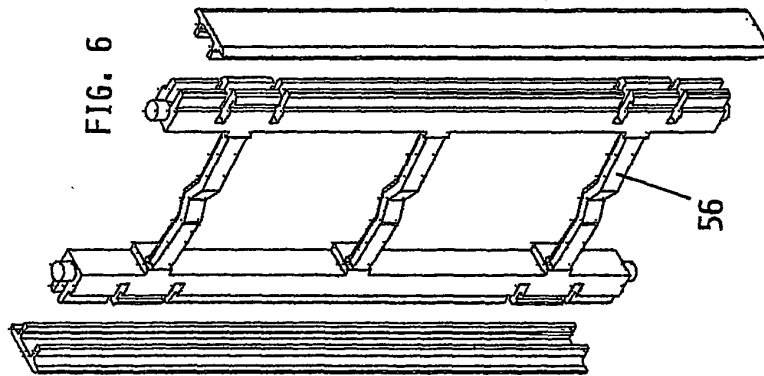
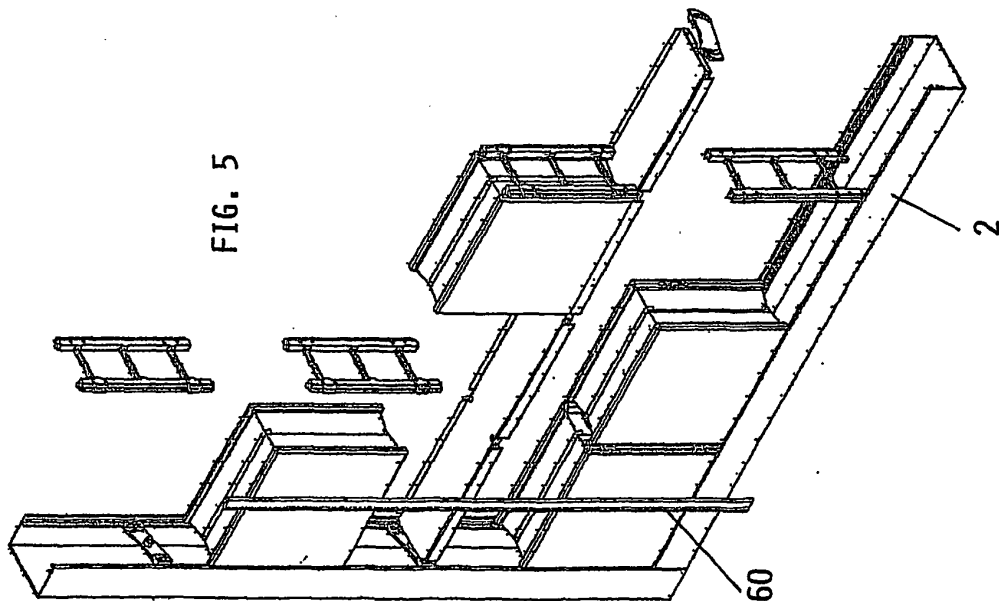
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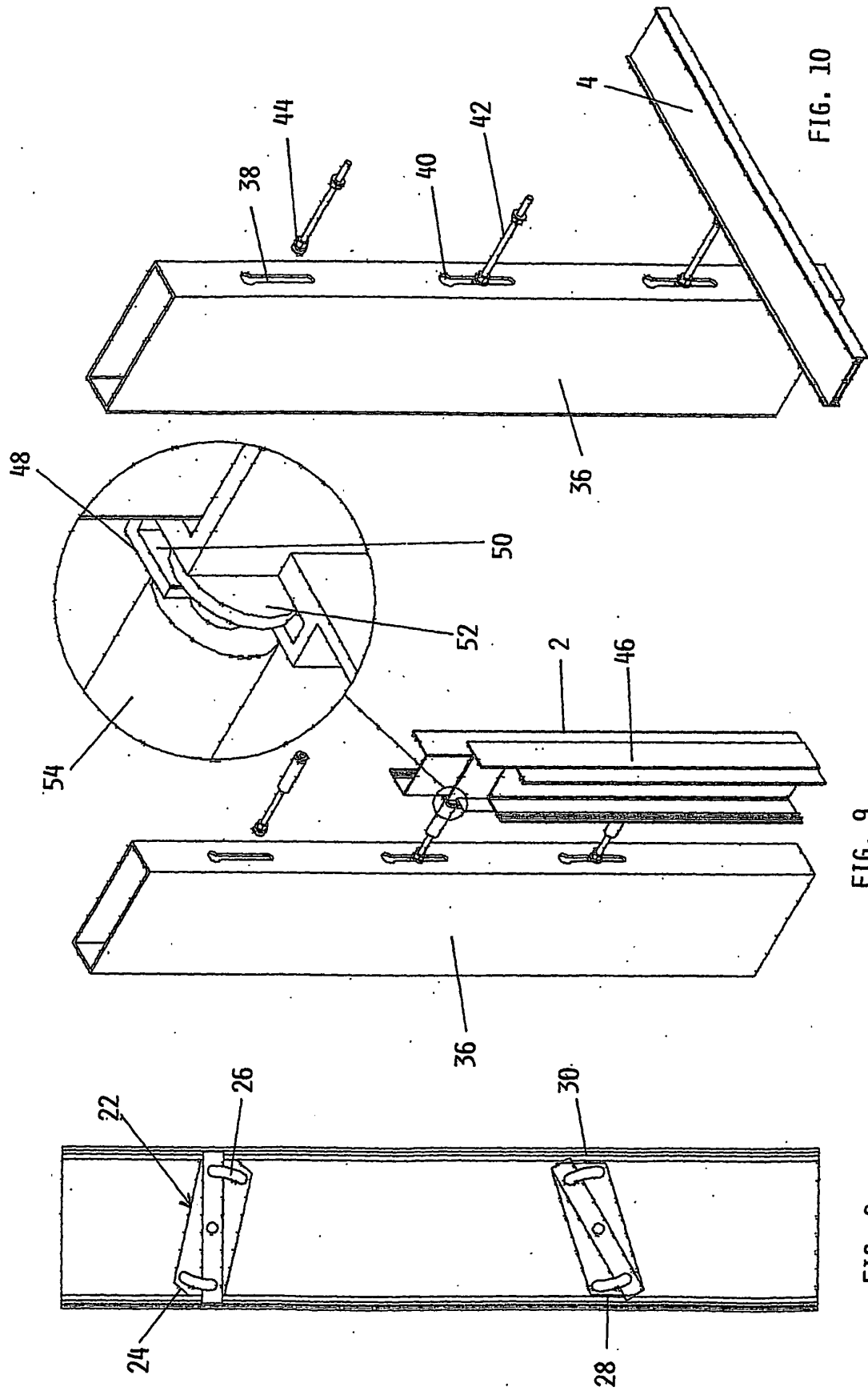
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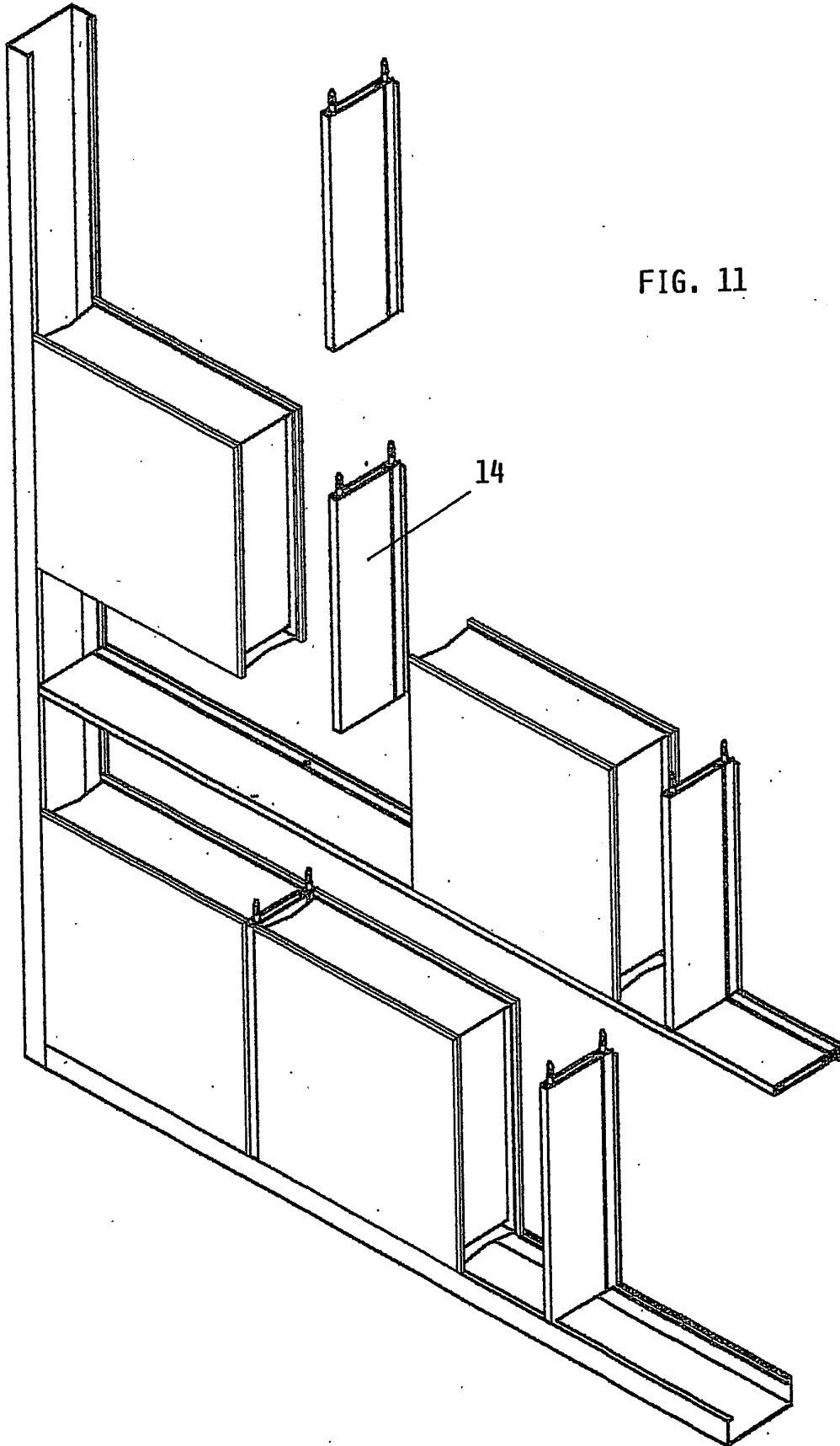
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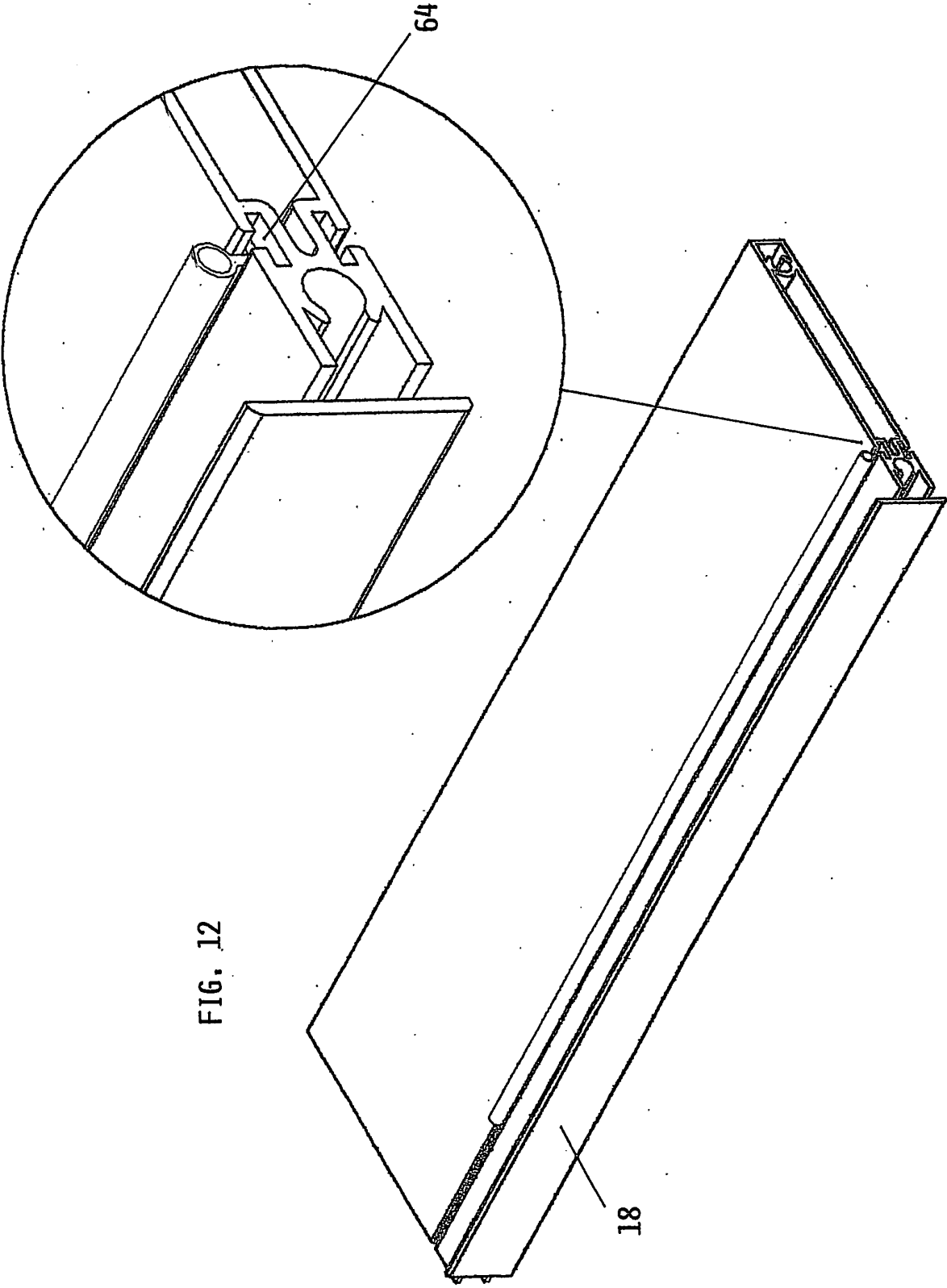


FIG. 12