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Fig. 2

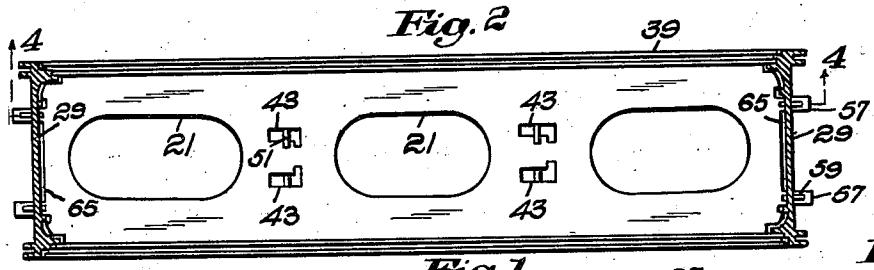


Fig. 1

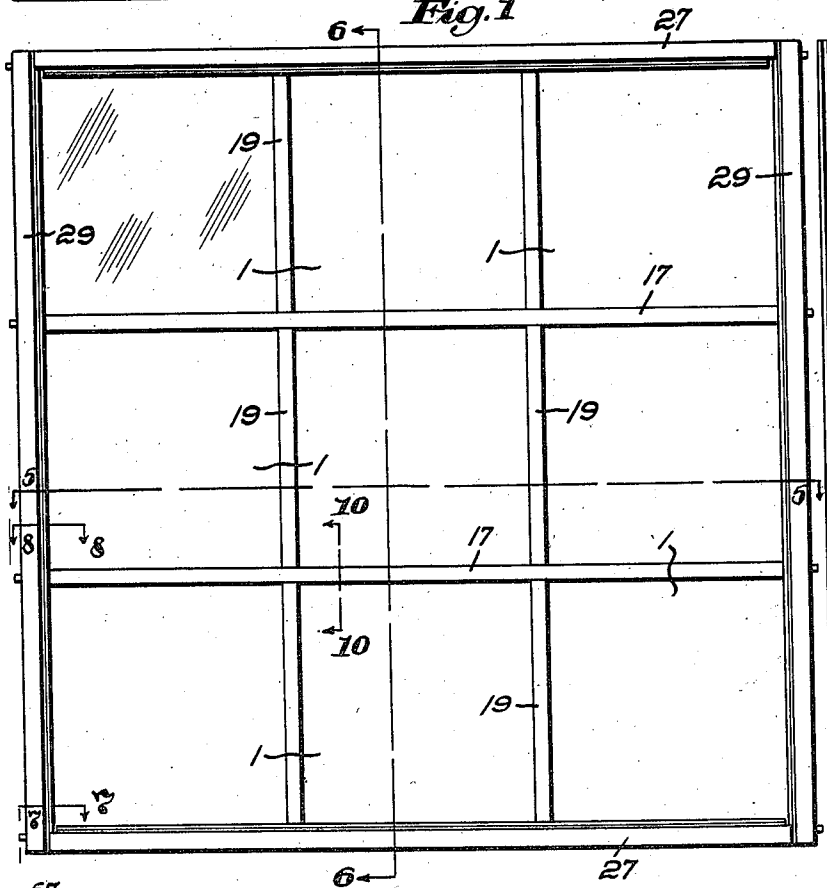


Fig. 3.

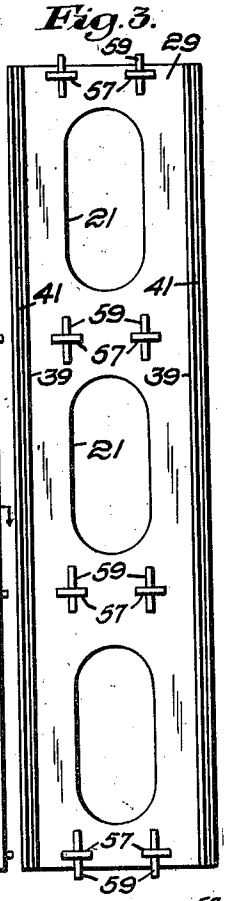
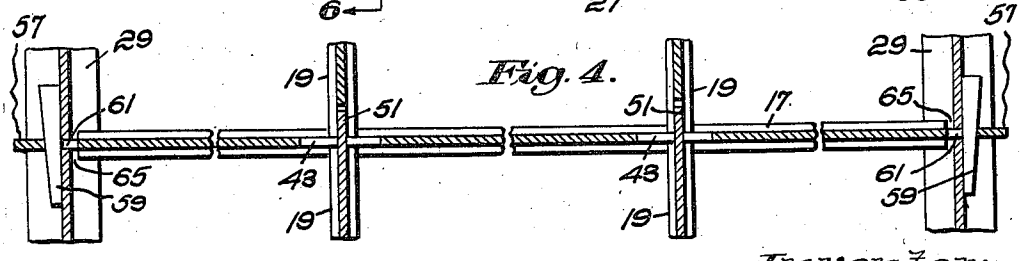


Fig. 4.



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Fig. 5

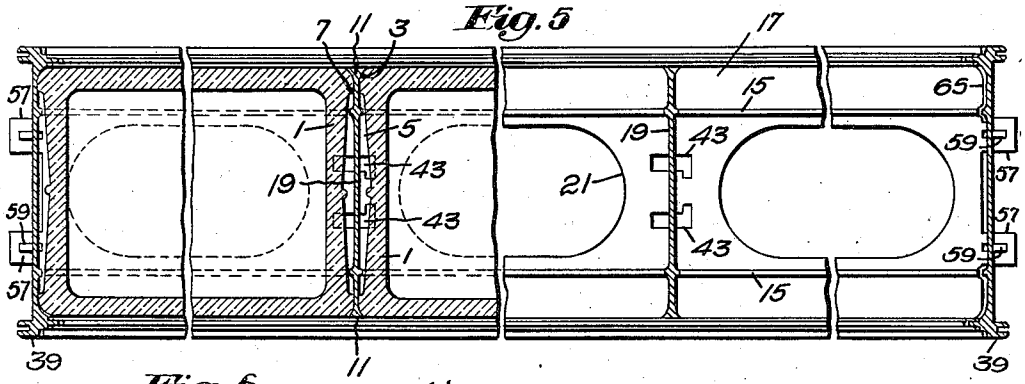


Fig. 6

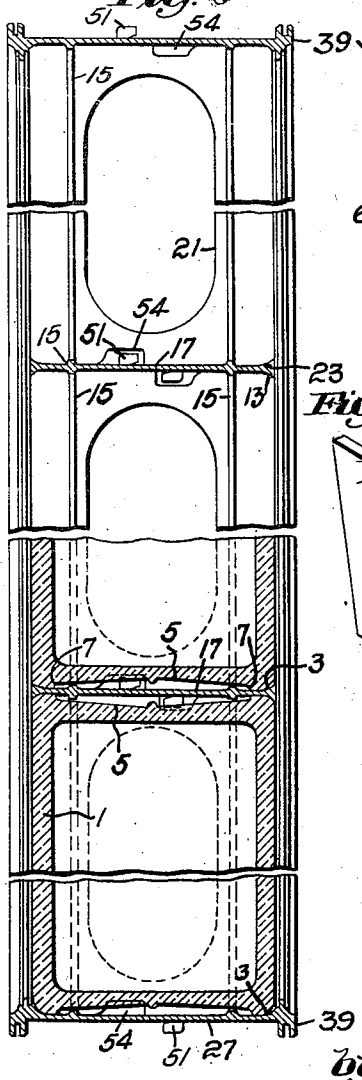


Fig. 7

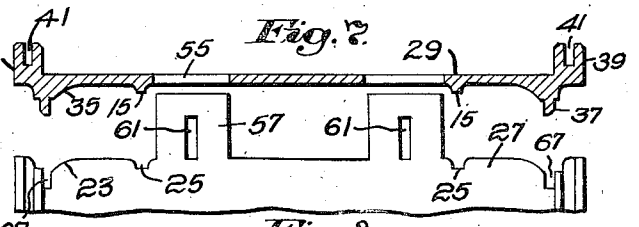


Fig. 8.

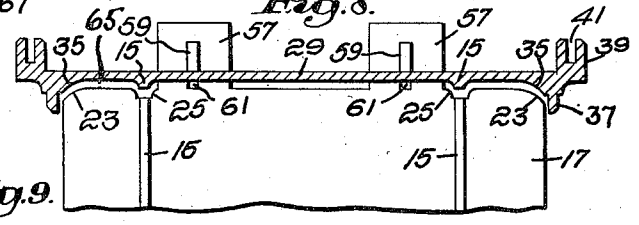


Fig. 9.

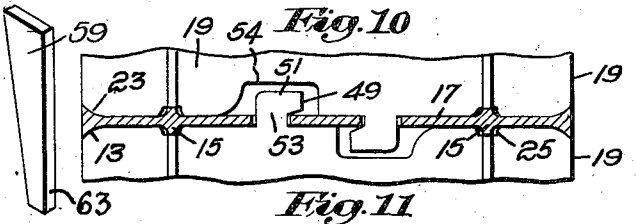


Fig. 10

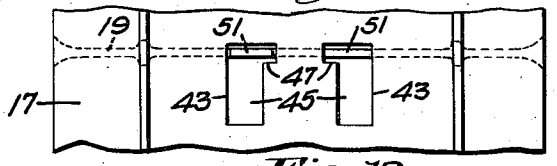


Fig. 11

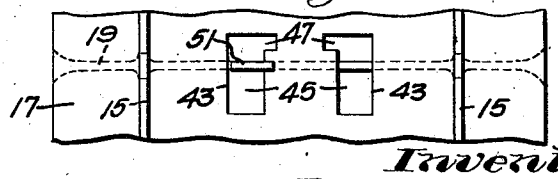


Fig. 12.

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Fig. 14

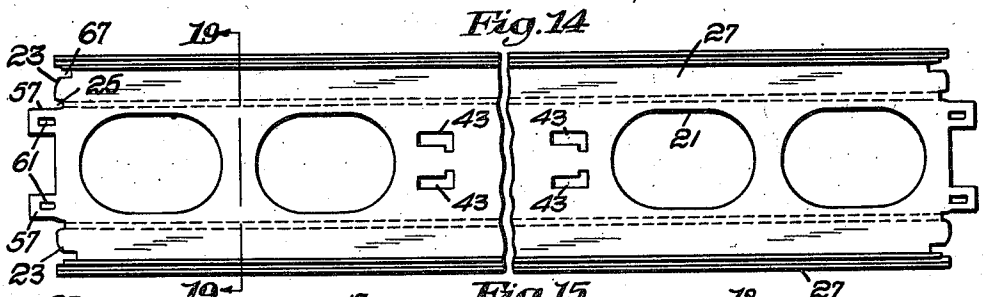


Fig. 15

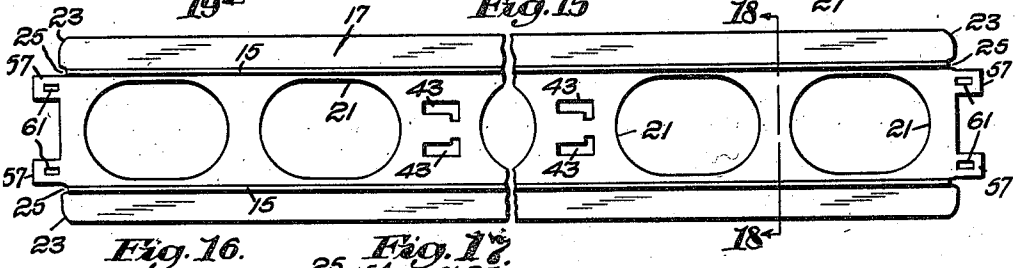


Fig. 16.

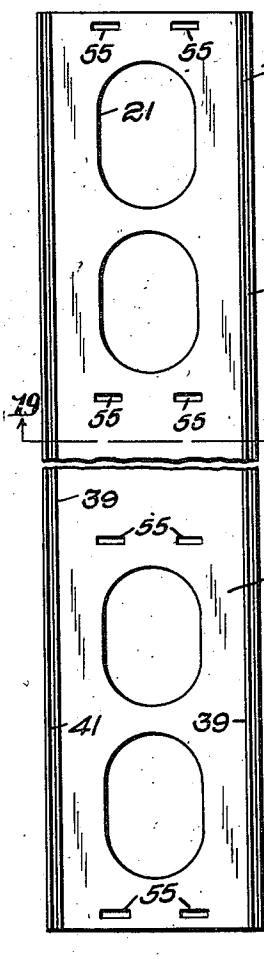


Fig. 17.

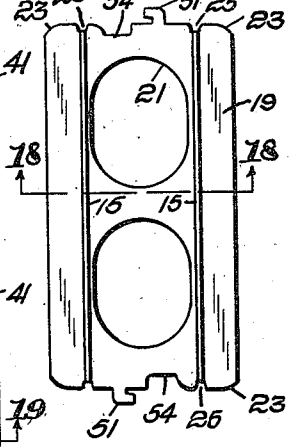


Fig. 13.

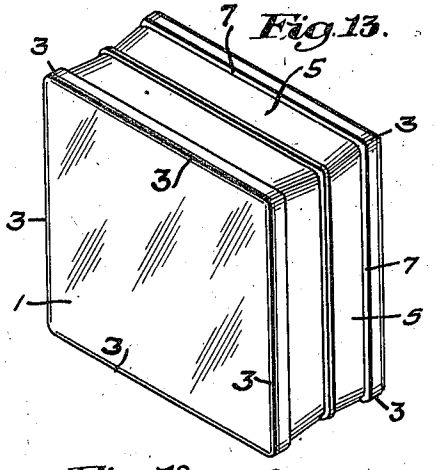


Fig. 18

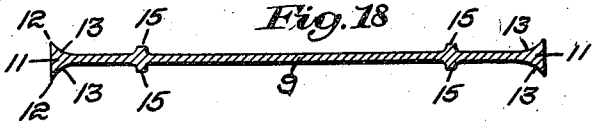
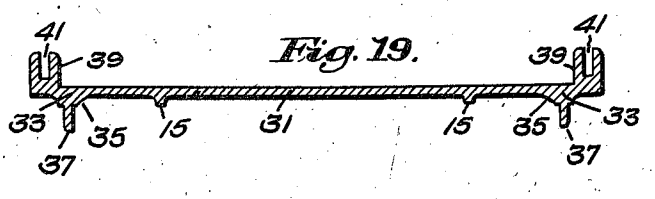


Fig. 19.



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Fig. 21.

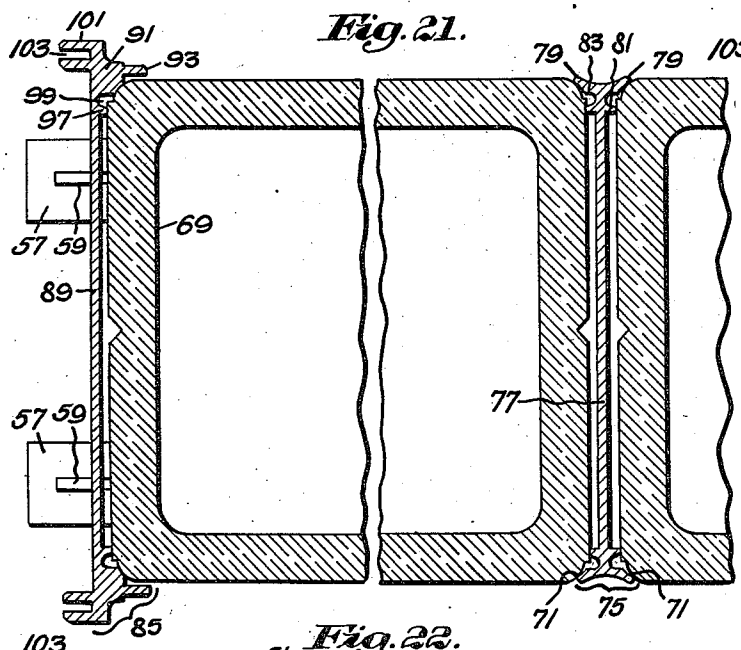


Fig. 23.

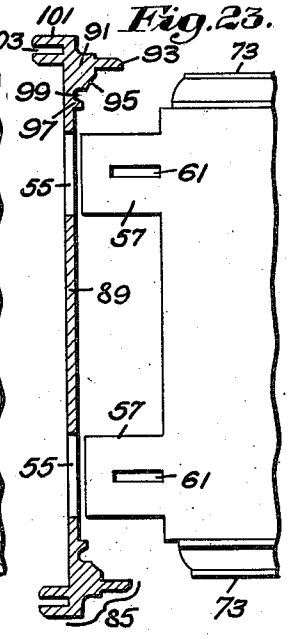


Fig. 22.

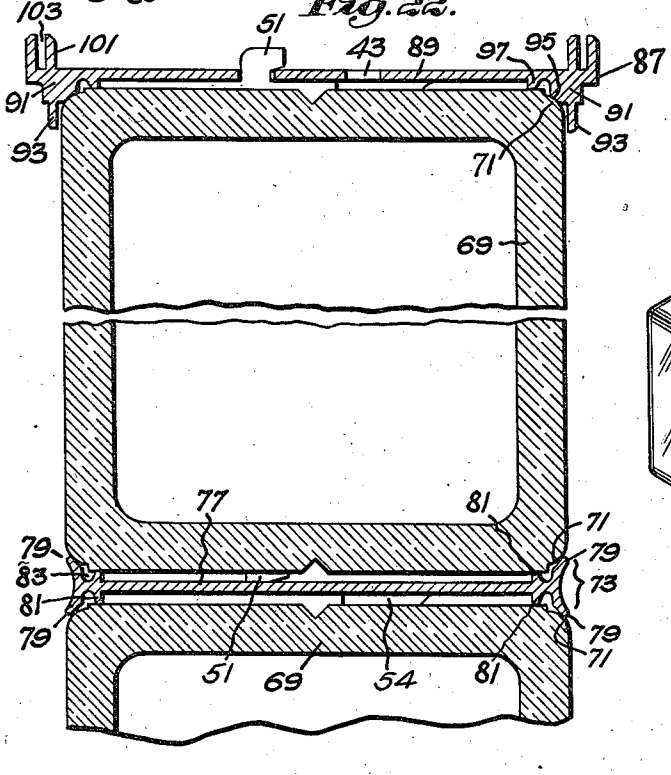
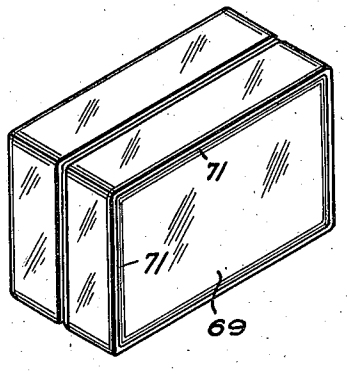


Fig. 20.



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Fig. 24.

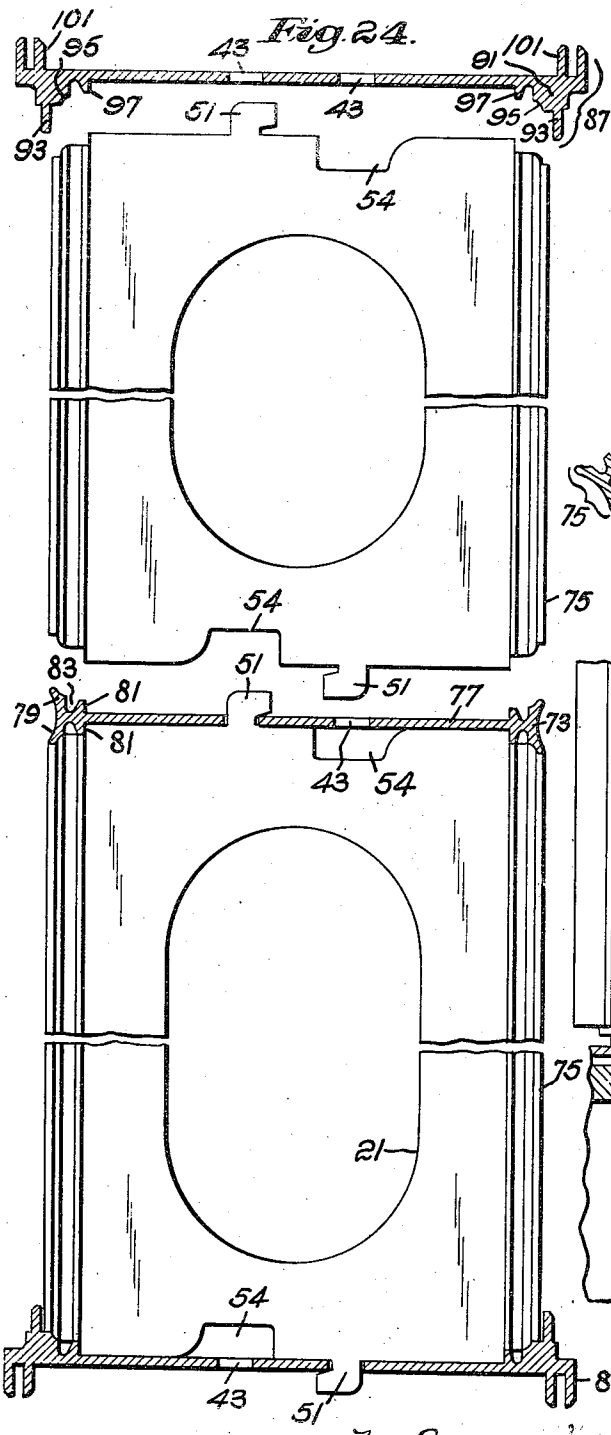


Fig. 25

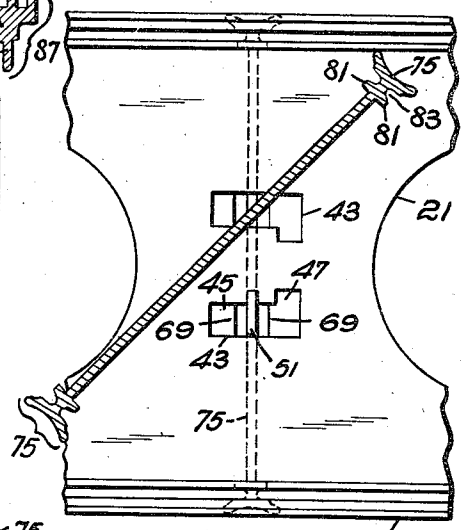
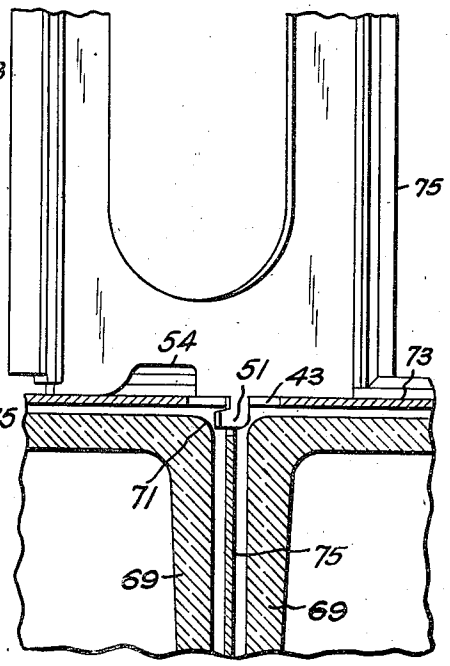


Fig 26.

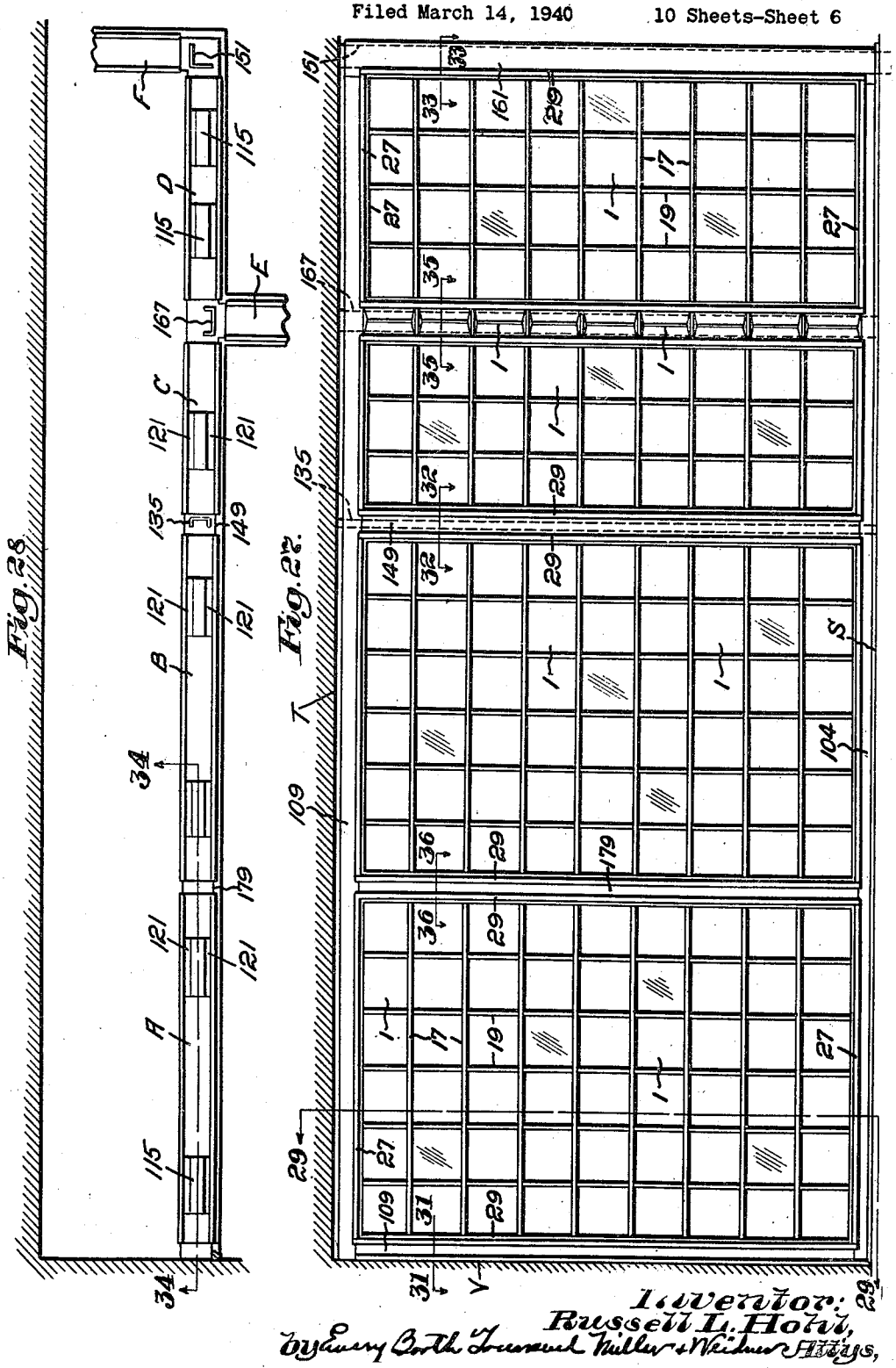


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Inventor:
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Fig. 29.

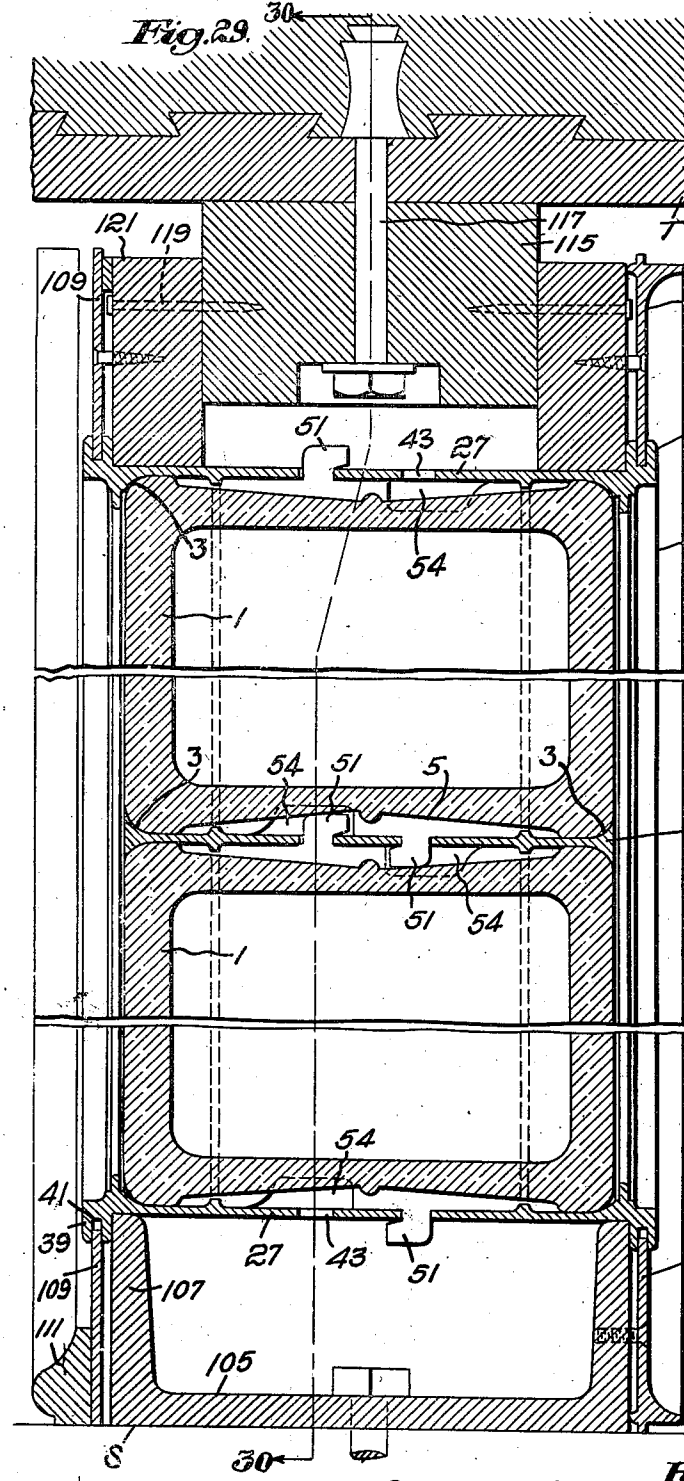
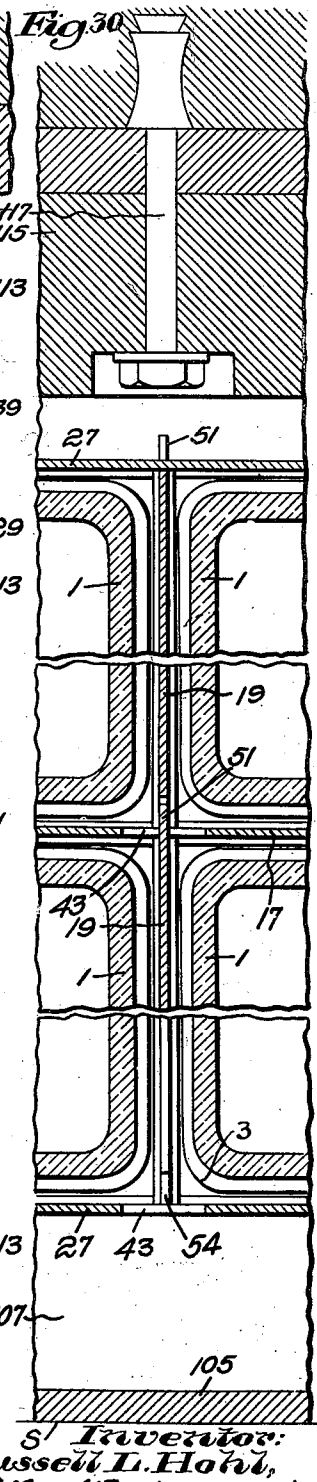


Fig. 30.



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Fig. 31.

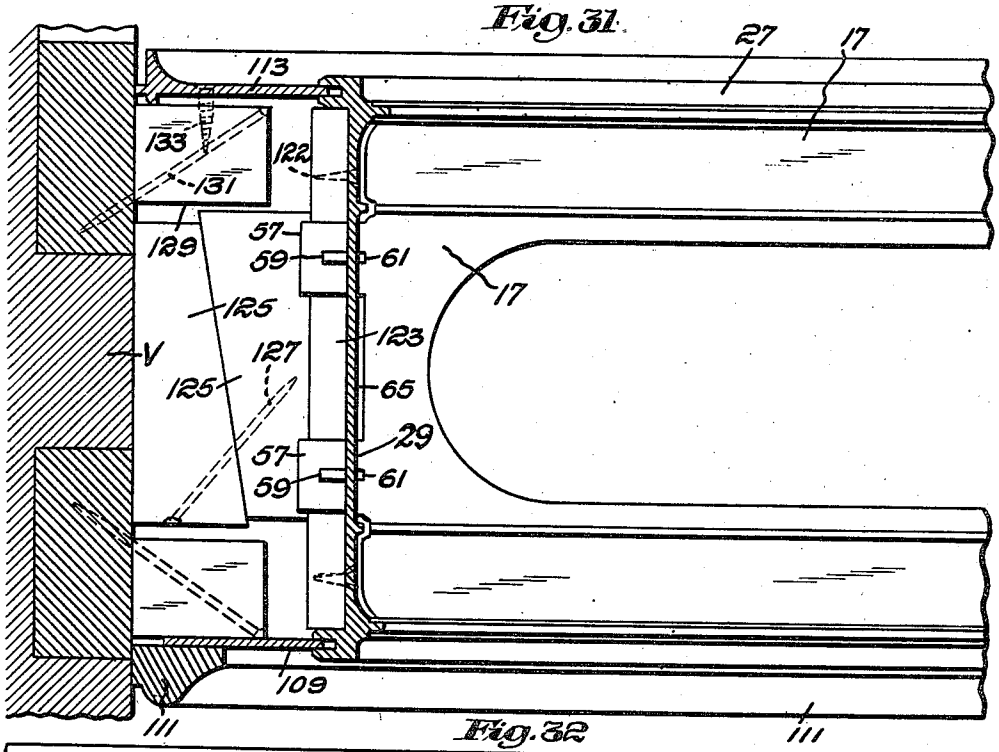
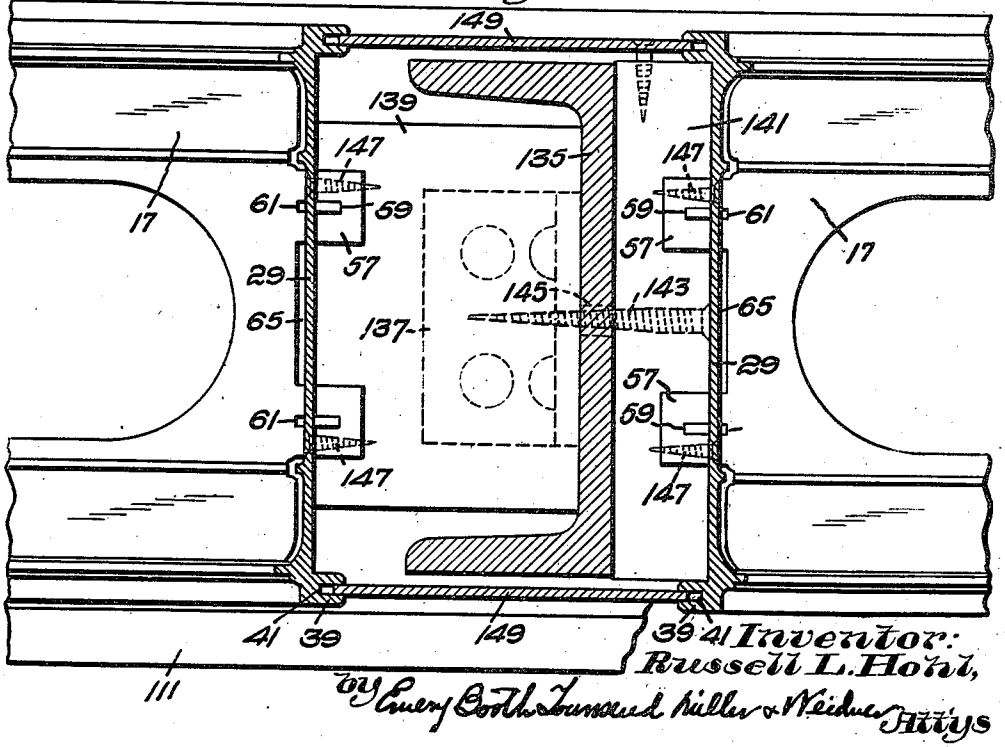


Fig. 32.



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Fig. 33

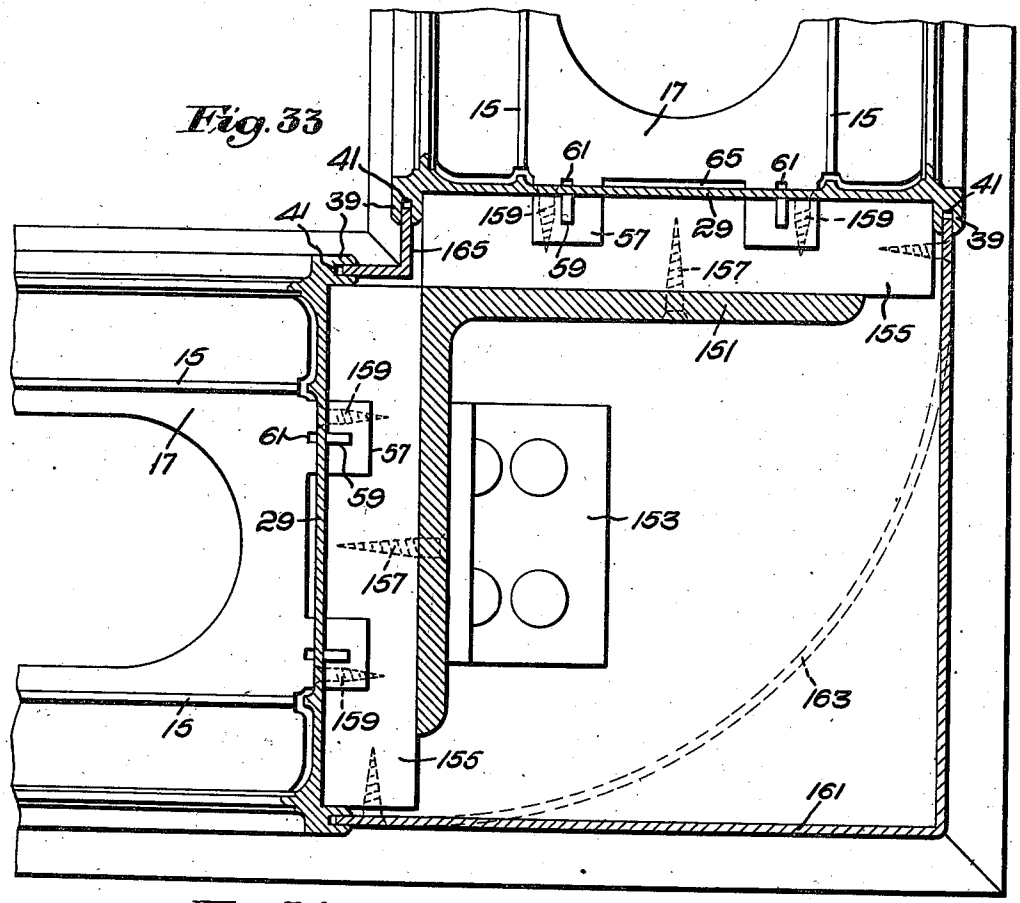
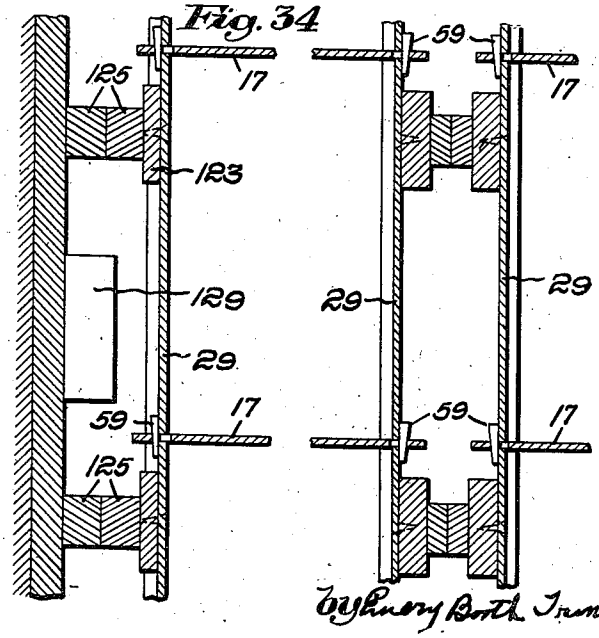


Fig. 34



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Fig. 35.

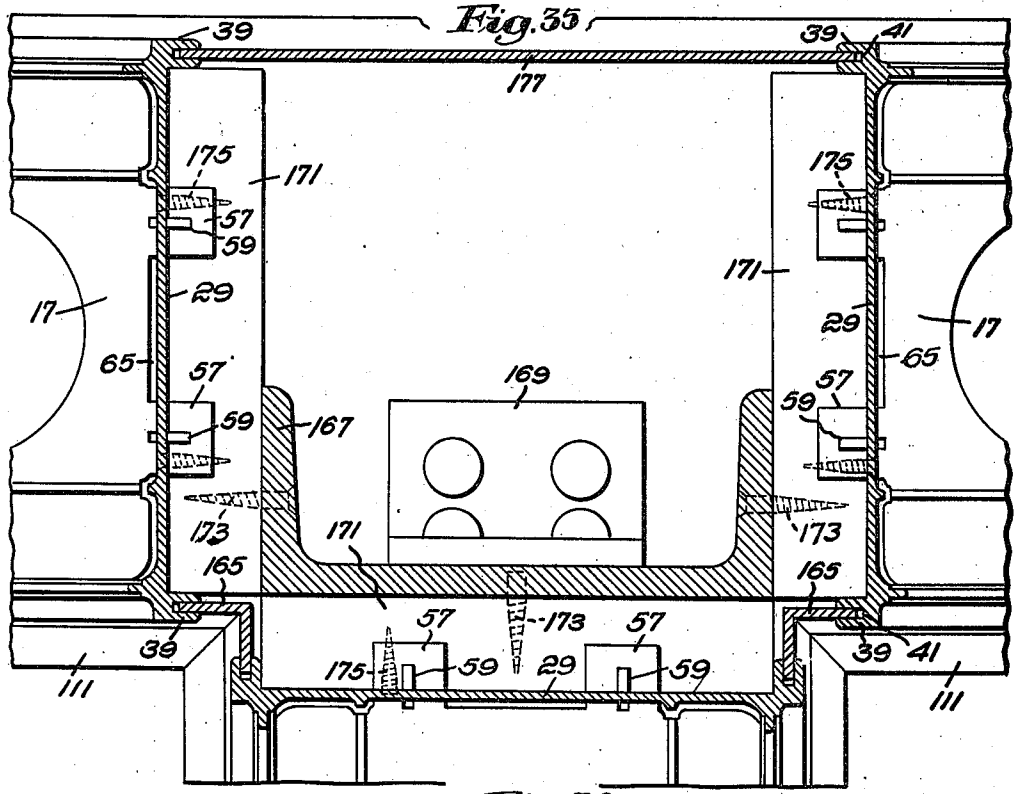
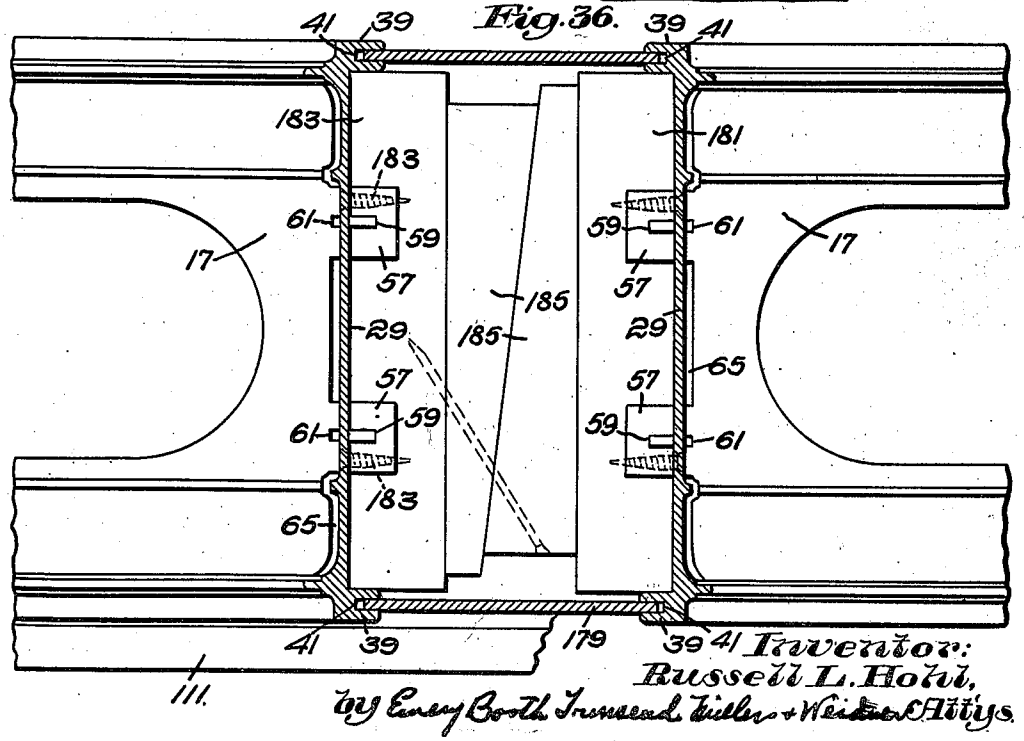


Fig. 36.



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Patented Jan. 12, 1943 2,308,242

UNITED STATES PATENT OFFICE

2,308,242

WALL AND THE LIKE

Russell L. Hohl, New York, N. Y., assignor to Revere Copper and Brass Incorporated, New York, N. Y., a corporation of Maryland

Application March 14, 1940, Serial No. 323,914

10 Claims. (Cl. 72—42)

My invention relates to building constructions, and is particularly, but not exclusively, concerned with walls made of preformed blocks held together by preformed bonding members.

The invention, which has among its objects the provision of a bonding frame and wall of improved construction, will be best understood from the following description when read in the light of the accompanying drawings of several forms of walls and bonding frames embodying the invention, the scope of which latter will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is an elevation of a wall unit or panel according to the invention;

Fig. 2 is a plan of a wall unit according to Fig. 1;

Fig. 3 is a side elevation of the wall unit according to Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 2, on an enlarged scale, with the blocks omitted and parts broken away;

Figs. 5 and 6 are respectively sections on the lines 5—5 and 6—6 of Fig. 1, on an enlarged scale, with parts omitted and parts broken away;

Fig. 7 shows a detail, on an enlarged scale, of the joint between the ends of the long horizontal members and the long vertical members at the perimeter of the wall unit according to Figs. 1 to 6, with the parts in disassembled relation, and corresponds to a section on the line 7—7 of Fig. 1 on an enlarged scale;

Fig. 8 shows a detail of the joint between the intermediate long horizontal members and the vertical perimeter members of the wall unit according to Figs. 1 to 6, and corresponds to a section on the line 8—8 of Fig. 1 on an enlarged scale;

Fig. 9 is a perspective of one of the wedge members according to Figs. 1 to 8;

Fig. 10 illustrates a detail of the joint between the short vertical and intermediate long horizontal members of Figs. 1 to 6, on an enlarged scale, and corresponds to a section on the line 10—10 of Fig. 1;

Fig. 11 is a plan of the joint according to Fig. 10 with the upper short vertical member of that figure omitted, and the lower short vertical member in partially disassembled relation with the intermediate long horizontal member;

Fig. 12 is a plan according to Fig. 11, with the parts of Fig. 11 in their final assembled relation;

Fig. 13 is a perspective of one of the blocks or wall elements of Figs 1 to 6;

Fig. 14 is a plan, on an enlarged scale, of the long horizontal members at the perimeter of the wall unit according to Figs. 1 to 12, with parts broken away;

Fig. 15 is a plan, on an enlarged scale, of one of the long horizontal intermediate members of the wall unit according to Figs. 1 to 12, with parts broken away;

Fig. 16 is an elevation, on an enlarged scale, of one of the long vertical members at the perimeter of the wall section according to Figs. 1 to 12;

Fig. 17 is an elevation, on an enlarged scale, of one of the short vertical intermediate members of the wall unit according to Figs. 1 to 12;

Fig. 18 is a section, on an enlarged scale, on the line 18—18 of Figs. 15 and 17;

Fig. 19 is a section, on an enlarged scale, on the line 19—19 of Figs. 14 and 16;

Fig. 20 is a perspective of a modified form of block further illustrated in Figs. 21, 22 and 26;

Fig. 21 is a horizontal section of a wall unit employing the block according to Fig. 20, and corresponds to a section on the line 5—5 of Fig. 1 on an enlarged scale with parts omitted and parts broken away;

Fig. 22 is a vertical section of a wall unit employing the block according to Fig. 20, and corresponds to a section on the line 6—6 of Fig. 1 on an enlarged scale with parts omitted and parts broken away;

Fig. 23 shows a detail, with parts in disassembled relation, of the joint between the long intermediate horizontal members and vertical perimeter members of a wall employing the blocks according to Figs. 20 to 22, and corresponds to a section on the line 8—8 of Fig. 1 with parts omitted and parts broken away;

Fig. 24 is a vertical section, with the blocks omitted and parts in disassembled relation, of a wall unit employing the blocks according to Figs. 20 to 22, and corresponds to a section on the line 6—6 of Fig. 1;

Figs. 25 and 26 illustrate steps of a way in which to assemble the short vertical members of Fig. 24 with the horizontal members, Fig. 26 roughly corresponding to a section on the line 10—10 of Fig. 1, and Fig. 25 being a plan of Fig. 26;

Fig. 27 is an elevation of a wall employing units or panels constructed according to Figs. 1 to 19, only with a greater number of blocks in the units;

Fig. 28 is a more or less diagrammatic plan of the wall according to Fig. 27;

Fig. 29 is a section, on an enlarged scale, on

the line 29—29 of Fig. 27, with parts broken away;

Fig. 30 is a section on the line 30—30 of Fig. 29;

Figs. 31, 32 and 33 are respectively sections, on an enlarged scale, on the lines 31—31, 32—32 and 33—33 of Fig. 27, with the blocks omitted;

Fig. 34 is a section, on an enlarged scale, on the line 34—34 of Fig. 27, with the blocks omitted and parts broken away; and

Figs. 35 and 36 are respectively sections, on an enlarged scale, on the lines 35—35 and 36—36 of Fig. 27, with the blocks omitted and parts broken away.

The blocks 1 illustrated in the wall units according to Figs. 1 to 19 are substantially like those shown in applicant's United States Patent No. 2,141,000, issued December 20, 1938. These blocks, which preferably are hollow and may be formed of material such as glass, have all their twelve edges rounded, as indicated at 3, while their four transverse faces are provided with recesses 5 presenting at opposite edges inwardly facing shoulders 7.

Between the horizontal and vertical transverse faces of adjacent blocks are positioned lengths of bonding members, the bonding members being in the form of strips or plates 9 (Fig. 18) having longitudinally extending thickened portions 11 at each of opposite edges thereof, which thickened portions form flanges 12 presenting rounded shoulders 13 cooperating with the rounded shoulders 3 of the blocks. Between opposite edges the bonding members at each side thereof have longitudinally extending beads 15 which in the assembled wall are in slightly spaced relation to the shoulders 7 of the blocks. The beads 15 serve mainly to retain calking material which may be placed in the spaces between them and the shoulders 13.

The blocks 1 may be arranged in horizontal superimposed rows, as shown in Fig. 1. Between each of these rows may be placed a long bonding member 17, illustrated in Figs. 15 and 18, which members are long enough to be coextensive with the rows, as shown by Fig. 1. Between each of the blocks of each of the rows may be placed the short bonding members 19, illustrated by Figs. 17 and 18, of such length as to be coextensive with the height of a single block.

The bonding members 17 and 19 have the same cross-section, and are preferably cut from lengths of extrusions of the cross-section shown by Fig. 18. These extrusions preferably are of metal such as aluminum or bronze. If desired, the intermediate portions of the members may be cut away, as indicated at 21, to lighten them and permit passage of light.

The short vertical bonding members 19, as shown in Fig. 17, are rounded at their four corners 23 to fit with the rounded corners 13 (Fig. 18) of the long horizontal bonding members 17, as will be clear from Figs. 6 and 10, and further are provided with notches 25 which engage with the longitudinally extending beads 15 of the long horizontal bonding members 17 and 27.

About the perimeter of the wall unit illustrated by Figs. 1 to 6 are placed members coextensive with the side of the unit. Both the vertical and horizontal perimeter members have the cross-section illustrated by Fig. 19. The horizontal perimeter members 27 are formed as illustrated by Fig. 14, while the vertical perimeter members 29 are formed as illustrated by Fig. 16.

As shown by Fig. 19, the perimeter members 27 and 29 have plate-like body portions 31, and, at each of opposite edges, longitudinally extending thickened portions 33 providing concavely rounded shoulders 35 for cooperation with the convexly rounded edges 3 of the blocks. On their same side as the shoulders 35 they are formed between their edges with the longitudinally extending calking beads 15. At the same side as the beads 15 they are formed with longitudinally extending flanges 37, and at their opposite sides with longitudinally extending edge flanges 39, the latter being provided with longitudinally extending slots 41, the purpose of which flanges 37 and 39 will presently appear. If desired, however, the shoulders or fillets 35 may be omitted so that there will be a square corner between each flange or bead 37 and the body portion 31.

The longitudinal horizontal bonding members 17 and 27 adjacent the joints between the blocks are shown as provided with pairs of openings 43 which, as best illustrated by Fig. 11, have narrower portions 45 and wider portions 47 when measured transversely of the members, the portion 45 being of relatively long length compared to the portion 47. The wider portions 47 of the openings 43 are wide enough to pass the heads 49 of the projections 51 formed on the ends of the short vertical bonding members 19, while the narrower portions 45 are wide enough to pass the shanks 53 of the projections, but not the heads 49 thereof. As the result of this construction the short vertical bonding members may be attached at opposite ends to the adjacent longitudinal horizontal bonding members. As shown (Fig. 17), the projection 51 at one end of the member 19 is out of alignment with the projection 51 at the opposite end. Each end is provided with a recess 54 to provide clearance for the projection 51 on the end of an adjacent aligned member 19, as clearly illustrated in Fig. 10.

As illustrated, the vertical bonding members 29 adjacent the joints between the blocks, and adjacent the upper and lower edges of the top and bottom rows of blocks, are provided with pairs of slots 55 for receiving pairs of tongues 57 formed on the ends of the horizontal bonding members 17 and 27. As best illustrated by Figs. 7 and 8, the tongues 57 may be passed through the slots 55, and the horizontal members 17 and 27 be secured to the vertical members 29 by means of wedge keys 59 (Fig. 12) driven through slots 61 formed in the tongues, the flat sides 63 of the wedge members bearing against the outer sides of the members 29.

Conveniently, the members 17 and 27 are cut slightly shorter than the length of the rows of blocks so as to provide at one or the other, or both, ends of the wall unit spaces 65 (Fig. 8) between the ends of the horizontal members 17 and 27 and the vertical members 29. In this way the wedge keys may draw the members 29 tightly against the blocks to tighten the joints between the blocks of the several rows, the horizontal members 17 and 27 under such conditions being under tension. The flanges 37 on the members 29 act to conceal this space 65.

As shown (Figs. 8 and 15), the horizontal members 17, like the vertical members 19, are formed with rounded corners 23 and notches 25 to fit the shoulders 35 and beads 15, respectively, of the vertical perimeter members 29, the flanges 37 on the members 29 being high enough under all conditions to extend over the sides of the members 17. Similarly, the ends of the horizontal perimeter members 27 are provided with

notches 25 (Figs. 7 and 14) for reception of the beads 15 on the members 29, and with rounded corners 23 for fitting the shoulders 35, and further are provided with slots 67 which receive the flanges 37 of the members 29. By this construction added transverse rigidity between the members is secured.

In building up the wall unit the vertical members 19 of each row may be first attached to the horizontal members on which the row is placed. Preferably this is done by passing the heads 49 of the projections 51 on the ends of the members 19 through the wider portions 47 of the openings 43, as illustrated in Fig. 11, and moving them into the position shown by Fig. 12. The blocks may then be placed between the members 19 to form the row. The lengths of the narrower portions 45 of the openings 43, it will be observed, permit the vertical members 19 to be slid slightly without disengaging them from the horizontal members, which facilitates assembly of the row. Further, when the wedge keys 59 are driven to force the vertical perimeter members against the adjacent blocks, this sliding enables the horizontal members 17 and 27 to be placed under tension and the row of blocks to be held snugly in assembled relation.

The wall may be built up with other forms of blocks as, for example, the blocks 69 illustrated in Figs. 20, 21 and 22. As shown, these blocks have rounded corners 71 extending about their four edges on each face. The construction of the wall unit employing these blocks is substantially like that heretofore described, except that the cross-sectional shapes of the extrusions are different to suit the different shapes of the blocks.

As shown in Figs. 21 to 26, the intermediate horizontal bonding members 73 and vertical bonding members 75 have plate-like body portions 77 at opposite edges of which at each side are longitudinally extending flanges 79 adapted to engage with the rounded corners 71 of the blocks. Close to these flanges at each side of the member are longitudinally extending beads 81 which act to hold the blocks in spaced relation to the body portions 77, the construction preferably being such that there is a slight clearance between the flanges 79 and corners 71 of the blocks to insure that the blocks rest on the beads 81. Between the flanges 79 and beads 81 are longitudinally extending grooves 83 which may serve for the reception of calking.

The vertical perimeter members 85 and the horizontal perimeter members 87, for the wall units having the blocks 69, may each comprise extrusions having plate-like body portions 89 formed with thickened portions 91 at one side adjacent each of opposite edges thereof, these portions having longitudinally extending upstanding flanges 93 and presenting longitudinally extending concavely rounded surfaces 95 for cooperation with the convexly rounded corners 71 of the blocks. Close to the thickened portions 91 these members are shown as provided with longitudinally extending beads 97 for holding the blocks in spaced relation to the perimeter members. Between the beads 97 and the thickened portions 91 of the members are longitudinally extending calking grooves 99. At the sides of the members opposite the beads 97 are longitudinally extending upstanding flanges 101 provided with outwardly opening slots 103, the purpose of which slots 103 will hereinafter appear.

As will be clear from Figs. 25 and 26, the projections 51 at the ends of the short vertical extrusions 75 cannot be placed in the wider portions 47 of the openings 43 in the horizontal extrusions 73 on top of a row of blocks and slid into the narrower portions 45 of these openings, because the blocks beneath the horizontal extrusions 73 would prevent such an operation. In order to lock the vertical extrusions 75 to a horizontal extrusion 73 on top of a row of blocks it is necessary, with the construction shown, to present the projections 51 to the narrower portions 45 of the openings at such angle, as illustrated by the vertical extrusion 75 shown in full lines in Fig. 25, that the head of the projection will pass through the portion 45 of the opening, and then turn the vertical extrusion to its dotted line position shown in Fig. 25. In placing the longitudinal horizontal extrusions 73 and 87 on top of a row of blocks it is necessary to pass the projections 51 at the top of the row through the wider portions 47 of the openings and then push the horizontal extrusions longitudinally to bring the projections 51 into the narrower portions 45 of the openings.

Walls may be made employing the units so far described in the ways shown by Figs. 27 to 36. In the wall shown by these figures are six such units A, B, C, D, E, F, each employing the blocks 1, these units being nine blocks high and of a varying number of blocks in length. Otherwise, except for the number of blocks, each unit is constructed identically as shown by Figs. 1 to 6.

As illustrated (see Figs. 29 and 30), each unit is supported by a suitable runner, which preferably is of the approximate length of the unit, the runner being secured to the floor or other support S. As shown, this runner takes to form of a steel channel 105 (Fig. 29), the lower horizontal perimeter member of the unit resting upon the upper edges of the flanges 107 of the channel, with the flanges 39 of the members 27 overlapping the flanges 107 to hold the parts against transverse displacement.

Inserted in the slots 41 of the flanges 39 of the lower perimeter members may be suitable finishing or covering strips extending to the floor S. As shown in Fig. 29, this finishing strip at one side of the wall takes the form of a flat metal plate 109, a moulding 111 being provided where the finishing strip meets the floor. At the opposite side of the wall this finishing strip is in the form of an elongated bronze or aluminum extrusion 113.

The space between the ceiling T and the upper horizontal perimeter extrusion or bonding member 27 may be finished in any suitable manner. For example, blocks 115 (Figs. 28, 29 and 30) may be secured to the ceiling by means of expansion bolts 117 at spaced points along the units. At each side of these blocks may be lightly nailed, as at 119, blocks 121, a space being left between the top of the blocks 121 and the ceiling, and between the bottoms of the blocks 115 and the unit, so that sagging of the ceiling will cause shearing or bending of the nails 119 and will not transmit any load to the unit. Engagement of the blocks by the flanges 39 of the extrusions 27 however prevents transverse movement of the wall relative to the ceiling. The space between the units and the ceiling may be finished by use of the strips 109 or extrusions 113 as described in connection with the lower portion of the units.

The space between the wall unit and the vertical wall or other support V may be finished in the way hereinbefore described in connection with the portion of the unit adjacent the floor.

As illustrated in Figs. 31 and 34, secured by screws 122 to the vertical perimeter extrusion 29 adjacent the wall V are spaced blocks 123, and between these blocks and the wall are wedge blocks 125 which after being driven in place may be secured together by suitable nails or other fasteners 127 to prevent them loosening. Other spaced blocks 129 may be nailed to the wall, as indicated at 131, to provide means for securing the finishing members 109 and 113 as, for example, by means of screws 133. Preferably the extrusion 29 should be spaced sufficiently from the wall V to provide room for the operator in driving the wedges 59 into the slots 61 of the tongues 57 before the finishing strips 109 or extrusions 113 are assembled with the unit.

Where a wall is of considerable length it is advisable to support the same at an intermediate portion of its length by means of a post as, for example, the vertical channel-iron 135 of Figs. 27, 28 and 32. This post may be supported in any suitable way at the floor and ceiling as, for example, by the brackets 137 (Fig. 32).

The adjacent vertical extrusions 29 of the wall units may be secured to the channel-iron post 135 in any suitable way. For example, blocks 139 and 141 may be secured to the channel-iron at spaced points by screws 143 extending through the blocks and perforations 145 in the channel-irons. The extrusions may be secured to these blocks as, for example, by screws 147.

For finishing the space between the units at opposite sides of the post 135 suitable elongated strips 149 of metal or other suitable material may be placed at their edges in the slots 41 of the flanges 39 of the adjacent vertical extrusions 29. As in the constructions previously mentioned, the blocks 139 and 141 should be of such thickness as to leave sufficient space between the post and the extrusions 29 adjacent thereto to permit the operator driving the wedges 59 into the slots 61 of the tongues 57. If desired, in place of the blocks 141, the blocks 123 and wedge blocks 125 of Fig. 31 may be used, and a similar construction may be used at the opposite side of the post.

At a corner of the wall there may be placed a suitable post as, for example, the angle-iron 151 of Figs. 27, 28 and 33. This post may be secured to the floor and ceiling in any suitable manner, for example, by means of brackets 153 (Fig. 33). At the outer sides of the posts may be secured spaced blocks 155 as, for example, by screws 157, and the adjacent vertical extrusions 29 at the ends of the units may be secured to these blocks by screws 159, the blocks being of sufficient width to space the extrusions 29 from the post sufficiently to allow the operator to drive home the wedges 59 into the slots 61 of the tongues 57. For finishing the outer corner of the wall at the post 151 an elongated sheet metal strip 161 of L-shaped cross-section may be provided. As shown, this strip has its opposite edge portions received by the slots 41 of the flanges 39 of the extrusions 29. If desired, in place of an L-shaped strip 161, a strip 163, which is curvilinear in cross-section, may be employed. At the inner corner of the wall the slots 41 of the flanges 39 may receive the edge portions of an elongated finished angle-iron 165 for closing the space between the flanges. If desired, the blocks 123 and wedge blocks 125 of Fig. 31 may be used in place of the blocks 155.

A post, as for example the channel-iron 167 of Figs. 27, 28 and 35, is preferably placed where one wall intersects another. This post is preferably rigidly secured at the floor and ceiling in any suitable way as, for example, by means of angle-brackets 169 (Fig. 35). As shown, spaced blocks 171 are secured to the outer sides of the post by screws 173 and the adjacent vertical extrusions 29 are secured to these blocks by screws 175. At its inner corners the intersection is finished by means of the angle-irons 165 hereinbefore mentioned. The opposite side of the wall is finished by an elongated strip 177 received at opposite edges in the slots 41 of the flanges 39 of the extrusions 29.

Where two wall units abut, the space between them may be finished by elongated strips 179 of metal or other material received in the slots 41 of the flanges 39 of the adjacent extrusions 29, the space between the flanges 39 preferably being not less than that which will permit the operator to drive the wedges 59 into the slots 61 of the tongues 57. Spaced blocks 181 may be secured to the outer sides of the extrusions 29 by screws 183, and between these blocks may be placed wedge blocks 185 for acting to secure one unit to the other.

It will be understood that, within the scope of the appended claims, wide deviations may be made from the embodiments of the invention described without departing from the spirit of the invention.

I claim:

1. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; and means adapted to be operatively held in engaged position by the wall elements of the rows detachably directly connecting the opposite end portions of the second mentioned members to the first mentioned members of the pairs thereof between which they lie, whereby said second mentioned members may act as tension elements directly to restrain said first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members; said members being adapted to hold in spaced relation the wall elements, and rows thereof, between which they are placed.

2. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; and means adapted to be operatively held in engaged position by the wall elements of the rows detachably directly connecting the opposite end portions of the second mentioned members to the first mentioned members of the pairs thereof between which they lie, whereby said second mentioned members may act as tension elements directly to restrain said first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members; said members having plate-like body portions adapted to extend transversely of the wall from one to the opposite face of said wall and to hold in spaced relation the wall elements, and rows thereof, between which they are placed, and being formed with raised portions adapted to co-

operate with said elements for restraining the latter against displacement transversely of the wall.

3. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; and means detachably directly connecting the opposite end portions of the second mentioned members to the first mentioned members of the pairs thereof between which they lie, whereby said second mentioned members may act as tension elements directly to restrain said first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members, said means comprising preformed means carried by the second mentioned members at the end portions thereof and cooperating preformed means on the first mentioned members constructed to be engaged and disengaged by relative movement between said members and adapted to be operatively held in engaged position by the wall elements of the rows.

4. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; and means adapted to be operatively held in engaged position by the wall elements of the rows detachably directly connecting the opposite end portions of the second mentioned members to the first mentioned members of the pairs thereof between which they lie, whereby said second mentioned members may act as tension elements directly to restrain said first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members, but permitting relative movement between said members in each of opposite directions longitudinally of the first mentioned members.

5. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; and means adapted to be held in engaged position by the wall elements disengageably directly connecting the end portions of the second mentioned members to the first mentioned members of said pairs, whereby said second mentioned members may act as tension elements directly to restrain the first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members.

6. A bonding frame according to claim 3 in which the preformed means of the first and second mentioned members comprise a projection on the end portion of the second mentioned member and a perforation formed in the first mentioned member, into which perforation said projection extends, said projection having a laterally extending portion overlying the wall of said perforation at the side of the latter opposite the second mentioned member.

7. A bonding frame according to claim 3 in which the preformed means of the first and second mentioned members comprise a projection on the end portion of the second mentioned member and a perforation formed in the first mentioned member, into which perforation said projection extends, said projection having a laterally extending portion overlying the wall of said perforation at the side of the latter opposite the second mentioned member; the projection at one end of the second mentioned member being out of alignment with that at the opposite end, and each end being formed with a recess receiving the projection on an adjacent second mentioned member longitudinally aligned therewith.

8. A bonding frame for elements built up to form a wall or the like having, in combination, parallel spaced elongated members adapted to be positioned between rows of the wall elements; other parallel spaced members, adapted to be positioned between wall elements of said rows, extending from adjacent one to the other member of pairs of the first mentioned members; means detachably directly connecting the opposite end portions of the second mentioned members to the first mentioned members of the pairs thereof between which they lie, whereby said second mentioned members may act as tension elements directly to restrain said first mentioned members of said pairs against separation in directions longitudinally of said second mentioned members, but permitting movement between said members longitudinally of the first mentioned members; third members at each of opposite ends of said first mentioned members common to a plurality thereof; and means connecting the ends of said first mentioned members to said third members for drawing at least one of the third members toward the opposite third member for drawing together the elements of said rows of wall elements.

9. A bonding frame according to claim 8 in which the first and second mentioned members are adapted to extend transversely of the wall from one to the opposite face of the wall and have portions at at least their opposite longitudinal edges adapted to extend for substantially the corresponding length of the wall elements for holding the latter in spaced relation, and have projecting portions adapted to cooperate with said wall elements for restraining the latter against displacement in each of opposite directions transversely of the wall.

10. A bonding frame for elements built up to form a wall or the like comprising first members arranged transversely of second members to form a plurality of cells for reception of the wall elements, the first members being interlocked with the second members to restrain the second members against separation longitudinally of the first members while permitting movement of the first members longitudinally of the second members, and means connected to the ends of the second members for drawing together the wall elements of those rows thereof which extend longitudinally of the second members.

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