Nov. 28, 1939. F. G. LANGENBERG 2,181,698

WALL CONSTRUCTION

Filed Sept. 29, 1938 2 Sheets-Sheet 1

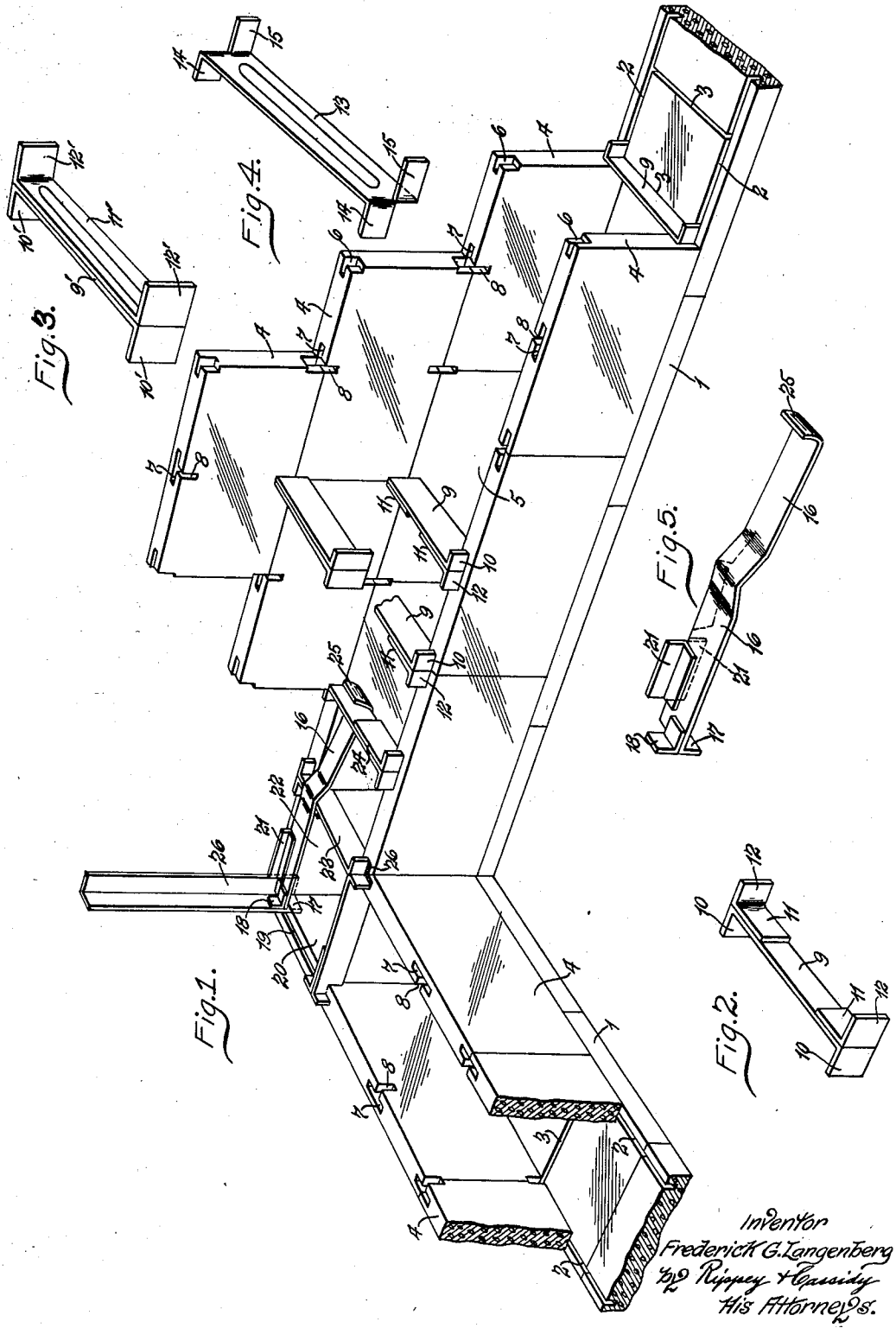


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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Filed Sept. 29, 1938 2 Sheets-Sheet 2

Fig. 6.

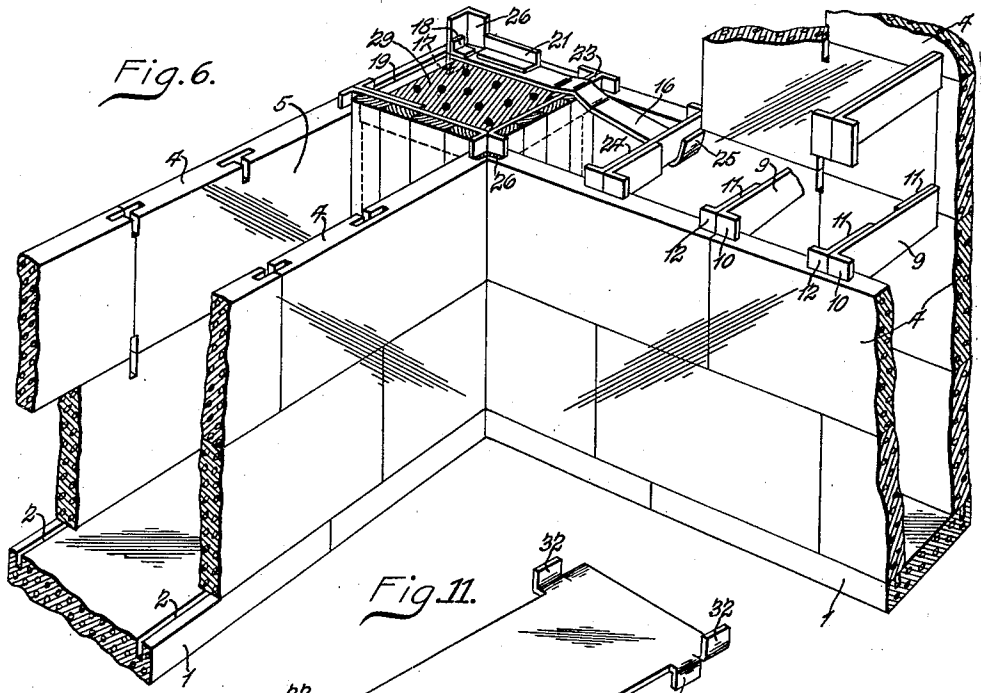


Fig. 11.

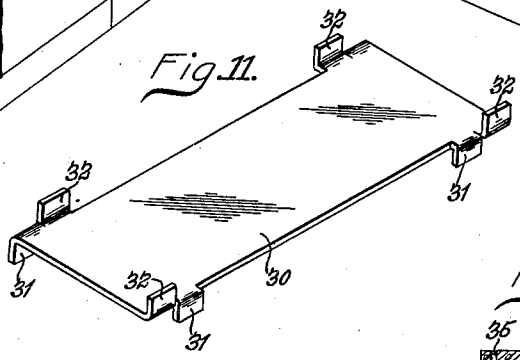


Fig. 7.

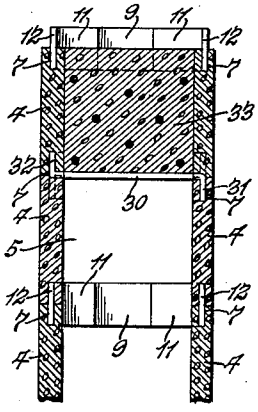


Fig. 8.

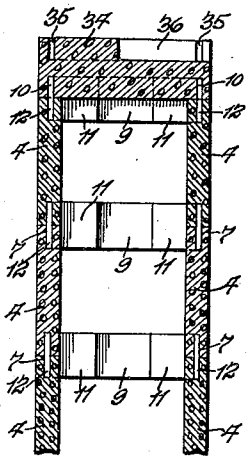


Fig. 9.

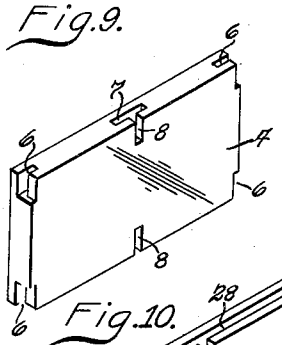
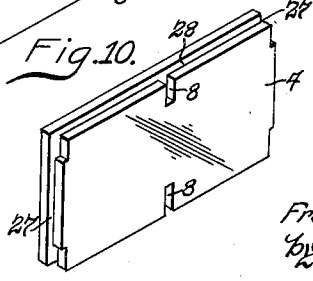


Fig. 10.



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UNITED STATES PATENT OFFICE

2,181,698

WALL CONSTRUCTION

Frederick G. Langenberg, St. Louis County, Mo.

Application September 29, 1938, Serial No. 232,388

9 Claims. (Cl. 72—44)

This invention relates to wall construction, and has special reference to walls having surfaces each of which is formed of a plurality of layers of slabs or tiles or the like, said surfaces being arranged in spaced relationship and appropriately connected and strengthened.

Objects of the invention are to provide an improved wall having its surfaces composed of layers of slabs or the like, said surfaces being separated by an intervening space which may be filled with concrete or other materials or not, as desired; to provide novel slabs for use in forming such walls; to provide slabs of novel construction closing the space between the rows of slabs forming the wall surfaces and supporting the entire wall; to provide slabs of improved and novel construction arranged in effective cooperative relationship with ties whereby the wall surfaces are held and sustained in rigid relationship; to provide improved means for holding in rigid relationship angularly disposed walls; and to provide wall construction and elements thereof embodying the novel features of construction and attaining the useful results hereinafter disclosed.

Other objects and advantages of my improved wall construction should be apparent from the following description, reference being made to the annexed drawings, in which—

Fig. 1 is a perspective view of a portion of two angularly disposed attached walls.

Figs. 2, 3 and 4 are perspective views of different forms of ties connecting the inner and outer wall surfaces.

Fig. 5 is a perspective view of a tie employed to attach the outer surface of one wall with the outer surface of an angularly disposed wall and with a rigid tie in said angularly disposed wall.

Fig. 6 is a perspective view of a portion of two angularly disposed walls in which the space at the corners thereof is filled or partially filled with concrete or the like.

Fig. 7 is a vertical cross-sectional view showing a body of concrete partially filling the space at the corner of the angularly disposed walls and leaving the remaining portion of the space open.

Fig. 8 is a vertical cross-sectional view of a portion of a wall illustrating an element in connection therewith for supporting floor studding or the like.

Fig. 9 is a perspective view of one of the slabs contained in the walls shown in Figs. 1 and 6.

Fig. 10 is a perspective view of a modified form of slab.

Fig. 11 is a perspective view of a plate constituting a tie for attaching together the inner and outer wall surfaces and for supporting a filler for the space between said inner and outer wall surfaces.

Each of the two angularly disposed connected walls shown in Figs. 1 and 6 comprises a series of horizontal longitudinally disposed slabs 1 of concrete or the like having therein near each side edge a longitudinal groove 2. The grooves 2 are parallel and are connected by transverse grooves 3.

Each surface of each wall is composed of a series of vertical superimposed elongated slabs 4, said inner and outer surfaces being separated by an intervening space 5. The lower layers of slabs are seated upon the marginal portions of the series of slabs 1.

The slabs included in the walls of Figs. 1 and 6 are of the form shown in Fig. 9. Each of said slabs has in each end corner thereof a notch or groove 6 and in each longitudinal edge thereof a T-shaped groove comprising a longitudinal portion 7 and an inwardly opening portion 8. These notches or grooves are adapted and designed to receive ties securing together the slabs forming the inner and outer wall surfaces. These ties may be of the form shown in Fig. 2, comprising a vertically wide transverse portion 9 having rigid with each end a lateral extension 10, and also having rigid with each end thereof a member 11 formed with a lateral extension 12 in alinement with the extensions 10. The extensions 10 and 12 are adapted to seat in the grooves 6, the extensions 10 seating in said grooves in two oppositely disposed slabs and the extensions 12 seating in said grooves in two oppositely disposed slabs having their ends abutting the ends of the slabs engaged by the extensions 10.

A modified form of this tie is shown in Fig. 3, which is the same as the tie shown in Fig. 2, with the exception that there is a single member 11′ instead of two members 11′. The same reference numerals with exponents are applied to parts shown in Fig. 3 that are applied to analogous parts shown in Fig. 2. The tie shown in Fig. 3 is applied in the same way as the tie shown in Fig. 2. Or the ties may be made in the form shown in Fig. 4, each including a part 13 having its ends split and bent to provide lateral extensions 14 and 15 at each end. This tie is applied by engaging the extensions 14 with the ends of slabs forming one layer, for instance, and engaging the extensions 15 with slabs forming a

next lower layer longitudinally beyond the slabs with which the extensions 14 are engaged.

The lower rows of tiles forming the wall surfaces are interlocked with each other and with the base tiles 1 by engaging the selected ties in the grooves 2 and 3 in the base members and in the grooves 6 of the lower wall slabs, as shown in Fig. 1.

The outer wall slabs at the corners are interlocked with each other and with at least one of the angularly disposed walls by a tie member shown in Fig. 5. Said tie members comprise an elongated metallic strip 16 having rigid with its outer end a pair of vertical extensions 17 and 18 of which the extension 17 extends downwardly and engages in a groove 19 in a slab 20, and the extension 18 engages in a groove in a superimposed slab (not shown). Two vertical extensions 21 and 22 rigid with the side edge of the member interlock with slabs in the angularly disposed wall of which the lower slab 22 is shown. The member 16 extends over and across a tie member 23 and under a tie member 24, both of which are within the types disclosed, and has a hook 25 engaging the tie member 24. Thus, the outer wall surface including the slab 20 is firmly interlocked with the angularly disposed wall in which the tie member 24 is mounted.

At the outer corner formed by the outer slabs of the angularly disposed wall, a vertical angle bar 26 is interlocked with the vertical series of slabs extending through grooves 27 in their adjacent ends. As shown in Fig. 10, such slabs have vertical grooves 27 in their ends and horizontal grooves 28 along their longitudinal edges. It is within the longitudinal grooves 28 that the extensions 17, 18 and 21 are engaged, and it is within the grooves 27 that the angle bars 26 are engaged.

The space between the inner and outer surface forming slabs may be left open, or partially or entirely filled, as desired. As shown in Fig. 6, the space at the corner is filled with concrete 29, which may be reinforced if desired. As shown in Fig. 7, the space 5 is partially filled with concrete for strengthening or other purposes. A plate 30 (Fig. 11) formed with a series of downward extensions 31 and with a series of upward extensions 32 is substituted for the tie members heretofore described and constitutes a support for a body of concrete 33 only partially filling the space 5. This concrete may be at any selected place or places along the wall, and the remainder of the space may be filled with insulating or other material, or not, as desired.

As shown in Fig. 8, at floor levels slabs 34 somewhat similar to but double the thickness of the slabs 1 may be used in the wall and interlocked with the tie members. These slabs have in their upper sides longitudinal grooves 35 corresponding to the grooves 2 or to the grooves 28 and, in their lower sides, similar grooves to receive the extensions 10 and 12 of the tie members or their analogues, as shown in Figs. 3 and 4.

It is now apparent that this wall is of durable and very rigid construction. The surface forming slabs form a space which may be filled with concrete or the like so that, when the slabs are once assembled, they really constitute a form for molding concrete walls with which the slabs are rigidly connected by the tie members. In instances in which extremely rigid walls are not required, the spaces 5 may be filled with heat insulating material or left empty, as preferred. In instances in which the walls are to extend upwardly through different stories, the slabs 34 may be provided with recesses 36 to receive the ends of floor joists or the like.

The wall may be varied in other particulars than those specifically indicated without departure from the nature and principle of the invention.

I claim:

1. A wall comprising a longitudinal series of slabs forming a base and having longitudinal grooves in their upper sides near their side edges and transverse grooves intermediate their ends connecting said longitudinal grooves, a longitudinal series of vertical slabs seated upon the margins of said base slabs and having grooves in their end corners, and transverse tie members seated in said transverse grooves of said base members and interlocking in said longitudinal grooves of said base members and in said corner grooves of said slabs.

2. A wall comprising a longitudinal series of base slabs having longitudinal grooves in their upper sides near their margins and transverse grooves connecting said longitudinal grooves, two vertical series of slabs seated on said base slabs and forming an intervening space and having grooves in their corners registering with said longitudinal grooves and also having T-shaped grooves in their upper edges opening upwardly and inwardly, tie members seated in said transverse grooves and in said corner grooves interlocking all of said slabs with each other, and transverse tie members seating in said T-shaped grooves and interlocking the upper edges of said vertical slabs.

3. A wall comprising a longitudinal series of base slabs having longitudinal grooves in their upper sides near their margins and transverse grooves connecting said longitudinal grooves, two vertical series of slabs seated on said base slabs and forming an intervening space and having grooves in their corners registering with said longitudinal grooves and also having T-shaped grooves in their upper edges opening upwardly and inwardly, tie members seated in said transverse grooves and in said corner grooves interlocking all of said slabs with each other, transverse tie members seating in said T-shaped grooves and interlocking the upper edges of said vertical slabs, and other vertical series of slabs seated on said first named series of slabs in break-joint relationship in which the grooves at the corners of said second series of slabs register with said T-shaped grooves and interlock with said last named tie members.

4. A wall comprising two tiers of vertical series of slabs having vertical grooves at their ends and having T-shaped grooves intermediate of their ends and opening to the inner sides thereof, and series of vertically wide sheet metal tie members for the two tiers of slabs extending transversely, and lateral extensions rigid with the ends of said tie members and each interlocking in an end groove of one slab and in said T-shaped groove of one of the superimposed series of slabs and holding said tiers of slabs in rigid spaced relationship.

5. A wall comprising two tiers of vertical series of slabs, each of said slabs having grooves in its upper and lower end corners and having T-shaped grooves in its upper and lower edges intermediate of its ends and opening to the inner sides thereof, series of tie members for the two tiers of slabs extending transversely and interlocking in said corner grooves of one series of slabs and in said T-shaped grooves of the superimposed

series of slabs and holding said tiers of slabs in rigid spaced relationship, and means for interlocking the slabs of an angularly disposed wall with the slabs of an adjacent angularly disposed wall and with tie members in said adjacent angularly disposed wall.

6. A wall comprising two tiers of vertical series of slabs, each of said slabs having grooves in its upper and lower corners opening to the inner sides of said slabs and having T-shaped grooves in its upper and lower edges intermediate of its ends opening to the inner sides of said slabs, and a series of tie members for the two tiers of slabs including a portion extending transversely across the space between said two tiers of slabs, and extensions on the ends of said transverse portion engaging in said corner grooves of one series of slabs and in the intermediate T-shaped grooves in the vertically adjacent series of slabs and holding said tiers and series of slabs in rigid relationship.

7. Two walls located angularly with respect to each other and forming a corner, and each comprising two tiers of vertical series of slabs, said two tiers of slabs being separated by an intervening space and each of said slabs having grooves in its upper and lower corners and having T-shaped grooves in its upper and lower edges intermediate of its ends and opening to the inner sides thereof, series of tie members for the two tiers of slabs of each wall spanning said space and interlocking in said corner grooves of one series of slabs and in said T-shaped grooves of the vertically adjacent series of slabs and holding the tiers of slabs of each wall in rigid spaced relationship, and means interlocking the end slabs of one tier in one wall with said tie members of the angularly adjacent wall.

8. A wall comprising two angular tiers of vertical series of slabs forming an intervening angular space between said tiers, each of said slabs having grooves in its upper and lower edges, tie members extending across the space between said tiers of slabs and seating in said grooves in vertically and longitudinally adjacent slabs in the respective tiers of slabs and thereby holding said tiers of slabs rigidly in spaced relationship, plates forming interlocking connections between one tier of slabs and the angularly disposed tier of slabs, and bodies of concrete on said plates filling the space between said tiers of slabs throughout the length of said plates.

9. Two angularly disposed walls forming a corner and each wall comprising two tiers of vertical series of slabs, each of said slabs having grooves in its upper and lower corners and also having T-shaped grooves in its upper and lower edges intermediate of its ends and opening to the inner side thereof, tie members extending from one tier of slabs to the other and interlocking in said grooves, means interlocking the end slabs of one wall with the tie members of the angularly adjacent wall, and a vertical body of concrete filling the corner space formed by said walls.

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