Oct. 6, 1925. 1,556,066

H. E. BELL

CONCRETE CONSTRUCTION

Filed July 1, 1924

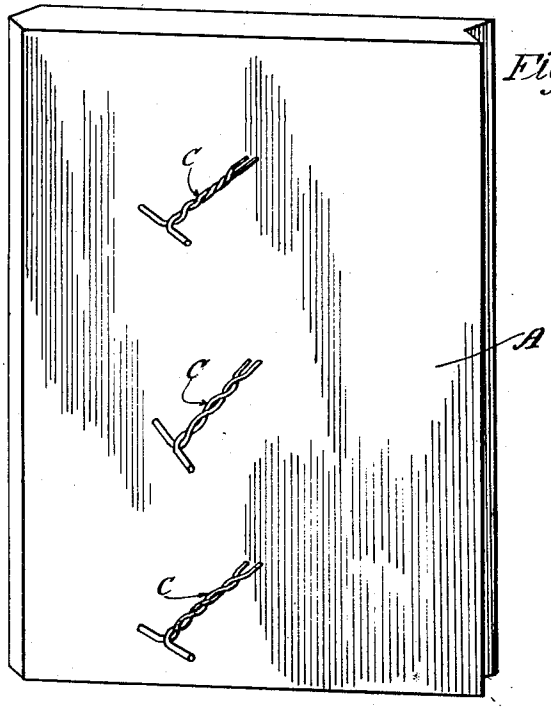


Fig. 5.

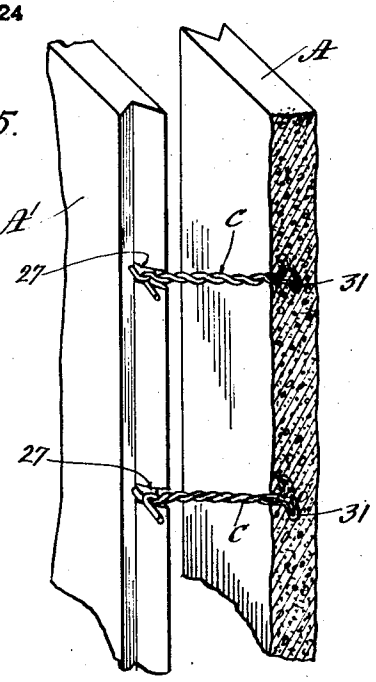


Fig. 6.

Fig. 1.

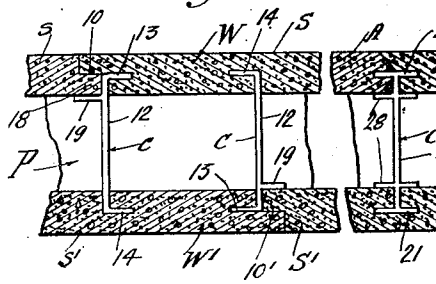


Fig. 3.

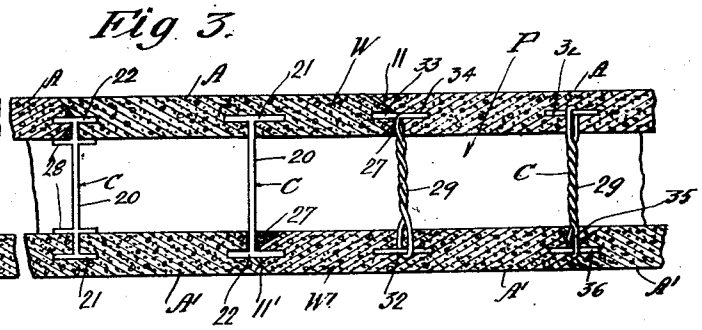
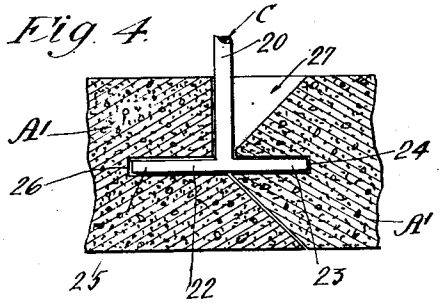


Fig. 4.



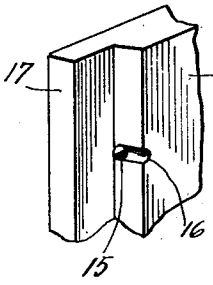


Fig. 2.

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UNITED STATES PATENT OFFICE.

HARRY E. BELL, OF SAWTELLE, CALIFORNIA.

CONCRETE CONSTRUCTION.

Application filed July 1, 1924. Serial No. 723,483.

To all whom it may concern:

Be it known that I, HARRY E. BELL, a citizen of the United States, residing at Sawtelle, in the county of Los Angeles and State of California, have invented new and useful Improvements in Concrete Constructions, of which the following is a detailed specification.

This invention relates generally to concrete constructions and more particularly to double concrete walls made up of pre-formed slabs.

The invention may be applied with advantage to the wall construction of dwellings, factory buildings, or any structure where it is desirable that there be insulating space within the walls, and where slab wall construction is feasible.

Inasmuch as the complete wall of my improved construction is made up of two laterally spaced walls, each wall complete in itself, it will avoid confusion to refer to the completed wall structure as a "partition" made up of spaced and associated walls. Therefore, it will be understood that whenever, either in the following description or appended claims, I may hereinafter refer to a partition, I am designating, as a whole, a double wall construction. Of course, the term "partition" is not intended to limit the invention to dividers between rooms or compartments, but is to be considered as including a bounding or space defining structure, since, considered in this light, it applies to a divider between the interior and exterior of a compartment.

I provide combination tie rods and spacers between the partition walls whereby they are tied in a manner to support one another and to maintain each other in predetermined spaced relation. I have so designed and arranged these tie members that they are cast in slabs of one wall and are adapted to be fixed or anchored to the slabs in the other wall during the erection of the partition. Sockets are formed in the slabs of said other wall to receive the tie members, the latter being sealed in position by grouting. Thus the slabs may be fully formed at the factory and delivered at the job in such shape that unskilled laborers may quickly assemble them into a unitary structure.

As a further feature, when the initially free ends of the tie rods are sealed in the opposite wall, they serve to assist in tying together adjacent slabs in said opposite wall, thus contributing largely to the ultimate strength of the structure.

Further objects and novel features of the invention will be disclosed in the following detailed description, reference being had to the accompanyng drawings, in which—

Fig. 1 is a section through a partition made up of two lap jointed walls which are tied and spaced by the device of my invention;

Fig. 2 is a perspective view of the socketed end of a lap joint slab;

Fig. 3 is a view similar to Fig. 1 but showing the invention applied to walls made up of tongue and groove joined slabs, and showing different types of tie members;

Fig. 4 is an enlarged section illustrating the tie member in its relation to a slab joint before said joint has been mortared;

Fig. 5 is a perspective view of a slab with the tie members anchored therein; and

Fig. 6 is a perspective view of a partition, one of the walls thereof being shown in section and the joint end of the other wall being exposed.

In Figures 1 and 3, the letter P generally indicates partitions made up of two walls W and W′ which are tied in laterally spaced relation by connecting members or spacers C to provide an insulating air space therebetween. Walls W and W′ in Fig. 1 are made up of a plurality of pre-formed slabs S and S′, respectively, while the corresponding walls in Fig. 3 are made up of slabs A and A′, respectively.

While adjacent slabs in a given wall may have their opposed ends engaging to form a plain butt joint, I prefer to join them either by lap joints, as at 10 and at 10′ in Fig. 1, or by tongue and groove joints, as at 11 and 11′ in Figs. 3 and 4.

For the purpose of more definitely locating and explaining the arrangement of the various partition elements, it will be assumed that the slabs are erected so the joints between them extend vertically, but no statements in this application are to be interpreted as inferring that the slabs may not equally well be laid so the joints extend horizontally.

Ordinarily, the slabs in the two walls will be of equal width and will be so arranged that the joints between slabs in opposite walls are staggered, the joint in one wall lying opposite the centers of slabs in the

opposite wall; and connectors C will be anchored along the center line of the slabs in one wall and extend into the joint between adjacent slabs in the other wall. While I will describe a partition with the slabs arranged as above, the invention, in its broader aspects, is capable of application to walls where slab widths vary, as such a structure would merely call for the anchoring of a plurality of horizontally spaced ties in the wider slabs, said ties being properly spaced to catch the ends of the several opposite slabs in the other wall. First considering the lap jointed partition walls of Fig. 1, it will be noted that connectors C are in the form of rods or shanks 12 having laterally extending terminals 13 and 14. When slabs S or S′ are cast or molded, connectors C are arranged with their terminals 14 in the mold so, when the concrete sets, said connectors are anchored within said slabs. The vertical edges of the slabs have sockets 15 extending in the direction of slab width, with grooves 16 extending from the socket mouths to the inner faces of the slabs. Sockets 15 are of a diameter to freely receive cross bars or lateral extensions 13 of such connectors as are anchored to slabs in the opposite wall. During partition erection, the sockets 15 are filled with grout and the slabs assembled so extensions 13 project into said sockets, such insertion causing the displacement of a certain amount of the grout which thereupon flows into the joint proper. Grooves 16 accommodate the bar or rod 12 where it passes between the ends of abutting slabs. When the mortar sets and hardens each connector is, in effect, embedded in and anchored to opposed slabs, each slab of one wall then serving to retain a companion slab of the other wall in spaced relation, the connector not only tying the companion slabs against separative lateral movement but also holding them against inward collapse.

Tongues 17 of the slabs which receive bars 13, engage tongues 18 of adjacent slabs to hold the ends of the latter against outward separative movement from the opposite wall; while rods 12 may have transverse bars 19, extending oppositely to bars 13, which are adapted to engage the inner faces of said adjacent slabs to hold their ends from moving inwardly toward the opposite wall.

Each slab is provided with a series of vertically alined connectors, the vertical spacing between connectors depending upon the size of the slabs and the strains to which they are imposed.

While the type of connector shown in Fig. 1 may also be used in connection with tongue and groove jointed slabs, in Figs. 3 to 6 I have illustrated different forms of connectors used for this purpose. In Fig. 3 I have shown one connector C as consisting of a rod or shank 20 having cross bars 21 and 22. Bar 21 is anchored in one of the slabs, when cast, while extension 23 of bar 22 is adapted to enter socket 24 in the tongue end of an opposite slab A′. The opposite bar extension 25 is adapted to enter socket 26 in the groove end of an adjacent slab A′, and since rod 20 is straight and enters the wall at the joint break on the wall surface, which break occurs in offset relation to the mouths of sockets 24 and 26, it is necessary that the wall of the slab groove be notched at 27 to admit the shank or rod of the connector when adjacent slabs in a given wall are moved together and over bar 22.

As in the case of sockets 15, sockets 24 and 26 are preferably filled with grout before entry of the cross bar, part of this grout being forced into notches 27 during bar entry. The notches may then be completely filled with mortar to finally anchor the connector within the adjacent slabs and to finish off the wall.

In Fig. 3 I have shown a connector similar to that just described, but having additional element in the form of cross bars 28 which are adapted to bear against the inner faces of the two walls, thus serving to aid in holding the walls against movement towards each other.

Normally, however, the extension of bar 22 into both of the abutting edges of adjacent slabs obviates the necessity of auxiliary braces 28.

In place of using solid and integral shanks and cross bars, I may substitute the twisted wires shown at 29 in Figs. 3 and 6, respectively. The initially fast end of the wire connector may be given a proper anchoring grip in the slabs by merely looping it at 31 (Figure 6) or by looping it over a separate cross bar 32 (Figure 3). The free ends of the wire are bent in opposite directions to provide transverse extensions 33 and 34 for entry into slab sockets similar to those described in connection with bars 21 and 22. I may also provide the initially free end of wire shanks 29 with a loop 35 to receive a separable anchoring cross bar 36.

It will be understood that while I have shown and described certain specific embodiments of my invention, I do not wish to be limited thereto except for such limitations as the appended claims may import.

I claim:

1. A partition construction embodying two oppositely disposed walls, each wall being made up of pre-formed concrete slabs arranged end to end certain of the opposing ends being provided with recesses extending longitudinally into the slabs, and means adapted to hold said walls in predetermined spaced relation, said means including shanks anchored at one end in the slabs

of one wall at points intermediate said opposing ends, and angular projections at the other ends of the shanks and adapted to be entered in the recesses in the slabs of the other wall by relative endwise movement of the slabs.

2. A partition construction embodying two oppositely disposed walls, each wall being made up of pre-formed concrete slabs arranged end to end, the opposing ends being provided with opposed recesses extending longitudinally into the slabs, the slabs of the two walls being relatively proportioned and arranged so the joints between adjacent slabs of one wall are midway of the joints between adjacent slabs of the other wall, and means adapted to hold said walls in predetermined spaced relation, said means including shanks anchored at one end in the slabs of one wall at points midway between the joints thereof, and projections extending angularly and oppositely from the opposite ends of the shanks and adapted to seat in the opposed recesses of adjacent slabs in the other wall, all in a manner whereby a given shank connects one slab in a given wall to two slabs in the other wall.

3. A partition construction embodying two oppositely disposed walls, each wall being made up of concrete slabs arranged end to end, and means adapted to hold said walls in predetermined spaced relation, said means including an elongated member bent upon itself to form a loop portion at one end, the loop ends being twisted together to form a shank portion, and the free ends of the member being angularly and oppositely bent with respect to the shank portion; said loop portion being embedded in the slabs of one wall, the shank portion being adapted to extend from wall to wall, and the projections being adapted to be entered in recesses provided in the slabs of the other wall.

In witness that I claim the foregoing I have hereunto subscribed my name this 24th day of June, 1924.

HARRY E. BELL.