Feb. 26, 1935. O. A. STEUER 1,992,785

BUILDING STRUCTURE AND BRICK FOR THE SAME

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FIG. 1.

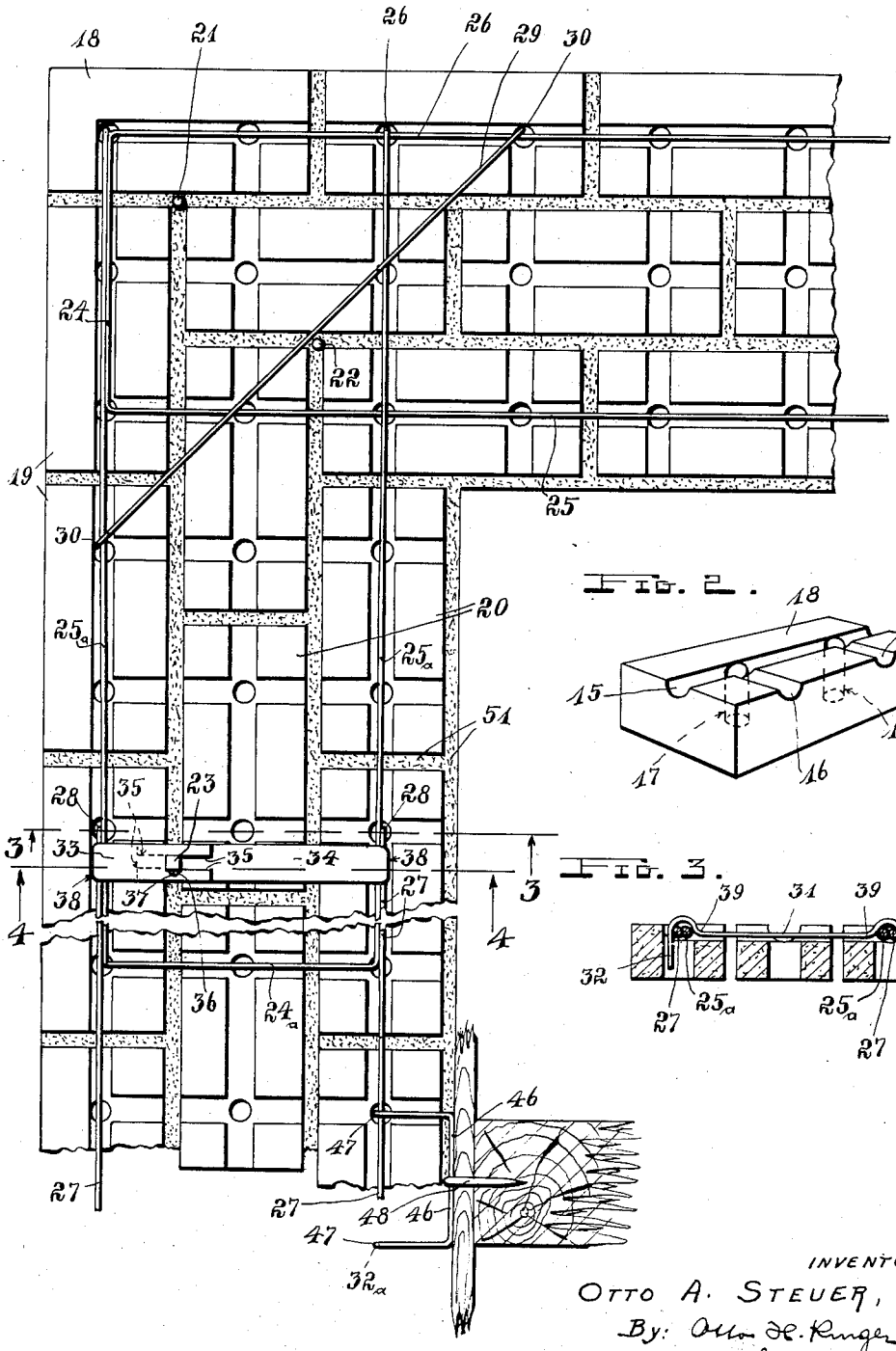

FIG. 2.

FIG. 3.

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Fig. 4.

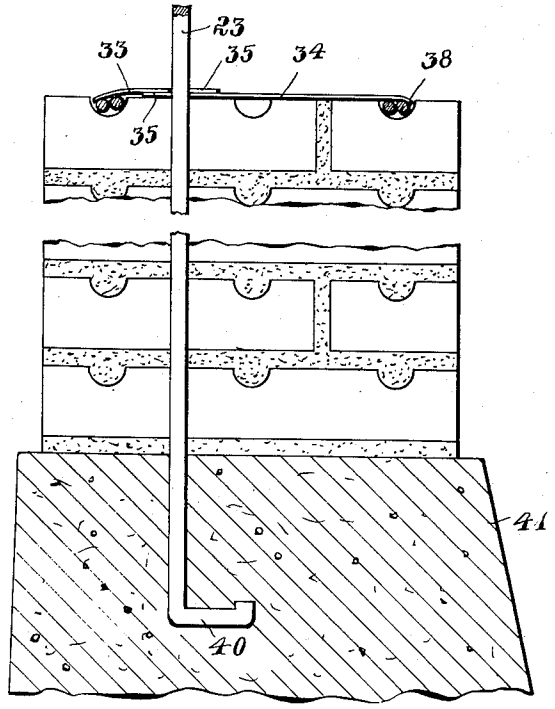


Fig. 6

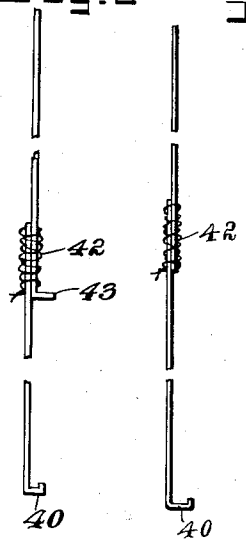


Fig. 5.

Fig. 7.

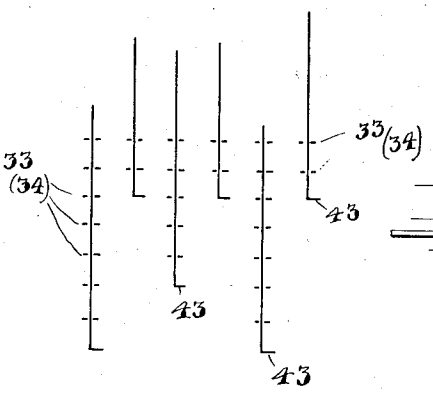
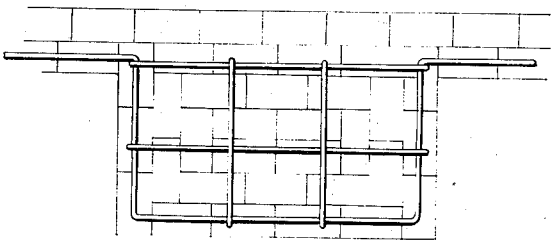


Fig 8.



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BUILDING STRUCTURE AND BRICK FOR THE SAME

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Application September 29, 1933, Serial No. 691,486

5 Claims. (Cl. 72—40)

This invention relates to a system of making brick-buildings earthquake- and storm-proof.

One of the objects of this invention is to interconnect different portions of a building and even individual bricks in a manner to form a uniformly secure structure.

Another object is to provide a brick so designed that interconnecting means can be placed according to this invention.

Another object is to interconnect bricks horizontally, vertically, and diagonally into a uniform structure.

Other objects will appear from the following description and appended claims as well as from the accompanying drawings, in which,

Fig. 1 is a top plan view of a layer of bricks with a typical interconnection according to this invention.

Fig. 2 is a perspective of the new brick.

Fig. 3 is a cross-section of a layer of bricks with a short reinforcement.

Fig. 4 is a vertical cross section through a broken-up portion of a brick wall and foundation approximately on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary side elevation of a spliced reinforcement.

Fig. 6 is a slightly modified form of spliced reinforcement.

Fig. 7 is a schematic illustration of a staggered arrangement of reinforcements.

Fig. 8 is a horizontal section through a pier or column.

Concrete structures, as a rule, require a number of preliminary steps, or operations, or actions, and then again generally require the work to be done in certain steps, allowing for drying in certain stages of construction before the following section is loaded on top of a previously finished section, which make brick-structures preferable to some extent even in earthquake- cyclone- and similar storm-infested parts of the world.

Plain brick-walls, however, are not very safe, as has been experienced repeatedly, and the mere anchoring of a brick-wall to the inner skeleton or framework of a structure does not seem fully satisfactory as practiced at present, as also a mere interconnection of adjoining bricks.

As illustrated in Fig. 1, vertical as well as horizontal and diagonal reinforcements are provided.

To facilitate the particular arrangement of reinforcements according to this invention, bricks are provided of a rather specific form, a corner brick being illustrated in Fig. 2 in enlarged scale, from which it should be clear that each brick is provided with a central longitudinal groove 15 and transverse grooves 16, besides vertical apertures 17, in communication with the groove-system at the junctions of the crossing grooves.

The corner brick as illustrated in Fig. 2 is of the same form as indicated at 18 in Fig. 1, outside edge bricks being indicated at 19, and the typical or most generally used brick being indicated at 20, and from this it should be clear that it is not absolutely necessary to have different bricks for corners, outside edges, or centrally disposed bricks, and that the typical brick may just as well be used along the outside edge and even at corners.

A typical brick of the form indicated at 20 has the central longitudinal groove extending from one end to the opposite, and the cross-grooves from one side to the other as can readily be seen from the illustration in Fig. 1, all grooves being in one of the two larger sides of a brick.

The placing as well as the spacing of bricks may be arranged according to any builder's specification, though the vertical reinforcements 21, 22, and 23, in Fig. 1 are shown in the spaces between bricks, and, for this purpose and reason, the spacing may be stipulated by the thickness of a reinforcement.

Moreover, the vertical reinforcements 21, 22 and 23 may just as well also be placed through the vertical apertures of the bricks in the different layers of a wall.

The illustration in Fig. 1 shows a typical arrangement of reinforcements between layers in a wall. A reinforcement is bent in form of a U, with the base of the U near the end of a wall in a corner, as indicated at 24, and the shanks or sides of the U extending into the wall, as indicated at 25. Another reinforcement, also bent in form of a U, is placed somewhat differently, with the base portion 24_a of the U disposed in aligning grooves of bricks in a wall at a distance from the corner, and the shanks or sides 25_a of the U extending towards the corner, placed over the first reinforcement and with bent terminations hooked into apertures of bricks, as indicated at 26.

Such reinforcements are preferably made as long as possible within practical limits, but splicing or overlapping joining of reinforcements can be accomplished in various ways that will be described more fully hereafter.

One way of overlapping or joining reinforcements is indicated at 27, the reinforcement being hooked into one of the apertures as indicated at 28, the larger length of such reinforcements then extending beyond the joint into the wall.

A diagonal reinforcement is indicated at 29, of which the opposite ends are bent and inserted into suitably disposed apertures of bricks as indicated at 30. Such diagonal reinforcement is preferably used at corners but may as well be used wherever diagonal forces in a wall are expected.

Similar reinforcements of various lengths are used and inserted wherever desirable, a short reinforcement of this type being illustrated in Fig. 3, the member 31 having the hooks 32, which are of the same or similar nature as referred to with reference to the numerals 26, 28, and 30, the hooks 32 being inserted in a similar manner into apertures of bricks.

Any of the vertical reinforcements are preferably locked between layers of bricks at suitable intervals, as, for instance, between every fourth, fifth, or tenth layer of bricks, the number of layers of bricks between locking members depending on the strength desired in a vertical direction.

Such a locking device is indicated in Figs. 1 and 4. The members 33 and 34 are provided with slots or cut-outs 35, to facilitate a slipping of the members sidewise over the vertical reinforcements, the cut-outs being enlarged near the innermost end as indicated at 36, coming into alignment in the pair of members when properly in place with respect to the reinforcement, to receive a key 37, whereby the members are held locked on the reinforcement, firmly pressed upon the surface of the layer of bricks.

The outermost ends of the members 33 and 34 are bent to engage over the horizontal reinforcements as illustrated in Fig. 4, indicated at 38, thereby serving also to form a transverse tie, similar to the tie illustrated in Fig. 3, the ends 38 being thereby also disposed within the grooves.

Wherever the ends of one reinforcement engage over another reinforcement, the upper reinforcement is preferably bent as indicated at 39 in Fig. 3, whereby the larger portions of all reinforcements are maintained within grooves.

The lower ends of the vertical reinforcements are preferably bent, as indicated at 40, and properly embedded in the foundation 41 of a building. Such reinforcements are continued upwardly through a building or wall as far as practical. However, in extreme high buildings, reinforcements are spliced, or overlapped, or staggered, as illustrated in Figs. 5, 6, and 7, the lowermost ends of the upper reinforcements always beginning in layers below the layers in which the uppermost ends of the lowermost or lower reinforcements end. The overlapping portions of reinforcements may be tied together as indicated at 42, with the ends of the lower as well as the upper reinforcements plain or straight, as illustrated in Fig. 5; or the lower end of the upper reinforcement may be provided with a hook-end 43 to engage in a suitably disposed groove of a brick while the overlapping portions of these reinforcements are tied together as well.

Inasmuch as the locking members described above hold the layers of bricks below such locking members suitably pressed down, when the locking members are arranged suitably near one another, a hook-end 43 merely disposed in one of the grooves below a locked layer is, however, fully satisfactory.

Piers or columns are similarly tied to the rest of a building or wall, as clearly illustrated in Fig. 8.

Partitions are connected to a main wall in the manner illustrated in Fig. 1. A yoke 46 is hooked to one of the main reinforcements in a wall, as indicated at 47, and this yoke is formed and placed so that the partition can be fastened, in Fig. 1, a staple 48 being indicated as driven into the partition.

From the above and the illustrations it will be clear that, by extending the cross-grooves fully to the sides, the mortar in a groove has a good chance to bind with the plastering, as indicated at 51 in Fig. 1; and, in cases where plastering is desired on the outside of a building, the cross-grooves can just as well be extended to the outside, or, in other words, the typical bricks with full cross grooves can be used, even on corners.

Having thus described my invention, I claim:

1. A brick of the character described, comprising a body of substantially rectangular formation having its top face formed with a longitudinal groove extending to the end faces of the brick and a pair of spaced transverse grooves formed in said top face and intersecting the first named groove and extending to the side faces of said brick at substantially quarter points of the latter, said body having an aperture extending vertically therethrough at each of the points of intersection of the grooves.

2. A building construction consisting of parallel courses of longitudinally and transversely grooved bricks, the grooves of the latter being alined so as to provide a continuous channel of substantially rectangular form extending along and connecting said courses, reinforcing elements disposed in said channel to secure said courses together, a plurality of spaced vertically extending rods disposed between said courses, and a separable bonding member connected to each of said rods having portions thereof extending into the longitudinal channel of opposite courses and engaging said reinforcing elements whereby to retain the latter in position within said channel.

3. A building construction consisting of parallel courses of longitudinally and transversely grooved bricks, the grooves of the latter being alined so as to provide a continuous channel of substantially rectangular form extending along and connecting said courses, said transversely extending grooves being at substantially the quarter points thereof, reinforcing elements disposed in said channel to secure said courses together, a plurality of spaced vertically extending rods disposed between said courses, and a bonding member connected to each of said rods having portions thereof extending downwardly into the longitudinal channel of opposite courses and engaging said reinforcing elements whereby to retain the latter in position within said channel.

4. A building construction including parallel courses of horizontally grooved and vertically perforated bricks, the grooves of the latter being alined transversely and longitudinally so as to provide a continuous channel of substantially rectangular form extending along and connecting said bricks and a plurality of substantially U-shaped reinforcing rods connected together and having their bight portions disposed in the transverse channels between the courses and the arms thereof being disposed in the channels extending longitudinally of each course, the free ends of each of said U-shaped reinforcing rods being downturned and disposed through the bight portion of the adjacent rod and into the vertical perforations in the bricks so as to bond said

courses together against longitudinal and lateral movement relative to each other.

5. A building construction including parallel courses of longitudinally and transversely grooved bricks, the grooves of the latter being alined transversely and longitudinally so as to provide a continuous channel of substantially rectangular form and a plurality of substantially U-shaped reinforcing elements linked together and having their bight portions disposed in the transverse grooves connecting the courses, and the arms of the U-shaped rods being disposed in the grooves extending longitudinally of the courses so as to bond the latter against horizontal and lateral movement relative to each other.

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