G. ROSENLEAF.

BUILDING CONSTRUCTION.

APPLICATION FILED APR. 28, 1911. RENEWED SEPT. 19, 1912.

1,084,967. **Patented Jan. 20, 1914.**

3 SHEETS—SHEET 1.

Fig. 1.

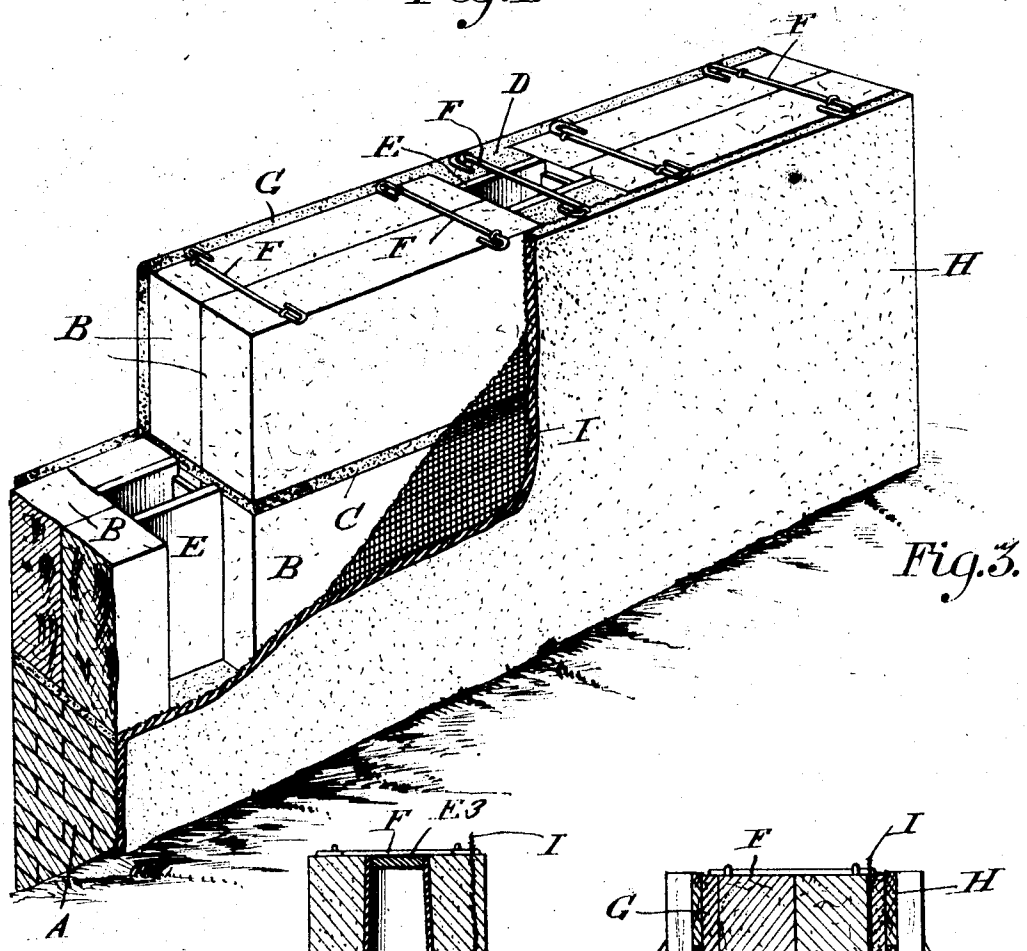


Fig. 3.

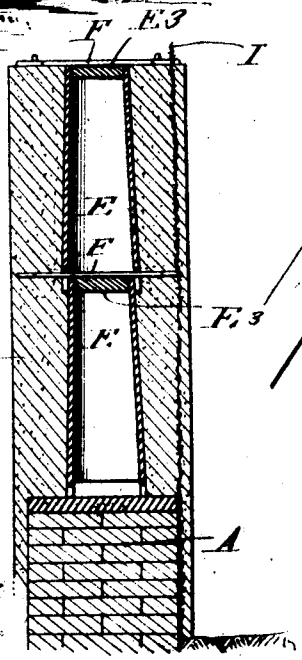
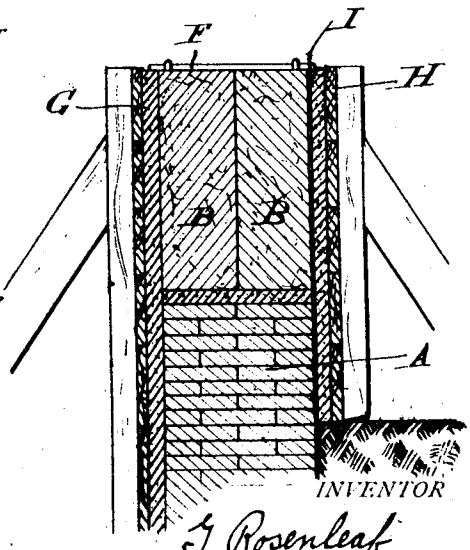


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 4.

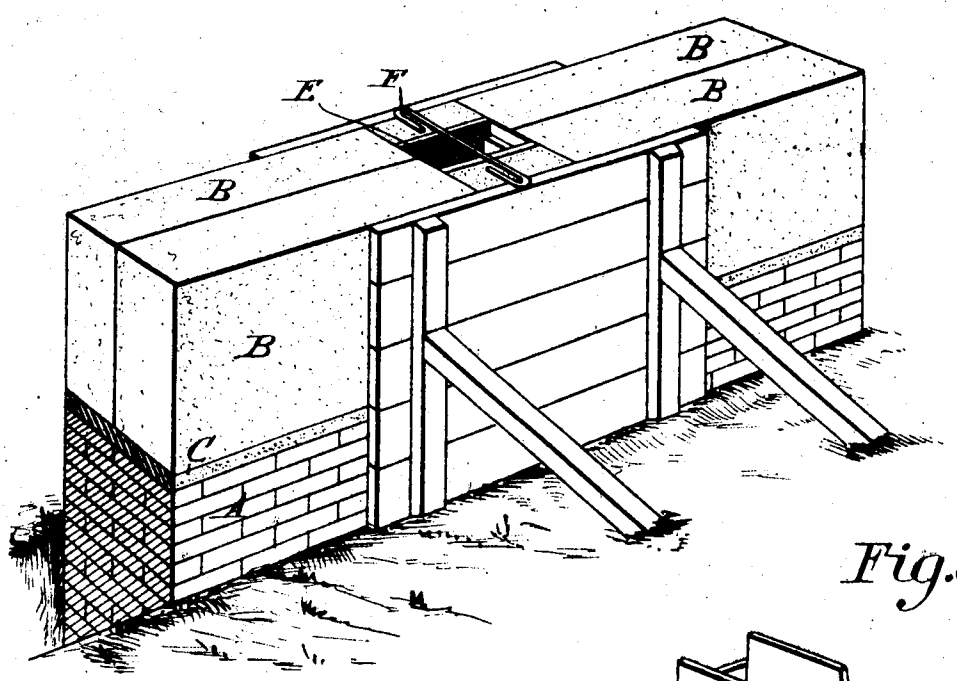


Fig. 6.

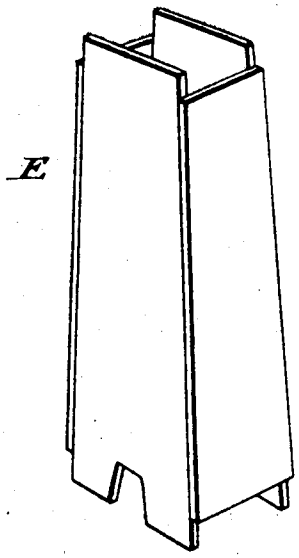
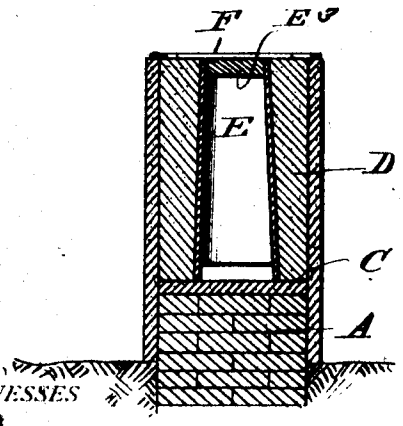


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 7.

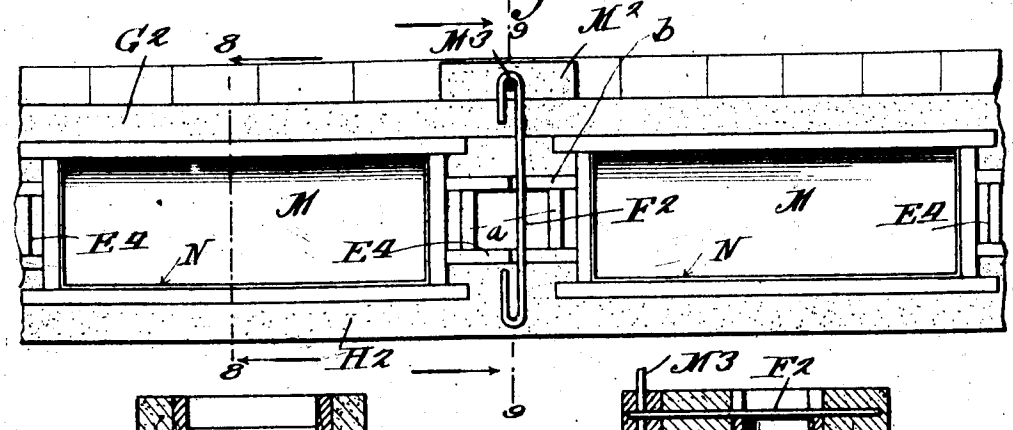


Fig. 8.

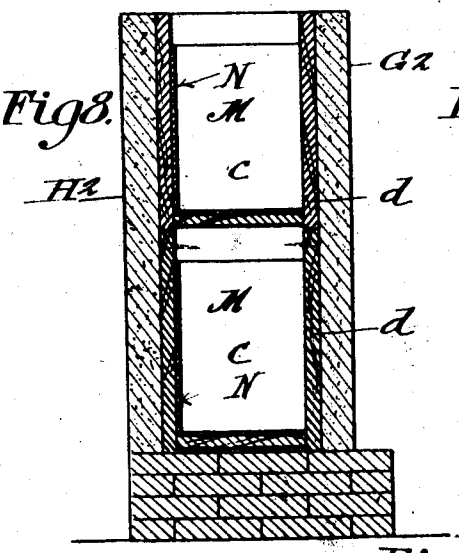


Fig. 9.

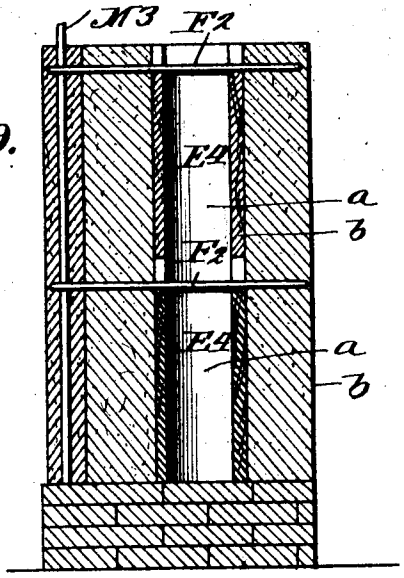


Fig. 11.

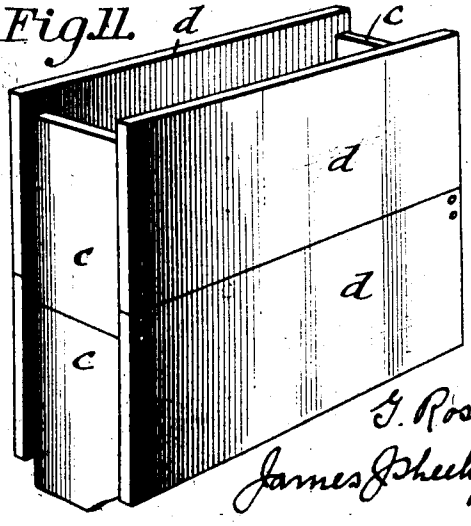
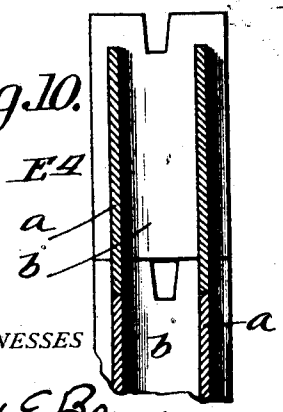


Fig. 10.



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UNITED STATES PATENT OFFICE.

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BUILDING CONSTRUCTION.

1,084,967. Specification of Letters Patent. Patented Jan. 20, 1914.

Application filed April 28, 1911, Serial No. 623,977. Renewed September 19, 1912. Serial No. 721,326.

To all whom it may concern:

Be it known that I, GUSTAF ROSENLEAF, citizen of the United States, residing at Grand Forks, in the county of Grand Forks and State of North Dakota, have invented new and useful Improvements in Building Construction, of which the following is a specification.

My present invention pertains to building construction, and has for its object to provide a cheap and strong building construction calculated to offer considerable resistance to fire, frost and moisture.

To the attainment of said object the invention consists in the novel combination and adaptation of parts hereinafter described and particularly defined in the claims appended.

In the accompanying drawings which are hereby made a part hereof: Figure 1 is a perspective with parts broken away illustrating so much of a wall as is necessary to illustrate the embodiment of my invention used in forming the walls of large buildings. Fig. 2 is a cross-section of the same, taken through the pier and the hollow core therein. Fig. 3 is a transverse section taken through the wall in a plane at one side of the pier. Fig. 4 is a view similar to Fig. 1 of a modification designed to form a wall of a small building. Fig. 5 is a transverse vertical section taken in the plane of the pier portion of said wall. Fig. 6 is an enlarged detail perspective of the hollow core employed in the said pier. Fig. 7 is a plan of a wall constituting another embodiment of my invention. Figs. 8 and 9 are transverse sections of same, taken in the planes indicated by the lines 8—8 and 9—9, respectively, of Fig. 7. Fig. 10 is a vertical section taken through the small cores in a plane at right angles to Fig. 9. Fig. 11 is a detail perspective illustrating the relative arrangement of the large trough-like cores.

Referring by letter to said drawings, and more particularly to Figs. 1—3 thereof: A is a base formed of bricks laid in the usual manner or of any other material compatible with the purposes of my invention.

B B are fiber blocks—*i. e.*, blocks of pressed flax or other straw or other suitable fibrous material.

C C are layers of suitable mortar interposed between the horizontal layers.

D is a pier of concrete or other suitable plastic material, having therein a hollow core or cores E, of wood, asbestos or other suitable material, designed to form an air space.

F F are transverse tie rods of metal, disposed in the mortar layers C and connected to the fiber blocks B.

G is a layer of plaster that is preferably, though not necessarily employed at the inner side of the wall.

H is a plastic veneering, preferably of monolithic concrete, employed at the outer or weather side of the wall, and I is a metallic reinforcement of suitable reticulated metallic material, interposed between the veneering H and the opposed sides of the blocks B, etc., and tied to the rods F and having for its office to hold the veneering H to the remainder of the wall and at the same time reinforce and strengthen the veneering.

I would here have it understood that the salient feature of my invention resides in the novel combination of the fiber blocks and plastic piers having therein hollow cores which afford desirable air spaces; the said novel combination being advantageous in that it is cheap and strong and capable of affording considerable resistance to fire, frost and moisture.

The construction shown in Figs. 1 to 3, with the exception of the metallic reinforcement I, is designed for embodiment in buildings of moderate size and good quality, and in the production of the same the base A and the blocks B are laid as shown, and the cores E are placed in the spaces reserved between the blocks B for the concrete or plastic piers D. Then as the wall is to be veneered at both sides, spacer clamps (not shown) are clamped over the blocks, and forms such as shown in Fig. 3 are fastened, after which concrete or other suitable plastic material is poured into the forms so that the pier portions and the veneers will be molded at the same time. After each horizontal course of blocks is laid, tie rods F are placed on the blocks B and core E to hold the veneers together; the said tie rods F being connected at their ends, when deemed expedient, to upright metallic reinforcing rods (not shown) embedded in the veneers. This mode of operation is repeated until the wall is carried up a distance corresponding to the height of the first story. For larger and first class buildings in which the reinforcement I will be employed, the blocks B and cores E are placed in the manner before

described, and boards, (not shown) are clamped on the sides of the blocks B to hold the concrete for pillars such as D. The said concrete is then poured in the pillar space and tie rods F are laid, with mortar, preferably cement mortar, between the blocks B, and the blocks and pillars are formed up to a height of say—three or four feet. Then the heavy reticulated material I is tied to the ends of the tie rods, and an outside form (not shown) is also tied to said tie rods and a spacer is interposed between the blocks and the form, after which concrete or plastic material is poured to form the veneer H, and the reticulated material I is preferably pulled outward so as to embed it in the concrete or plastic material of said veneer H and enable it to better reinforce and hold the same.

The construction shown in Figs. 4 to 6, being for small buildings, comprises the base A, fiber blocks B, mortar C, concrete or plastic pier D and a hollow core E in said pier. In forming the said construction boards are clamped on both sides of the block wall over the pier space, concrete is then poured to form the pier to the height of the blocks, and a tie rod is placed on top of the core E. This process is continued up to the height of the first story. The sides of the said wall may, if desired, be plastered.

In Figs. 1, 3 and 4, fiber blocks B are shown as arranged side by side, but it is obvious that without involving departure from the scope of my invention, single blocks of a thickness equal to the combined thicknesses of the side by side blocks may be employed.

In both of the embodiments thus far described in detail, the upper ends of the cores E are preferably, though not necessarily, occupied by plugs E^3, Figs. 2 and 5, this with a view to preventing dropping of mortar or concrete into the cores.

The modification shown in Figs. 7 to 11 comprises upright spaced cores E^4, of even size throughout their height and formed of wood, asbestos or other suitable material; comparatively large upright cores M, of even size throughout their height and formed of wood, asbestos or other suitable material; an outer layer G^2, of suitable concrete; an inner layer H^2, of suitable concrete; and transverse tie-rods F^2, of metal, the end portions of which are anchored or cast in the concrete layers to hold the same together.

The comparatively narrow cores E^4 are arranged in vertical series, and upon the upper end of each core E^4 and between the same and the next upper core E^4 I arrange one of the tie-rods F^2. I would also have it understood, that when deemed necessary tie-rods such as F^2 may be arranged on each core M and between the same and the next upper core M. The cores M are wider and longer than the cores E^4 in about the proportion shown, and each is provided with a bottom, sides and ends, and hence is trough-like in character. From this it follows that incidental to the erection of the wall, water may be placed in each of the cores M with the idea of enabling the water to percolate or pass slowly through the walls of the cores and into the concrete layers to assist the latter in hardening and setting. Then when the water leaves the trough-like cores M, the air spaces within said wall contribute materially to the capacity of the wall as a non-conductor of heat. Moreover the cores M as well as the cores E^4 reinforce and strengthen the wall and render the same as a whole quite strong and durable.

I prefer to utilize the trough-like cores M to hold water for the purpose stated, but do not wish to confine myself to such utilization, inasmuch as when a building is erected in accordance with my invention during cold weather or at the approach of the cold season, water is liable to freeze and it is therefore deemed inexpedient to place it in the cores M.

When a building constructed in accordance with my invention is to be occupied promptly after its completion, it is desirable when water is used in the trough-like cores M, to enable said water to pass to the outer concrete layer G^2, for the purpose before stated, while preventing the passage of such water to the inner concrete layer H^2, where it would be liable to render the interior of the building damp for an indefinite period. Therefore in some cases I provide the inner, bottom and end walls of the trough-like cores M with a water-proof coating N, as shown in Figs. 7 and 8; the outer walls alone or together with the outer portions of the end walls being left uncoated for the percolation or passage of water to the outer concrete layer G^2, alone.

In the construction of the embodiment shown in Figs. 7 to 10, the cores E^4 and M, and the tie-rods F^2 are placed as stated, and then with the aid of suitable forms or retainers (not shown), the portions F^3, of concrete, at opposite sides of the cores E^4 are constructed, either in the first instance, or, if preferred, at the same time that the layers G^2 and H^2 are constructed.

For the purpose of lending increased strength to the outer concrete layer G^2 of the wall shown in Figs. 7 to 9, I prefer to provide the same at suitable intervals in its length with upright exterior piers of concrete or other suitable plastic material; the said piers each having an upright metallic reinforcing rod therein for the connection of the adjacent transverse tie-rod that is extended into the exterior pier. One of the said exterior piers is shown in Figs. 7 and 9, and lettered M^2; the upright me-

tallic rod in said pier being lettered M^3 and being connected to the adjacent tie-rod F^2, which is extended into the pier M^2 as shown. The pier M^2 may be formed at any time, though I prefer to form it after the completion of the layer G^2, employing in the said formation any means compatible with the purpose of my invention. I would also have it here understood that the use of exterior piers such as M^2 is not restricted to the embodiment shown in Figs. 7 and 11; the said piers M^2 being adapted to be used to advantage on the embodiment shown in Figs. 1–3, and also on the embodiment shown in Figs. 4 and 5.

By reference to Fig. 2 it will be seen that the cores or core sections E of the embodiments in Figs. 1–6 have their end portions lapped with a view to permitting of one core or section being nailed to the adjacent core or section and secured in position so as to lend increased strength to the wall as a whole. In the embodiment shown in Figs. 7–11, the cores E^4 have their end portions lapped as have also the cores M so that the cores E^4 may be nailed together and the cores M may likewise be secured together, and this notwithstanding neither the cores E^4 or the cores M are tapered, but on the other hand are of even size throughout their heights. The end stated is attained by extending the end walls *a* of the cores or core sections E^4 below the side walls *b* thereof, Figs. 9 and 10, and by extending the end walls *c* of the cores or core sections M below the side walls *d* of said cores M as appears in Figs. 8 and 11. In either case the side walls of one core may manifestly be expeditiously and easily nailed to the end walls of the adjacent core. It will also be understood that in the embodiment shown in Figs. 1 to 6, as well as in the embodiment shown in Figs. 7 to 11, each core serves to hold the adjacent core in position and to reinforce the same, this because of the engagement between the meeting ends of the cores. I would further have it understood that when desired cores E^4 such as shown in Figs. 7, 9 and 10, may be used in the embodiments shown in Figs. 1–6, in lieu of the cores E, without involving departure from the scope of my claimed invention.

In Figs. 2 and 6, and also in Figs. 9 and 10, ends of the cores are shown as notched for the reception and passage of the transverse tie-rods.

In all of the embodiments of my invention, I would have it understood that the thickness of the plaster veneers or the layers of concrete may be varied to suit different conditions, and that in the embodiment shown in Figs. 7, 8 and 9, veneers G and H and the reticulated metal I may be employed or omitted in the discretion of the contractor, without affecting my claimed invention.

In all of the embodiments of my invention, I prefer to make the cores adjacent window and door openings of some suitable fireproof material, this in order to contribute to the fire-proof quality of the wall as a whole.

At the completion of the wall portion for each story of a building, a reinforced girder of concrete is molded on said portion, this to bind the walls together and for the connection of the floors. The said girder, however, does not form part of my invention, and since its construction and use is well known in the art, I have deemed it unnecessary to illustrate the same.

My invention resides in the construction and not in the mode of producing the same, and from this it follows that the erection of the construction may be carried out in any manner other than the modes described without involving departure from the scope of my claimed invention.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. A wall construction comprising a pier of plastic material, a hollow upright core arranged in said pier; said core being composed of superposed hollow sections the meeting ends of which are interlocked and which are provided with notches extending from the ends of their side walls, transverse metallic tie rods extending through said notches of the core sections and resting in the pier, and suitable wall portions between which the pier and its inclosed core are arranged.

2. In a wall construction, a pier of plastic material, a core arranged in said pier; said core being composed of superposed hollow sections the meeting ends of which are interlocked and which are provided in the ends of their side walls with notches, tie-rods extending transversely of the pier and through the said notches, plastic layers applied to said pier, superposed trough-like cores, of greater width than the core in the pier, arranged at opposite sides of the pier and having their meeting ends interlocked, an upright exterior pier of plastic material applied to the outer plastic layer, and an upright metallic reinforcing rod arranged in said exterior pier and connected with the outer ends of the said tie-rods.

3. A wall construction comprising trough-like cores arranged in spaced relation and in horizontal courses on a suitable foundation, a pier of plastic material disposed in the space between the trough-like cores, a hollow core arranged in said pier and affording an air space, transverse tie-rods arranged on said core and pier, a reticulated metallic reinforcement connected to said tie-rods, and inner and outer plastic veneers connected to said tie-rods and the reticulated metallic reinforcement.

4. A wall construction comprising trough-like cores arranged in spaced relation and in horizontal courses on a foundation, a pier of plastic concrete disposed in the space between said cores, a hollow core arranged in said pier and affording an air space, plastic layers applied to said pier, a metallic tie-rod extending transversely of the pier and the core therein and having its inner end secured in the inner plastic layer, an upright exterior pier of plastic material applied to the outer plastic layer, and an upright metallic reinforcing rod arranged in said exterior pier and connected with the outer end of said tie-rod.

5. A wall construction comprising large upright hollow cores, a small hollow core, a concrete pier containing the latter, and reinforced concrete veneers on opposite sides of said large cores and pier; the said large hollow cores being arranged in spaced relation, a base below said cores, a pier of plastic concrete disposed on the base and in the space between the large cores, a hollow core arranged in said pier and affording an air space, transverse metallic tie-rods arranged at a suitable distance through the hollow core to the plastic concrete in pier, a reticulated metallic reinforcement connected to said tie-rods, inner and outer plastic veneers connected to said tie-rods and the reticulated reinforcement.

6. A wall construction comprising hollow trough-like cores, piers containing hollow cores located at opposite ends of the trough-like cores, plastic concrete arranged at opposite sides of said cores and piers; the said trough-like cores having the capacity to hold water and allow the same to escape and thus give sufficient moisture for the proper setting of the concrete.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GUSTAF ROSENLEAF.

Witnesses:
N. C. Healy,
T. E. Turpin.