Feb. 8, 1927. 1,616,977

A. A. KOIVU

CONCRETE BUILDING CONSTRUCTION

Filed Sept. 20, 1926

Fig. 1.

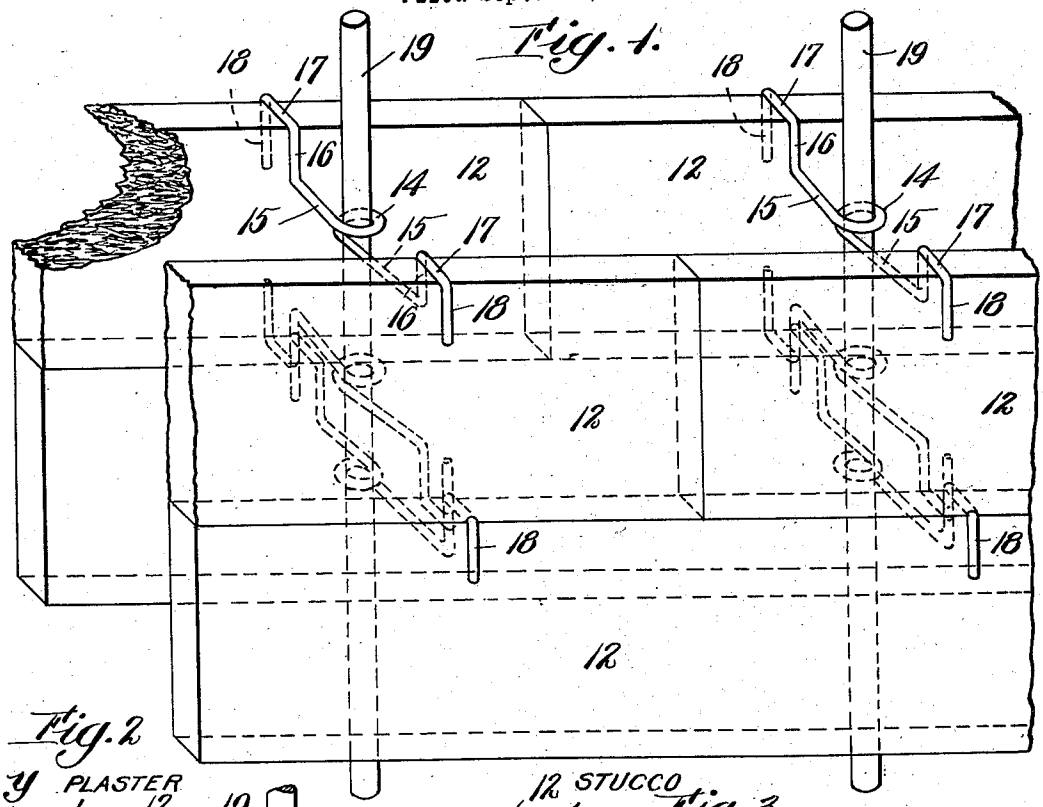


Fig. 2

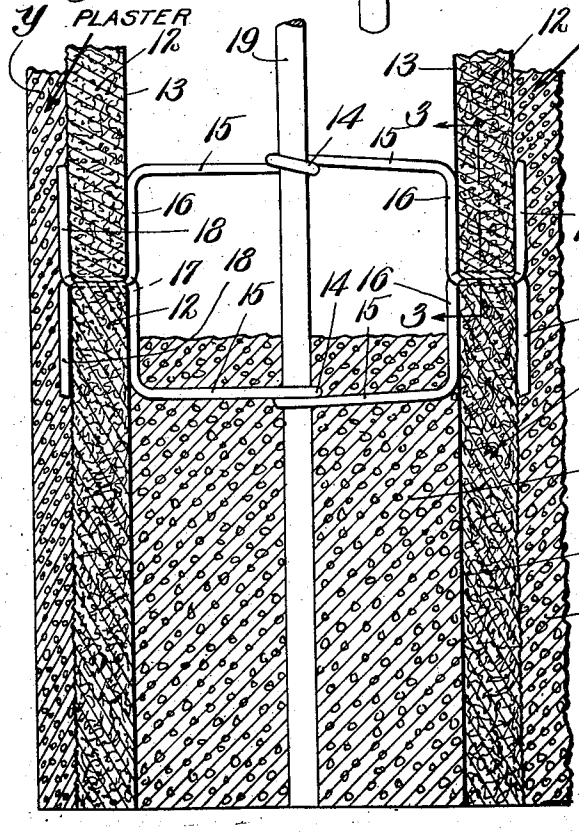


Fig. 3.

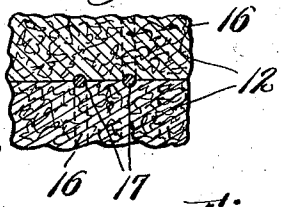
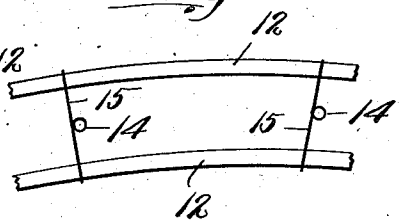


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CONCRETE BUILDING CONSTRUCTION.

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This invention relates to buildings, especially for residential purposes, in which the chief element of the walls, and sometimes the partitions, consists of concrete, or other hard setting material.

The most common method heretofore employed for the construction of such buildings involves the use of wood form boards which are removed after the concrete which was poured between them becomes hardened or set. Then when inner plaster, or outer stucco, or both, are applied to the cement surfaces, firm and durable adherence of such coatings, can not be depended upon to resist cracking unless furring and expanded metal lath is first applied to the face of the concrete.

The principal object of my invention is to provide inexpensive and simply constructed buildings which are strong, substantially fire proof and heat insulated.

Another object is to provide concrete buildings capable of carrying a stucco finish and retaining the same without cracking, and without employing expanded metal lath or equivalent.

With the above and other objects hereinafter referred to in view, the invention consists in the method and the combination of elements substantially as hereinafter described and claimed.

Of the accompanying drawings,

Figure 1 is a perspective view of so much of a wall constructed according to my invention as is necessary to an understanding of the same, the concrete filling being omitted, and a corner portion broken away to better illustrate the fibrous material.

Figure 2 represents a vertical section of the same, with part of the concrete filling in place.

Figure 3 represents a section on line 3—3 of Figure 2.

Figure 4 is a plan view on a smaller scale illustrating a utility hereinafter described.

Similar reference characters indicate similar parts or features in all of the views.

The sheets on slabs 12 are rough-surfaced and preferably they are composed chiefly of sugar cane fiber. They are stiff, although somewhat soft and capable of being bent if rounded or curved wall portions are desired. And an important characteristic is that said material, which is slow-burning, is a very effective heat insulator. For the sake of brevity the sheets or slabs, which, in practice, may be conveniently cut to such sizes as 1 x 6 feet, will be hereinafter referred to as fiber boards.

Preferably each board has one surface rendered waterproof by a coating of a suitable composition such as black asphaltum paint, indicated at 13 in Figure 2.

To hold the fiber boards in the relationship illustrated, uniform wire clips are employed. Each clip comprises a length of wire bent to form a loop or eye 14 at its mid-length, and arms 15 diverging therefrom, each arm 15 terminating in a U-shaped portion 16, 17, 18, to grip a board 12. The portions 16, 18, engage the inner and outer faces of the boards while the portions 17 engage and are pressed into the edges of the boards.

The clips are held in their proper positions during the erection of a wall by vertical rods 19 passing through the eyes 14 of the clips.

When a wall is being built, a course of boards 12 will first be set end to end and in two rows on a suitable foundation not necessary to illustrate, and their edges connected by several clips suitably spaced as, for instance, 8 to 12 inches apart. Then, rods 19 are passed down through the eyes 14 and concrete is poured or "puddled" into the space between the boards as indicated at a in Figure 2, nearly to the upper edges of the boards. The rods 19 ensure retention of the clips in proper positions with their U-shaped portions vertical during all assembling and concrete filling.

When the first-poured concrete has hardened, or nearly so, another set of clips, the U-shaped portions of which open upwardly and with the lower edges of a second row of boards engaged therein, are mounted as illustrated, with the eyes 14 of the clips strung on the rods 19 which thereby maintain the several rows of boards in proper vertical relationship. Each added row of boards is pressed down so that, owing to the comparative softness of their cut edges, the edges of the boards can be brought close together (Fig. 3), the portions 17 of the clips being embedded in the opposite or adjacent edges of the boards. This provides such a close joint that when more concrete is then poured into the space between the boards practically none will escape through crevices.

The next step will be to add more clips

with their eyes 14 strung on the rods 19 and engaging the upper edges of the second row of boards as shown at the top of Figure 1, and the second pouring of concrete will be effected. The operations or steps described will then be repeated until the desired height of the wall is attained.

Owing to the rough surfaces of the boards and the fibrous characteristics thereof such as the well known types of compressed fibrous lumber, plaster and stucco material as indicated in Figure 2 at *y* and *z* respectively, will readily adhere permanently thereto without employing any uniting elements or compositions. For reinforcing of the stucco itself a coarse wire mesh may be embedded in the first coating, and said plaster and stucco completely cover and conceal the end portions 18 of the wire couplings or board-uniting clips.

The rods 19 not only serve to hold or steady the clips in their positions with their U-shaped portions opening downwardly or upwardly during construction of the wall, but they serve as reinforcing rods for the completed wall. Said rods can be of almost any length. If not long enough to equal the total height of the wall, shorter ones can be employed because, at any time, a rod can be added with its lower end resting on the surface of a set mass of concrete.

Owing to the fact that the fibre boards can be bent or curved as indicated by Fig. 4, a building can be erected in the manner described and having portions such as are called "bay window" projections, or provided with various other architectural shapes not easily obtainable with present methods of construction.

While I have referred to the slabs or boards as made of material composed chiefly of sugar cane fibre, I do not limit myself thereto as other suitable heat or cold insulating material might be employed. It is also to be understood that by the term "concrete" I do not mean to limit myself to any specific kind of concrete, as the material may be any suitable kind capable of setting hard after pouring. For the sake of brevity I refer to such material as concrete.

Having now described my invention, I claim—

1. A building wall comprising outer and inner upright rough-surfaced boards of cellular material united at intervals and having concrete between the opposing surfaces of the boards, the exposed surfaces of the outer boards having a stucco finish directly applied thereto.

2. The combination in a building wall, of inner and outer cellular fiber boards and a concrete filling between them, clips extending across the concrete-filled space, said clips having end portions engaging the edges and the inner and outer surfaces of the boards, the portions which cross the edges of the boards being embedded therein, and said boards having cementitious facings bonded thereto.

3. The combination with a building wall of inner and outer cellular fiber boards and a concrete filling between them, clips having U-shaped end portions engaging the edges of the boards and having intermediate eyes, and upright rods extending through said eyes, the said boards having cementitious faces bonded thereto.

4. Means for uniting inner and outer members of a wall, said means consisting of wire bent to provide a mid-length eye with arms extending in opposite directions from the eye and having U-shaped terminals, the said terminals extending in a direction to present their openings or mouths facing in the same direction as the axis of the said mid-length eye.

5. A building wall comprising outer and inner upright substantially rigid cellular fibrous boards united at intervals by clips having U-shaped end portions engaging the said boards and pressed substantially half their depth in each of the two upper and lower boards adjacent each of said clips, and having intermediate eyes which register, a reinforcing rod extending through the registering eyes and a filling of concrete enveloping said clips and reinforcements and bonding with the cellular fibrous boards, and a layer of cementitious material on each of the exposed faces of the wall.

In testimony whereof I have affixed my signature.

ALFRED A. KOIVU.