

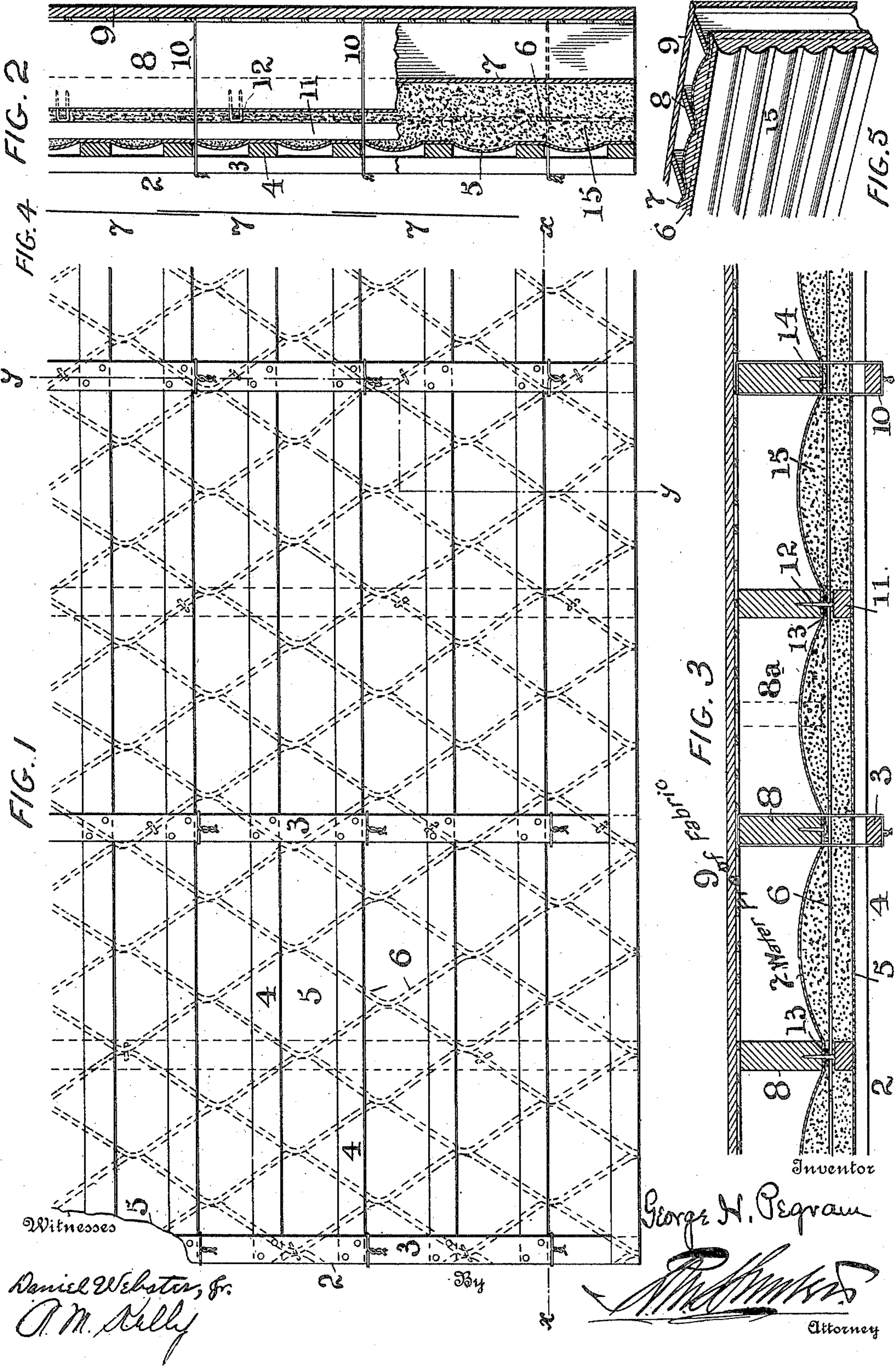
G. H. PEGRAM.

CEMENT WALL.

APPLICATION FILED JUNE 4, 1908.

948,186.

Patented Feb. 1, 1910.



# UNITED STATES PATENT OFFICE.

GEORGE H. PEGRAM, OF NEW YORK, N. Y.

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Specification of Letters Patent.

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Application filed June 4, 1908. Serial No. 436,547.

*To all whom it may concern:*

Be it known that I, GEORGE H. PEGRAM, a citizen of the United States, and a resident of the city of New York, State of New York, have invented an Improvement in Cement Walls, of which the following is a specification.

My invention has reference to the construction of concrete walls and consists of certain improvements set out in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide an efficient and cheap method for the construction of concrete walls for buildings and which may be employed instead of applying board sheathing covered with water-proof paper and outer coverings of matched boarding, shingles or stucco work on wire cloth, heretofore in use.

My invention consists of an improved wall when made by applying to the studding a preferably waterproof layer so that it extends between the studding, securing to the studding a reinforcing metal sheet, detachably supporting at a short distance from and parallel to the reinforcing metal sheet and studding a mold form, and pouring into the space between the mold form and the water proof layer a mixture which is in the semi-fluid state and which hardens when set (such as concrete), and removing the mold form after the mixture has become set and hardened.

More specifically, my invention consists of a wall for a building comprising parallel studs, combined with a fabric (preferably water proof) secured to the studs and bulging inwardly between them, a non-yielding metallic reinforcement also secured to the studs and stretched between them whereby it is supported independently of and away from the water proofing fabric between the studs, and a body of concrete surrounding the metallic reinforcement and extending between it and the water proofing fabric whereby there is a varying thickness of concrete between the metallic reinforcement and the water proofing fabric and the latter protects the inner surface of the concrete.

My invention also comprehends details of construction, which, together with the features above specified will be better under-

stood by reference to the drawings, in which:

Figure 1 is an elevation of a wall in the process of formation and more particularly illustrates the mold form; Fig. 2 is a sectional elevation of the same on line  $y-y$ ; Fig. 3 is a sectional plan view of the same on line  $x-x$ ; Fig. 4 is a view showing how the water proof layers overlap; and Fig. 5 is a perspective view of a portion of a finished wall.

8 are the studs; 9, the inner plastering or ceiling; 7, a flexible layer of waterproof material such as roofing felt fastened to the studs; 6, a sheet of wire cloth, expanded metal or other reinforcing material; 15, concrete to form the outer face of the wall; 2, the mold form for retaining the concrete in its plastic state during construction; 10, flexible ties for holding the form to the studs during construction, which may be removed with the mold form; 11, spacing strips to hold the mold form away from the studs to allow space to deposit the concrete, and which are removed as the deposition of concrete proceeds and their spaces filled with the concrete while it is all semi-fluid.

The mold form 2 is made of light framing and as shown comprises the vertical strips 3 secured to a series of parallel strips 4 over which is stretched and secured a textile layer 5. The strips making up this mold form may be of any suitable arrangement, that shown being given as an example. Broadly considered, the mold form may be covered with sheet metal, wood or any other material instead of cloth of textile character, but I prefer the latter as being both cheap and excellently adapted to the purposes of my invention.

The waterproof layer 7 may be made of felt, paper, or other suitable material and should have sufficient tensile strength to support the concrete between the studding. This waterproof layer 7 is secured to the studding 8 by tacks 14, and it is preferably arranged so that successive strips overlap as indicated in Fig. 4.

The reinforcing metal layer 6 is secured in place by staples or nails 12 and may be held slightly away from the studding, (to allow the cement room to flow around it) by means of blocks or washers 13 of any suit-

able character in conjunction with the staples or nails.

The ties 10 are usually of wire but may be made of any other material adapted to the purpose.

The method of construction would be ordinarily as follows:

Assume a house to be provided with the studding erected for the outer walls; then instead of applying board sheathing to be afterward covered and made waterproof with matched boarding, shingles or stucco work on wire cloth, in the usual way, sheets of roofing felt 7 are nailed to the studding, giving each a three inch lap on the sheet below, and then reinforcing wire cloth 6 of any kind, but preferably one having a large mesh and large wires, say one foot mesh of No. 10 wire, is fastened to the studs with staples or nails 12 at the intersections with the studs, keeping it at least a quarter of an inch away from the waterproof sheet so that it will be entirely embedded in the concrete. This latter may be accomplished by means of a plug 13 in the staples or a washer under the nail head between the wire cloth and the waterproofing, as is well known. Spacing strips 11 of  $1\frac{1}{2}$ " square sticks or the proper size to give the desired thickness of concrete are then placed against some of the studs, and against these the outer mold form 2 is pressed. The outer form may be made of pliable material or of any other materials suitable to the purpose; the form is held to the studs by wire ties 10 which are afterward removed. The concrete is then poured into the space formed between the mold form and layer 7. After the concrete is poured in the spacing strips 11 are removed so that the concrete can fill the spaces occupied by them, the concrete itself acting to hold the outer form away from the studs and, by the length of the wire ties, preserving the desired thickness of the wall.

It is obvious that the wire cloth or other reinforcing material may be omitted when desired, also that the studs may be of wood, iron or other material and that where permanent studs are spaced at unusually long distances apart removable studs may be used between the permanent studs (as indicated at 8<sup>a</sup> in dotted lines) for support of the concrete where the span is too great for the strength of the pliable waterproofing material 7. Experience has shown that, with the ordinary 16" spacing of studding, several grades of waterproofing felt now on the market have ample strength without additional support.

While the ribbed arrangement of the outside face of the concrete 15, as shown in Fig. 5, is advantageous for ordinary outside walls, as would be any other irregular face representing for example stone blocks, such irregularity is not essential, and would not

be used under many conditions. When desired, the layer 5 of the mold-form may be made of non-flexible material, and composed ordinarily of wood. If this wooden layer was sufficiently heavy, it is evident that less of the framing 4 would be necessary. Where textile material is used as the layer 5, it has the advantage, not only in cheapness and lightness, but also permits the outward configuration of the concrete wall to resemble stone blocks or other forms, and would in addition permit the escape of water during the solidifying of the concrete, and tend to cause the finer particles of the cement to work their way into contact with the textile layer, so that when the molded form is removed, the outer surface is exceedingly smooth and in a very finely finished condition. Where these special advantages are not required and the layer 5 is made of boards, the outer surface of the concrete would be flat, and this would be more desirable under some conditions of the use of my invention, as for instance in employing it in connection with the making of roofs.

Where the invention is employed for making concrete roofs the general arrangement would be as if Fig. 3 were inverted, in which case the felt paper or layer 7 would be nailed or tacked to the tops of the rafters, and with the other parts above them. Such roofs may be made flat or inclined, the latter being better adapted to the filling of the space with the concrete. Where the roof is made flat and is intended also as a floor, then in that event, the cement might be floated over the felt paper 7 and the reinforced metal layer 6, without the employment of the strips 11 and molded form 2, but the omission of the use of these latter parts would only be possible where the concrete was to be formed with a level upper surface.

In all house walls in which concrete is used for the wall, there is difficulty and expense in making them water proof, and also in providing proper air or insulating space. The construction herein proposed is more nearly comparable to the present common practice of making cement plaster walls which are constructed with water proofing fabric and wire cloth applied to the outside of the wooden sheathing. Apart from the obvious saving in cost by the omission of the wood sheathing, which is very great in regions far removed from the lumber district, experience has shown that a more durable wall is obtained by the construction herein proposed. In the stucco forms at present in use, a fine mesh must be used to give a surface to plaster on and the wire or expanded metal now used is so thin that when the weather reaches them through cracks, they are rapidly corroded, and failure results; also where the cement mixture is plastered on, it must be made rich and pasty so that

it will not flow and the successive additions in the process of plastering do not cohere perfectly, especially if a little time is allowed to elapse between the applications, and incipient cracks are produced which enlarge through shrinkage of the plaster and temperature changes, and water enters and destroys the metal reinforcements. For the construction herein described, the concrete or mortar is made very wet, and deposited continuously in forms to make a homogeneous mass, the wire cloth or other reinforcing material employed is made of greater thickness than in the uses herein above referred to, which is economically possible through the large mesh used, and furthermore the very fluid character of the concrete allows it to inclose the wires thoroughly.

By the term "concrete," as used herein, I have referred to any plastic mixture which hardens after being deposited in the forms, but ordinarily this mixture would preferably in most cases employ more or less cement.

It will be observed that the flexible water proofing fabric attached to the studding of the house acts in tension as a part of the form or mold for the concrete during construction and subsequently as water-proofing in the permanent structure.

In using the term "walls" in this specification in describing my invention, I use it in a general sense as bounding any space whether side walls, roofs or floor and not in a specific sense as applying to side walls alone.

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

1. A wall for a building which consists of parallel studs, combined with a water proofing fabric secured to the studs and bulging inwardly between them, a non-yielding metal reinforcement also secured to the studs and stretched between them whereby it is supported independently of and away from the water-proofing fabric between the studs, and a body of concrete surrounding the metal reinforcement and extending be-

tween it and the water-proofing fabric, whereby there is a varying thickness of concrete between the metallic reinforcement and the water-proofing fabric and the latter protects the inner surface of the concrete.

2. A concrete wall for a house which consists of a series of parallel wooden studs or frames, a flexible yielding water proofing layer secured at intervals to the studs or frames and arranged in curves between its points of support, a non-yielding metal reinforcing layer supported by the studs or frames and stretched straight between its point of support and also held separate from the water-proof fabric, and a solid body of concrete supported by the flexible water-proofing layer and metallic reinforcing layer and completely surrounding the latter and in which the concrete body intermediate of the points of attachment of the water-proofing layer and the metallic reinforcing layer vary in thickness between the two layers, but is of substantially uniform thickness upon the side of the metal reinforcing layer most distant from the water-proofing layer.

3. A concrete wall, which consists of a series of studs, a yielding fabric secured to the studs and bulging inwardly toward and between them, a metal reinforcing layer also secured to the studs at points of attachment of the yielding fabric and stretched substantially straight between the studs, and a solid body of concrete surrounding the metal reinforcing layer and extended to the yielding layer and having a varying thickness between the yielding layer and metal reinforcing layer said thickness being greatest at substantially intermediate points between the studs and forming a solid mass having a cross section flat on one side and convex on the other.

In testimony of which invention, I hereunto set my hand.

GEORGE H. PEGRAM.

Witnesses:

WM. F. LOCKWOOD,  
O. D. HOLMAN.