May 26, 1931. J. J. O'REILLY 1,807,323

CONCRETE, MASONRY, AND STEEL CONSTRUCTION

Filed June 25, 1927

Fig. 1.

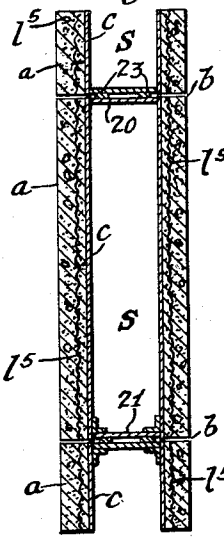


Fig. 2.

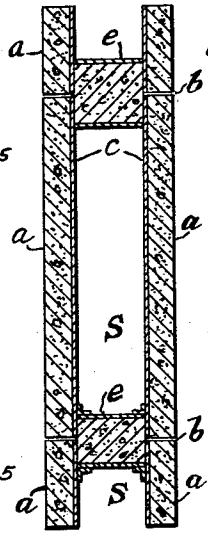


Fig. 3.

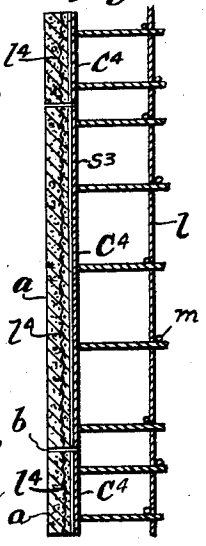


Fig. 4.

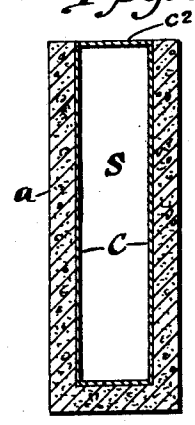


Fig. 5.

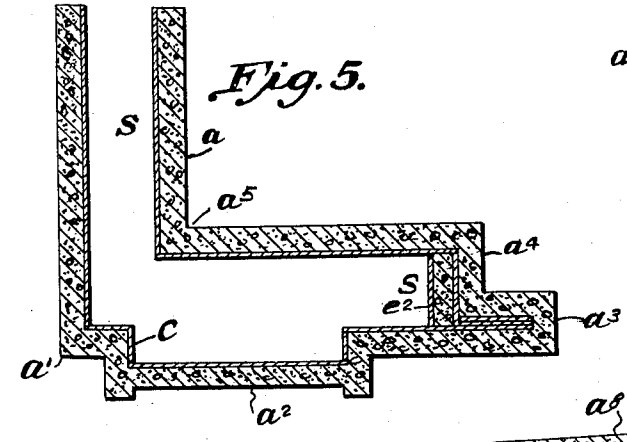


Fig. 6.

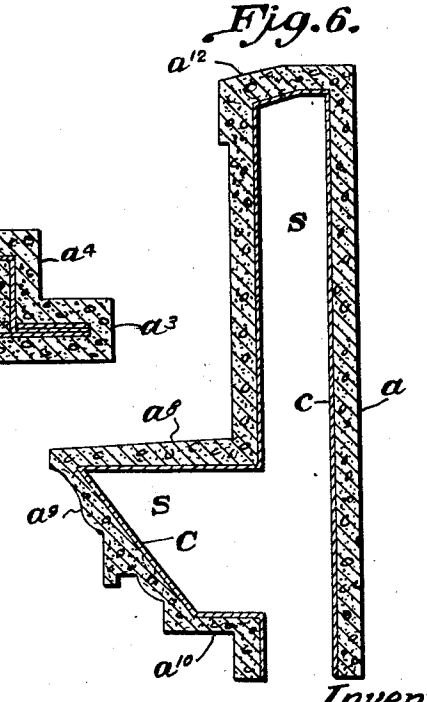
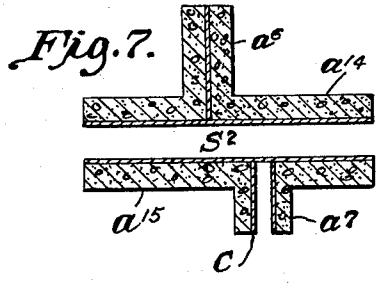


Fig. 7.



Inventor.

John James O'Reilly

Patented May 26, 1931

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UNITED STATES PATENT OFFICE

JOHN JAMES O'REILLY, OF NEW YORK, N. Y.

CONCRETE, MASONRY AND STEEL CONSTRUCTION

Application filed June 25, 1927. Serial No. 201,573.

This invention relates to a method or process of fabricating, manufacturing and erecting sections of building material to form a wall, partition, floor slab, beam, girder, column, or other unit, or part thereof, with facings of any natural or artificial building material by the means outlined hereinafter, and has for its object to render the fabrication, manufacture, and erection of said units of building material more expeditious dependable, and among other things cheaper, by minimizing the amount of skilled labor and expensive materials necessary to obtain the end desired.

Briefly stated the method or process consists, mainly, of reheating steel or other metals and imposing a fireproof covering on one or both sides of same, or of imposing the fireproof materials on the metal while it is heated in the original process of manufacture, or of casting a layer of molten metal over a layer of fireproof materials. The idea being to obtain a very rough surface of fireproof materials with a backing of metal, or a more nearly finished surface of fireproof materials with a backing of metal, for the purpose of fabricating and finishing same into units of building material.

Referring to the drawings in which Figures #1—2 and 3 are vertical sections thru different types of wall construction. Figure #4 is a section thru a beam, girder or column of hollow construction. Figure #5 is a plan view of part of an exterior wall showing an external and an internal corner, an exterior pilaster, a window reveal, and a rabbeted jamb. Figure #6 is a vertical wall section showing the construction of a sill and a heavy cornice. Figure #7 is a vertical section thru a floor slab, showing a single interior partition above, and a hung ceiling and a double or hollow partition below.

The letter *a* in the drawings indicates the fireproof covering over the metal backing indicated by the letter *c*. The letter *b* indicates a bed joint between the units. The letter S indicates a hollow space formed by assembling different pieces of the fireproofed metal. Similar symbols throughout refer to similar parts.

In Figures #1—20 and 21 are the top and bottom connecting points for the units shown with small filler pieces (23) interposed between the sections to allow room for a mortar joint between different sections. The symbol 1.5 indicates wire lath or additional reinforcing for the fireproof covering.

In Figure #2—*c* indicates a double channel formed by putting two sections together in the field.

In Figure #3—1.4 is a layer of wire lath or reinforcing for the fireproof facing, *c*4 indicates the metal backing, and S3 is a small hollow space between the facing and the metal backing which may be filled with light insulating materials such as asbestos. In this case the fireproof facing is secured to the metal backing by means of the lath or reinforcing 1.4.

In Figure #4—*c*2 indicates the top of a beam or girder which in this case may not be fireproofed. The shape of the hollow section may be changed to adapt itself to any condition of design.

In Figure #5—*e*2 indicates the vertical continuation of the double horizontal channel *e*—Figure #2. The symbol *a*1 indicates an external corner, *a*2 an exterior pilaster, *a*3 a window reveal, *a*4 a rabbeted jamb, and *a*5 an internal corner.

In Figure #6—*a*8, *a*9, and *a*10 indicate an exterior cornice, and *a*12 indicates a window sill.

In Figure #7—S2 indicates a space between the floor slab *a*14 and the hung ceiling *a*15. The symbol *a*6 indicates a single or a monolithic partition, and *a*7 indicates a double or hollow partition.

A more detailed description will be given in describing the method used to obtain a flat surface of broken stone, slag, gravel, or other hard fireproof material over a backing of flat rolled steel or other metal, as follows:

A flat sheet of metal is laid on a solid bed in a kiln or other place suitable for reheating same, with the fireproof materials laid over or under same, or both over and under same as desired. Overhead a heavy fireproof press is placed in position so that it may be made to bear down evenly on the materials, with a

stop for the press so arranged that it may move downward only for a given distance to obtain the exact penetration desired. The metal is then heated to a temperature where it will offer slight resistance to the penetration of the fireproof materials. The press is then lowered and when the operation is completed the metal is allowed to cool. Afterward the fireproof covering material is treated with other materials to form a finished building product. The same result may be obtained by pouring molten metal over a surface of fireproof materials and then pressing an additional layer of fireproof materials on top of the metal. The pressure may be exerted by a roller set to give an even pressure to a certain depth, or by other similar means.

The process may also be used to press a bond or pattern of tile or brick or similar materials into a backing of metal, or by casting the backing over the materials, and after the metal has cooled the joints may be pointed up with mortar or other materials to form a finished building material.

The product of the process is hereinafter referred to as rough and finished fabric.

Various pieces of rough and finished fabric may be joined together to form a hollow wall section (Figures #1 and 2) by means of angles, channels, sheets, and other metal members bolted, riveted, welded, or otherwise fastened to the edges of the metal backing of the fabric and to each other. Additional bracing may be added to the interior of the hollow section, so formed for extra lateral bracing, and for other purposes, to give the section a definite strength in any particular. An interior system of reinforcing may be formed inside the sections should it be advisable to fill same with concrete or similar materials. Sound deadening, insulation, or light fireproof materials may be placed in the sections so formed. The metal backing of the fabric may be a latticed or similarly designed plate instead of a solid sheet, to save metal.

Ornamental cornices, pilasters, projections, and the return at corners, jambs, sills, reveals, etc., (*a*1—*a*2—*a*3—*a*4—*a*5—*a*8—*a*9—*a*10—*a*12 Figures #5 and #6) may be made of strips of fabric joined together and to the hollow wall section, or they may be made by bending the fabric to the desired profile and fastening same to the main body of the wall.

When the wall sections are to be erected to form a hollow wall the fabric for the back and front of the wall may be fastened together, as shown in Figure #2, to form a continuous space all around the sections (*e* and *e*2) which may be reinforced and filled up with concrete to fireproof more substantially all of the field joinings. This concrete containing a small sized aggregate of stone and a secondary aggregate of small pieces of wire from one half to six inches long. Or the connections may be made as shown in Figure #1 by placing the connecting plates 20 and 21 at the top and bottom of the sections so that they may be readily bolted, riveted, welded or otherwise fastened to each other in the field, small filler pieces of steel being interposed between the sections to allow space for a mortar joint. If a solid concrete backing is desired, only the exterior facing may be formed of fabric as shown in Figure #3. Part of the reinforcing shown (*l* and *m*) may be welded to the backing of the fabric (*c*4) and the balance put in place in the field. The hollow space S3 may be filled up with insulating materials, and the reinforcing 14 which is fastened to the backing *c*4 serves nearly the same purpose as the rough fabric.

The wall sections are fastened to each other and to the adjacent sections of the building in the same general manner as at present used for the erection of structural steel. The connections, however, would be so arranged that all of the fastening or welding could be done from the inside of the building without disturbing the exterior facing or damaging it in any way. Small temporary hand holes may be cut in the fabric.

In some cases the hollow wall sections are designed and made to envelop the wall columns. In reinforced concrete structures the wall columns may be poured inside the wall sections in spaces provided for them.

Partitions are made either of one flat section of fabric or of hollow construction similar to the walls but on a smaller scale (Figure 7). For interior partitions the fabric is made in long sheets to extend from floor to ceiling or between supports. If the hollow construction is used light vertical angles may be erected in between the fabric facings, and the fabric facings may be fastened to the angles which in turn may be fastened to the floor and ceiling.

Floor slabs are made in the same general manner as the hollow partitions, the top slab acting as a lateral tie and a bed for the finished flooring, and the bottom slab acting as a lateral tie and a hung ceiling. Between the top and bottom slabs and fastened thereto are light structural steel members designed for the purpose of carrying the floor load between supports. Wire lath may be used for the hung ceiling, instead of fabric.

The beams, girders and columns are likewise formed from sheets of fabric and made hollow as shown in Figure #4. Structural steel members may be used to give additional strength to the hollow sections, or they may be reinforced and filled up with concrete either before or after erection in the field.

In general all of the material to be used on the exterior of a building would be finished in the shop and the interior work would be plastered after erection in the field, but the exterior may be finished after erection in the field and the interior work may be given special finishes in the shop.

Where reheating of the metal backing would be made prohibitive by local restrictions an extra sheet of rolled steel or a structural steel member may be welded to the metal backing of the fabric to give it any necessary strength. During the process of making the fabric, or after cooling, the metal backing may be rolled, or otherwise treated in any practicable manner to increase or maintain its ultimate tensile strength.

The fabric sheets may be wrapped around wood or other non-fireproof materials, or fastened to same to obtain a fireproof covering, or they may be fastened to masonry work or backed up with same in the usual manner. Where extra large units of fireproof materials are to be backed up with metal a series of holes may be cut, in the back of the unit, and filled up with molten metal to which may be fastened additional metal to form a complete backing. In pouring molten metal over a layer of brick or tile the back of each unit may be cut away or the units may be otherwise treated to give them a better bond with the metal backing, temporary sand joints being used to avoid the use of unnecessary metal.

From the foregoing it may be readily seen that I have evolved a new and unique method of making building materials of highly fire resistant materials strongly combined with skillfully designed metal, and that anyone acquainted with the art could readily fabricate and erect a complete structure, using the above materials only or by using the above mentioned materials in combination with other materials. The material or the peculiar method of combining hard fireproof materials with metal will have many uses other than those outlined above. For one thing a heavy thickness of mixed steel and stone such as I have described hereinbefore would make an excellent material for a vault. It would also offer unusual resistance to an ordinary projectile. The metal could completely enclose the stone or other material.

I claim:

1. A building unit comprising two equally dimensioned parallel slabs in relative spaced alignment each slab having an exposed facing of spaced particles of building material with a cementitious filling moulded solidly in the outer portion of the spaces or joints between said particles and a metal matrix moulded solidly in the inner portion of the spaces between said particles and over the backs thereof forming a solid continuity of metal extending to the side and end edges of the aforesaid slabs, intermediary connecting members fastened to the metal backing of both slabs holding them rigidly in spaced relation, and means in the unit for assembling same together with other similar units in a building structure.

2. A building unit comprising two equally dimensioned parallel slabs in relative spaced alignment each slab having an exposed facing of stucco or like material with spaced concrete aggregates or the like partly embedded in the back portion of the said stucco and a metal matrix moulded solidly in the spaces between the remaining parts of the embedded aggregates and over the backs thereof forming a solid continuity of metal extending to the side and end edges of the aforesaid slabs, intermediary connecting members fastened to the metal backing of both slabs holding them rigidly in spaced relation, and means in the unit for assembling same together with other similar units in a building structure.

Signed at #141 West 67th Street, New York city, in the county of New York and State of New York this 12th day of May A. D. 1927.

JOHN JAMES O'REILLY.