Feb. 5, 1924. 1,482,813

M. SAMAHA

REENFORCING FRAME FOR CONCRETE BUILDING STRUCTURES

Filed March 18, 1922 2 Sheets-Sheet 1

Fig. 1.

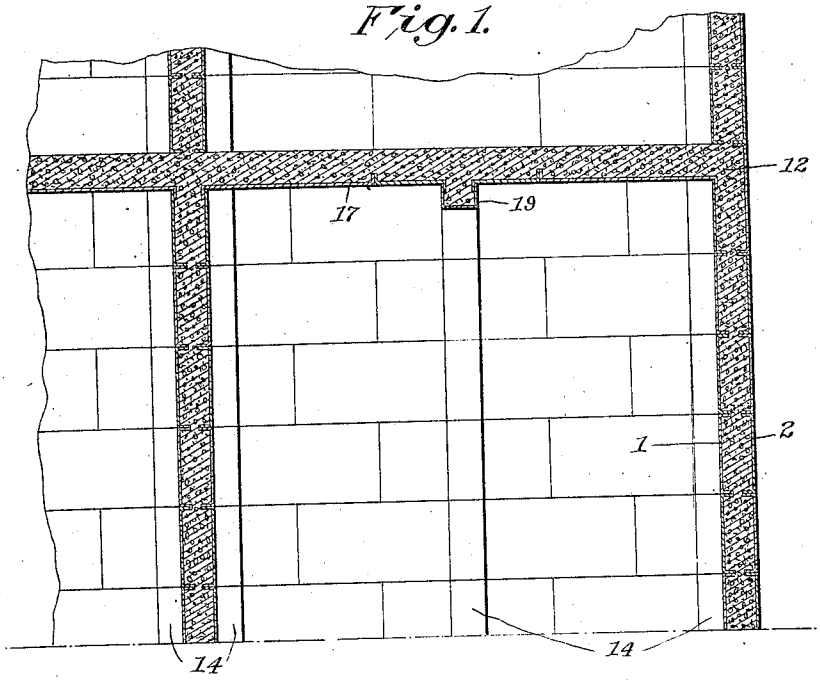


Fig. 2.

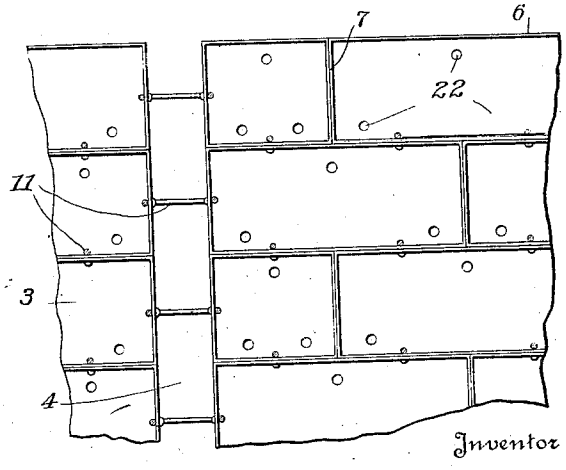


Fig. 3.

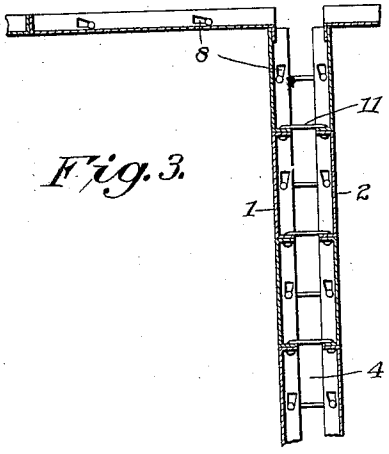
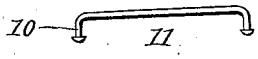


Fig. 8.



Inventor

Mansour Samaha

By Harry T. Riley

Attorney

Feb. 5, 1924. 1,482,813

M. SAMAHA

REENFORCING FRAME FOR CONCRETE BUILDING STRUCTURES

Filed March 18, 1922 2 Sheets-Sheet 2

Fig. 4.

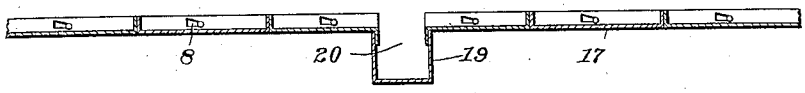


Fig. 5.

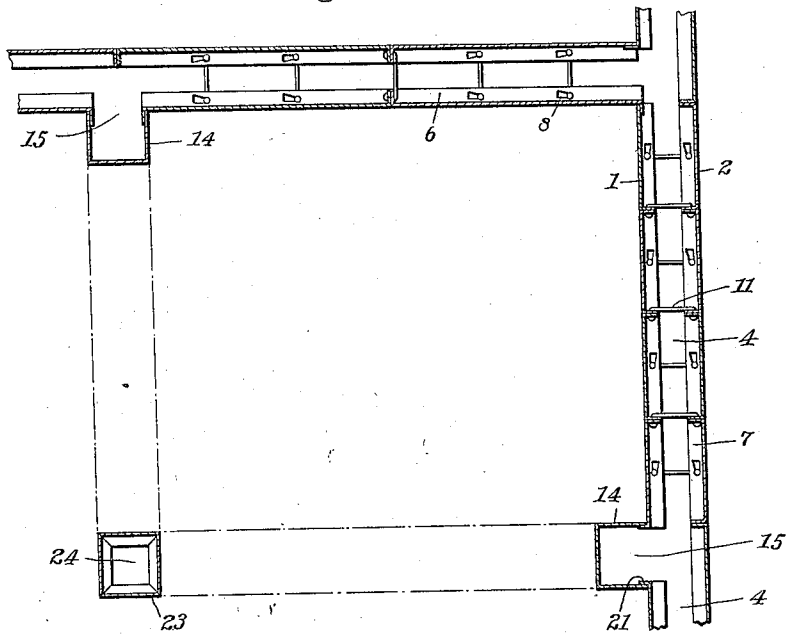
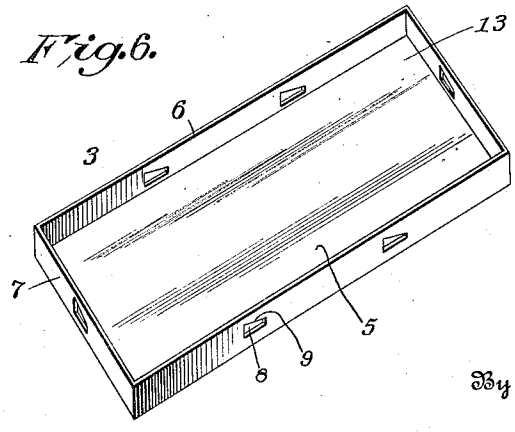


Fig. 6.



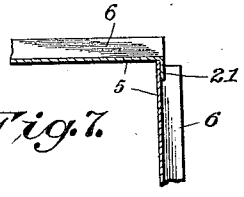


Fig. 7.

Inventor

Mansour Samaha

By Harry T. Riley.

Attorney

Patented Feb. 5, 1924. 1,482,813

UNITED STATES PATENT OFFICE.

MANSOUR SAMAHA, OF ATLANTIC CITY, NEW JERSEY.

REENFORCING FRAME FOR CONCRETE BUILDING STRUCTURES.

Application filed March 18, 1922. Serial No. 544,769.

To all whom it may concern:

Be it known that I, MANSOUR SAMAHA, a citizen of the United States, residing at Atlantic City, in the county of Atlantic and State of New Jersey, have invented new and useful Improvements in Reenforcing Frames for Concrete Building Structures, of which the following is a specification.

The invention relates to a reenforcing frame for concrete building structures.

The object of the present invention is to improve the construction of reenforcing frames for concrete building structures and to provide a simple and comparatively inexpensive reenforcing frame adapted to form a metallic casing for the concrete and capable of providing inner and outer exterior skins arranged in spaced relation to permit the concrete to flow through the entire reenforcing frame and form a monolithic concrete structure within the said metallic casing.

A further object of the invention is to provide a reenforcing frame of this character adapted to present at the inner and outer skins of the metallic casing exterior plane wall surfaces adapted to be finished interiorly and exteriorly of the building in any desired manner such as by painting, enameling or otherwise coating or decorating such exterior plane surfaces.

A further object of the invention is to provide a reenforcing frame adapted to form supporting columns of the concrete either as a portion of the walls or at points within the structure spaced from the walls and capable also of providing girders at the ceiling or roof of the structure as required.

Another object of the invention is to provide a reenforcing frame adapted to constitute a mold or form into which the concrete is poured and capable of constituting a permanent reenforcing means for the concrete structure and thereby save time, labor and material in obviating the necessity of providing temporary forms or frames for molding the concrete.

It is also an object of the invention to provide a reenforcing frame composed of metallic sections adapted to be easily and rapidly assembled into a reenforcing frame of the required character by unskilled labor and thereby lessen the cost of erecting concrete structures.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, in which like characters of reference designate corresponding parts in the several figures:—

Figure 1 is a vertical sectional view of a portion of a concrete building provided with a reenforcing frame constructed in accordance with this invention.

Figure 2 is a vertical sectional view of the reenforcing frame taken longitudinally of one of the walls before concrete is poured.

Figure 3 is a transverse sectional view of the same extending through the portion of one of the walls and one of the ceilings.

Figure 4 is a vertical sectional view of the ceiling taken at right angles to Fig. 3, the concrete being omitted.

Figure 5 is a horizontal sectional view through the wall frame illustrating the arrangement of the wall sections and the column sections.

Figure 6 is a detail perspective view illustrating the construction of the sections.

Figure 7 is a detail sectional view showing the terminal flanges of the sections secured together.

Figure 8 is an enlarged detail view of the rod and clamping portions.

In the accompanying drawings, in which is illustrated the preferred embodiment of the invention the reenforcing frame which consists of inner and outer metallic skins at the walls, partitions and other upright concrete portions of a building provides between the inner and outer skins a continuous space extending throughout the said walls, ceilings, partitions and other parts of the building and adapted to permit a continuous flow of the concrete throughout the entire frame work to form a monolithic concrete structure within the inner and outer skins. The inner and outer skins 1 and 2 of the walls and partitions are each composed of sections 3, the sections of the inner and outer skins being spaced transversely to provide an intervening space 4 for the flow of the concrete between the inner and outer skins. Each

section consists of a metallic shell composed of a plate or web 5 and upturned or inturned side and end flanges 6 and 7. The sections may be of any desired form and of any required dimensions, but they are preferably of oblong formation as illustrated in the accompanying drawings. The sections which are of box-like formation simulate wall blocks and are adapted to be arranged one upon another and built up to provide inner and outer skins of the required area and the abutting flanges of the sections are provided with openings 8 having inner inclined edges 9 and adapted to receive terminal connecting and clamping portions 10 of rods or members 11, which may be arranged at the sides and ends and which may be of any desired number as required. These connecting and clamping members 11 consist of rods having angularly bent terminal portions provided with heads which are passed through the registering openings 8 at the enlarged ends thereof and are forced to the reduced or narrow ends thereof by the blow of a hammer or other suitable means whereby the abutting flanges are fairly clamped together and the inner and outer skins are properly spaced from each other. In this manner, the sections of each skin are securely and quickly fastened together while the sections of the opposite skins are positively tied together in accurate spaced relation. The inner edges of the flanges of the sections of the opposite skins are spaced apart to provide a solid central concrete wall formation 12 of the required thickness and the flanges 6 and 7 may be of any desired width to form recesses or enclosed spaces 13 for the concrete to intelock the same with the sections. The transverse rods or members which clamp the sections together and connect the sections of the opposite skins also form reenforcing elements for the concrete and if desired additional reenforcing elements of any well known form and approved construction may be incorporated in the monolithic concrete formation between the inner and outer skins where from the size and height of a building such elements are deemed desirable or necessary. The inclined edges 9 of the openings 8 form a longitudinally tapered opening which has sufficient width at one end to permit the engaging ends of the connecting bars or members to be readily passed through it and the heads or engaging portions of the rods or members 11 are of greater size than the reduced portions of the slots so as to effectually prevent the angularly related terminals from being withdrawn through the said reduced portions of the slots or openings. Any other suitable fastening means may however, be employed for connecting and clamping the sections in proper spaced relation.

The walls may be provided at suitable intervals with offset or projecting column sections 14 which form interior spaces 15 communicating with the space 4 between the skins of the wall to form columns of the required size at the desired intervals integral with the concrete monolithic structure. The inwardly offset projecting column sections which are arranged one upon another as shown consist of shells of substantially the structure of the wall shells and the said shells present outer plane wall or column surfaces similar to the exterior faces of the sections of the inner and outer skin.

The partitions of a building will be constructed similar to the walls and as a partition would correspond in structure with an end wall detailed illustration of the same is believed to be unnecessary as it would constitute mere duplication of the wall structure.

The horizontal elements of the concrete structure, namely, the ceiling or roof, stairways and the like require only a lower supporting skin, constructed of sections similar to those heretofore described and adapted to support the concrete so that the concrete of the ceilings or roof or the like, will form an integral part of the monolithic structure of the building. This lower skin may be flat, arched or of any other required shape and the said lower skin 17 is provided at intervals with downwardly offset girder sections 19, corresponding with the offset column sections and forming interior spaces 20 in the same manner that the spaces 15 within the columns are formed, so that the entire concrete of the building will constitute a single or monolithic concrete structure encased within the said metallic skins which present plane exterior surfaces for finishing or coating in any desired manner. In uniting the sections of the skin with the sections of the vertical inner skins, the terminal flanges of the sections of the horizontal skins may be bent backward or reversed to provide attaching portions 21, for overlapping the sections of the inner vertical skins.

The sections may be provided wherever desired with suitable apertures 22 of a size to permit escape of moisture without permitting the passage of the concrete therethrough.

Also the frame may be provided at any suitable points with the interior columns 23 formed by sections similar to those heretofore described and provided with vertical interior spaces 24 which communicate with the spaces between the upper and lower skins of the ceilings to permit the concrete to flow into the inner columns and unite the same integrally in the monolithic concrete formation.

In erecting a building the first story frame work is erected and the concrete is poured

and then the second story frame is set up and the concrete poured and so on until the building is completed.

The invention is applicable to various reenforced concrete structures such as buildings, bridges and analogous constructions where a monolithic concrete structure and an exterior metallic protecting and reenforcing casing, in contra-distinction to the present interior reenforcing means, are desired.

What is claimed is:

1. A concrete structure, including an exterior metallic casing composed of opposite skins comprising box-like sections having upturned flanges, provided with tapered openings presenting inclined edges, said sections being fitted together in staggered relation simulating wall blocks, interconnecting rods having headed terminal portions bent at right angles and arranged in the tapered openings and engaging the inclined edges thereof to draw the sections together, and a plastic filling poured between the sections of the opposite skins.

2. A concrete structure, including inner and outer skins composed of box-like sections having upturned flanges, said sections being fitted together in staggered relation simulating wall blocks, offsetting projecting column sections connecting spaced sections of the inner skin to form columns, interconnecting rods engaging the flanges of the section and holding the latter together, and a plastic filling poured between the inner and outer skins.

3. A concrete structure, including inner and outer skins composed of box-like sections having upturned flanges, said sections being fitted together in staggered relation simulating wall blocks, interconnecting rods secured at their terminals to the flanges of the sections and holding the latter together, a lower ceiling skin composed of horizontal box-like sections having upturned flanges fitted together simulating blocks, said ceiling skin being secured to and supported by the said inner skin, downwardly projecting offsetting beam sections connecting spaced sections of the ceiling skin, and a plastic filling poured between the inner and outer skins and over the ceiling skin.

4. A concrete structure, including inner and outer skins composed of box-like sections having upturned flanges, said sections being fitted together in staggered relation simulating wall blocks, interconnecting rods secured at their terminals to the flanges of the sections and holding the latter together, a lower ceiling skin composed of horizontal box-like sections having upturned flanges fitted together simulating blocks, said ceiling skin being secured to and supported by the said inner skin, and an inner column consisting of connected sides enclosing an inner space and composed of box-like sections having inturned flanges and arranged upon each other simulating blocks, and a filling of plastic material poured between the inner and outer skins and over the ceiling skins within the space enclosed by the column sections.

In testimony whereof I have hereunto set my hand.

MANSOUR SAMAHA.