A. C. TOZZER.

REINFORCED CONCRETE BUILDING CONSTRUCTION.

APPLICATION FILED JUNE 15, 1910.

1,049,420. Patented Jan. 7, 1913.

Fig. 1.

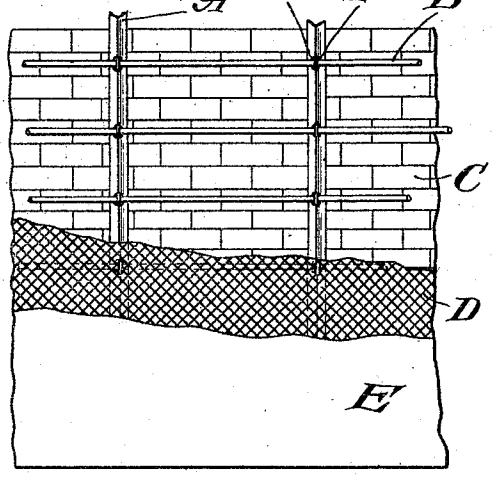


Fig. 2.

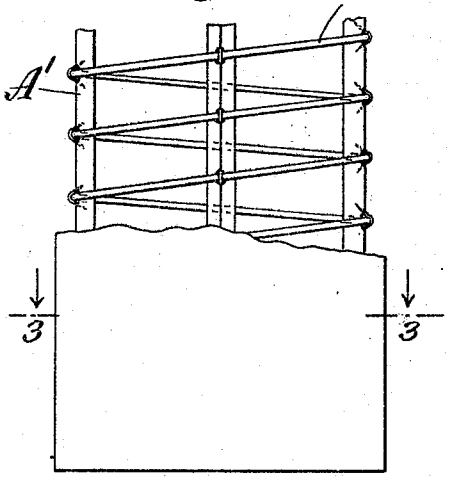


Fig. 4.

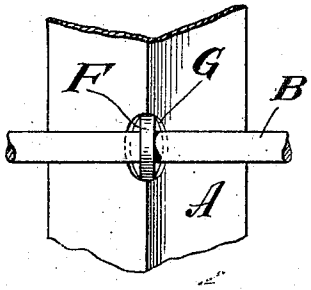


Fig. 3.

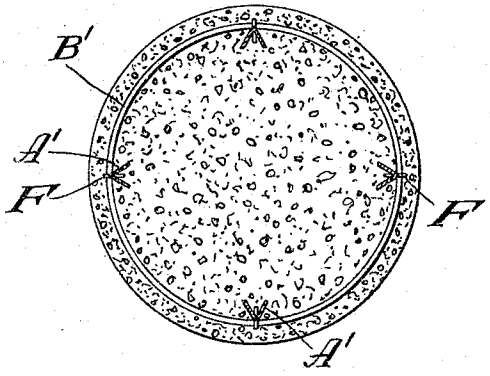
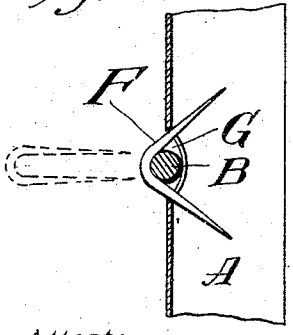


Fig. 5.



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REINFORCED-CONCRETE BUILDING CONSTRUCTION.

1,049,420. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed June 15, 1910. Serial No. 566,928.

To all whom it may concern:

Be it known that I, ARTHUR C. TOZZER, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Reinforced-Concrete Building Construction, of which the following is a specification.

The invention relates to improvements in the construction of walls, columns, floors, ceilings and other parts of a building and particularly to constructions of this character in which the main frame of the building is supplemented by a metallic construction for the purpose of carrying the plaster and concrete and usually embedded in the concrete so as to form a unitary structure therewith of fireproof character. Its objects are, among others, to provide a metallic construction of the character specified which can be manufactured at small cost and assembled without the exercise of a great degree of skill and without the necessity for working any of the parts used in the construction at the place where the construction is being set up, and which will be of such simple, strong and durable form as to minimize the cost and secure a maximum of strength and efficiency.

To these ends the invention consists in the construction, combination and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a section of wall embodying the improvements, the outer parts being cut away to expose the inner construction. Fig. 2 is a similar view of a column embodying the improvements. Fig. 3 is a horizontal cross-section substantially on the line 3—3 of Fig. 2. Figs. 4 and 5 are details showing the method of securing two of the principal parts together.

In the construction shown in Fig. 1, the angle bars A are secured to the wall in vertical position, and the bars B are horizontally disposed and cross the bars A at right angles. This is substantially the arrangement shown in Fig. 2, which illustrates a fragment of a column, except that the bars B′, corresponding to the bars B, are wound around the bars A′, which correspond to the bars A, in hoop or spiral fashion.

When the construction is applied to a wall, as shown in Fig. 1, the edges of the metal strip forming the angle A are placed against the wall C, and secured in position in any desired manner, and metal lath D and plaster E may be placed on the outside of the structure formed by the bars A and B, the lath being secured thereto by lacing or in any other suitable manner. This attachment of the metal lath, however, is unnecessary in most instances, as the staples F, by which the rods B are secured to the angles A, may be driven through the lath, and all three parts secured together thereby. When the lath is used it is not necessary to use the bars B, except in cases where a great degree of strength is required, and the lath may be secured directly to the angle bars A. This may be accomplished by providing the angle bars with a pair of small holes instead of one hole, the metal between the two holes acting to expand the staple.

The method of forming the angles A and of connecting them with the rods or bars B is peculiar and forms the most important feature of the invention. This is done in the following manner:—Flat strips of metal are punched centrally to form a series of openings G. The metal strips are then placed in a suitable machine and bent to form bars of angular cross-section. This operation brings the side edges of each perforation closer together and forms an elliptical opening in the bend or angle of the bar. It also provides the said angle bar with a series of indentations at its apex, so that when the rods B are placed therein they will be held to a certain extent against lateral movement. The staples F are then taken and driven through the perforations G astride the bar B so that the said bar B will expand and spread out the legs of the staple well beyond the extremities of the perforation and thus prevent the said staple from being withdrawn or working out. This expansion of the staple also causes it to bind between the ends of the opening and the bar B and thus form a second rigid connection between them. It will be seen that with this system of construction the bars may be connected without the use of wire lacing, rivets or other fastening means, and that no other work is required in assembling the parts than the placing of the bars B in the openings G and driving staples therethrough. I prefer to use staples having slightly divergent points, but this is not essential, as the bars B will expand a staple having parallel points, provided only that the said staple is

of slightly lesser internal diameter than the diameter of the bar.

It will be understood that in forming a column the structure composed of the bars B′, the angles A′ and the staples F by which they are secured together, is first made secure in position and the column then filled by placing a form around the outside and pouring in the freshly mixed concrete aggregates. When the wall is constructed, without lathing, a form will also be used outside the bars A and B and the said bars embedded therein by pouring and tamping the concrete. When the angles A are used with lath alone, and thus made to take the place of ordinary furring, an air space is usually left between the inner wall and the lath, and plaster or the like applied to the exterior. This space between the lath and the inner wall, however, may be filled in any desired manner.

It will be understood that instead of using flat, metal strips and punching them before bending them into angular form, angle irons may be used and punched in any suitable manner. The improvements are also useful in slab floor construction and in other parts of fireproof buildings.

What I claim is:—

1. The herein described process of making metallic reinforcements for concrete construction which consists in forming series of bearing abutments through a bar of relatively thin material, arranging a rod of width materially inferior to the distance between the abutments transversely with respect to the bar and between a series of said abutments, the distance between a series of abutments being materially greater than the width of the bar, in providing a staple having outwardly flaring legs, the distance between which, about midway their length, is materially less than the width of said rod, and which above this point is of less width than the said rod, in then applying the staple across the bar between the abutments and forcing the same upon the rod whereby the legs of the staple are spread by their engagement with the rod and bear against the abutments and the arched portion of the staple is brought into contact with said rod.

2. The herein described process of making metallic reinforcements for concrete construction, which consists in forming a series of bearing abutments through a bar of relatively thin material, arranging a rod transversely with respect to the bar and between a series of said abutments, the distance between a series of abutments being materially greater than the width of the bar, in providing a staple having legs the distance between which is materially less than the width of the rod and the distance between the exterior surfaces of which is materially less than the distance between the series of abutments, in then applying the staple across the bar and between the abutments and forcing the same upon the rod whereby the legs of the staple are spread by their engagement with the rod and bear against the abutments after their outer ends have passed beyond and within the same, thus bringing the parts into a position in which the upper ends of the staple legs are in close contact with the rod, the lower or outer ends spread apart a distance greater than the distance between the abutments and a portion of the said legs intermediate their ends in close contact with the abutments.

3. In a device of the character described the combination of an angular member provided with a perforation at its vertex, a bar crossing the angular member at the perforation, and a fastening means having arms extending around the second bar into and beyond the perforation, the opening between the arms of the fastening means being less than the width of the said bar and the distance between the sides of each perforation being greater than the width of the bar.

4. The herein described process of making metallic reinforcements for concrete construction which consists in forming a series of bearing abutments through a bar of relatively thin material, arranging a rod of width materially inferior to the distance between the abutments transversely with respect to the bar and between a series of said abutments, in providing a staple having legs, the distance between the inner surfaces of which is materially less than the width of said rod and the extreme diameter of which staple from the exterior of one leg to the exterior of the other is materially less than the distance between the said abutments, then applying the staple across the bar between the abutments and forcing the same upon the rod whereby the legs of the staple are spread by their engagement with the rod and caused to bear against the abutments and the portion of the staple connecting the legs is brought into contact with said rod.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR C. TOZZER.

Witnesses:

HERBERT J. LILLIE,

JOHN N. NELSON.