No. 783,539. PATENTED FEB. 28, 1905.

E. G. PERROT.

BUILDING CONSTRUCTION.

APPLICATION FILED AUG. 31, 1904.

2 SHEETS—SHEET 1.

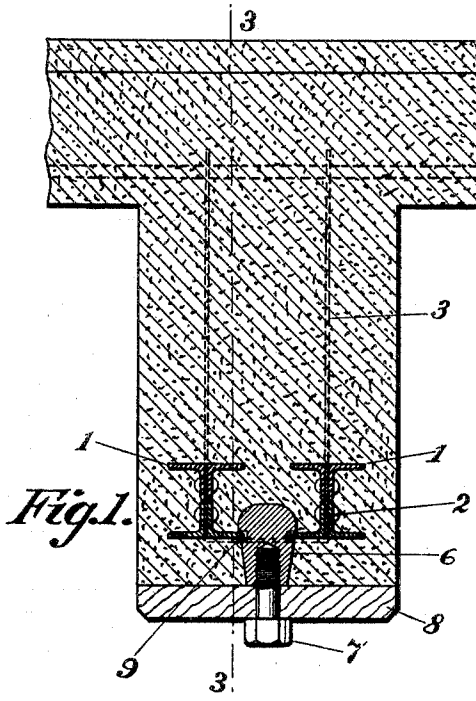


Fig. 1.

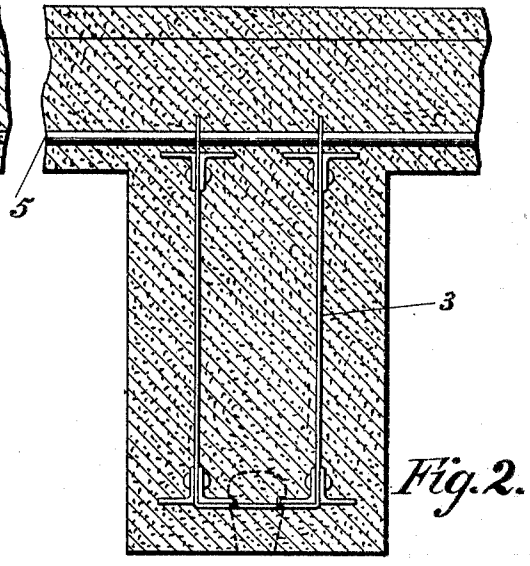


Fig. 2.

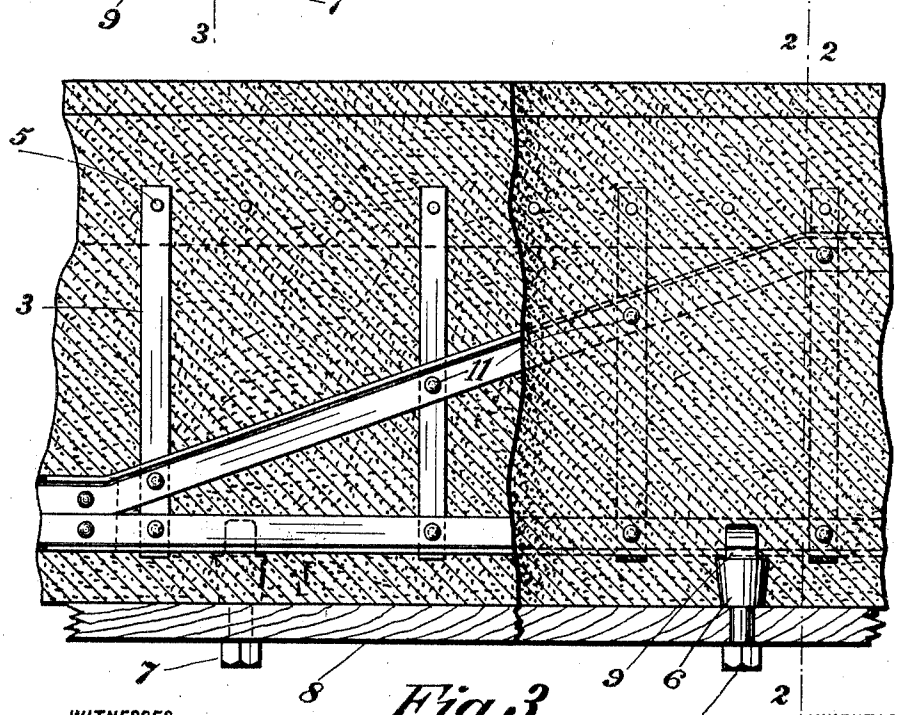


Fig. 3.

WITNESSES:

Edw. W. Vaill Jr.

Alexander Park.

INVENTOR

Emile G. Perrot

BY

Munn & Co.

ATTORNEY.

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2 SHEETS—SHEET 2.

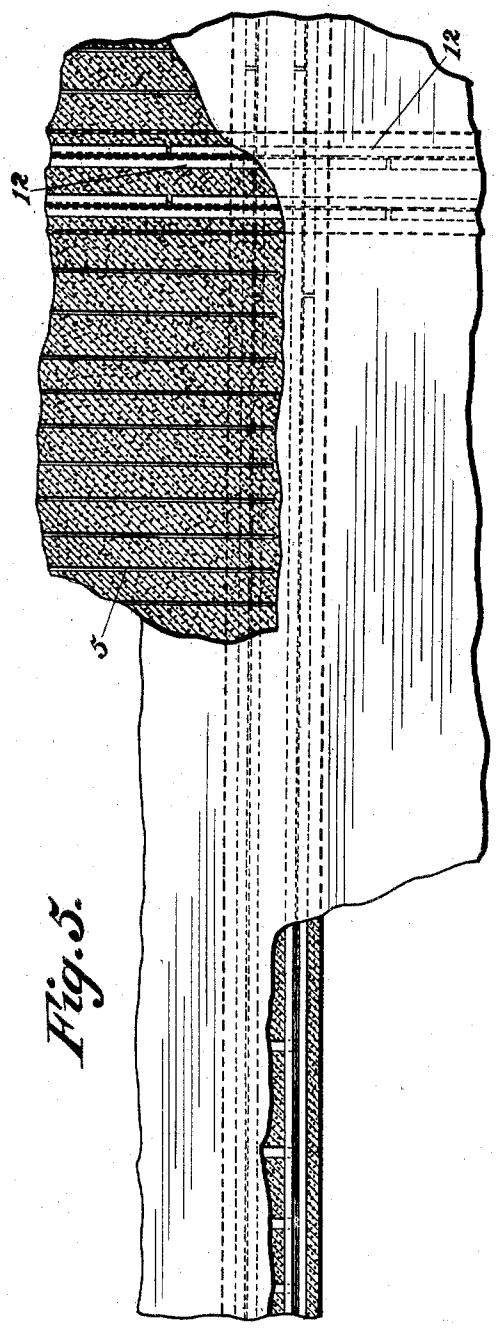


Fig. 5.

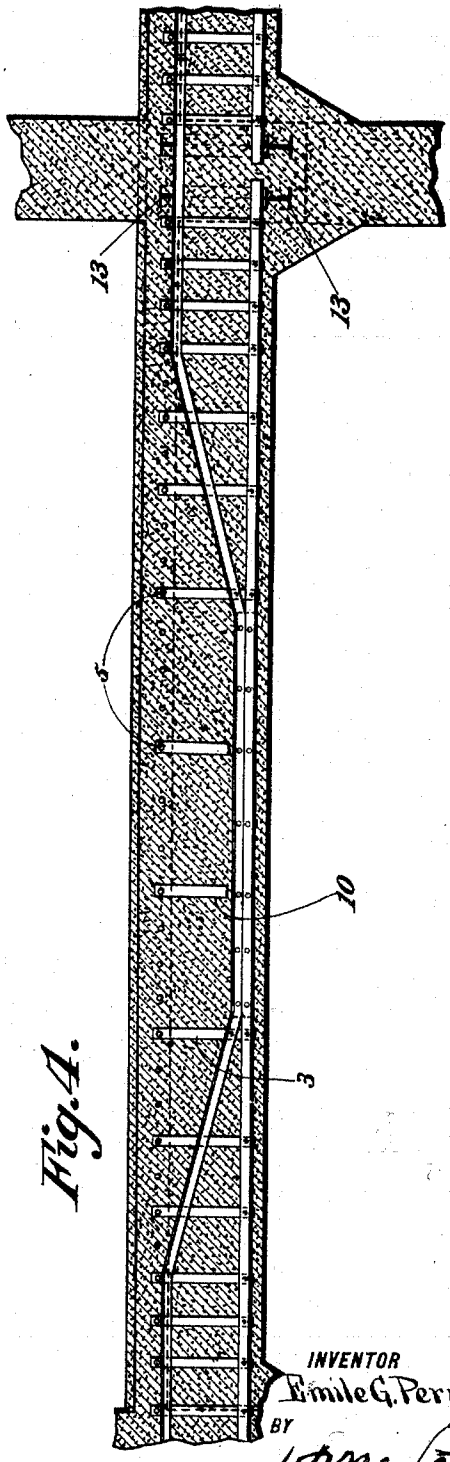


Fig. 4.

WITNESSES:

Edw. W. Vaill Jr.

Alexander Park.

INVENTOR

Emile G. Perrot

BY

Munn & Co.

ATTORNEY.

No. 783,539. Patented February 28, 1905.

UNITED STATES PATENT OFFICE.

EMILE G. PERROT, OF PHILADELPHIA, PENNSYLVANIA.

BUILDING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 783,539, dated February 28, 1905.

Application filed August 31, 1904. Serial No. 222,791.

To all whom it may concern:

Be it known that I, EMILE G. PERROT, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Building Construction, and particularly in means for reinforcing cementitious parts, such as beams, posts, floors, walls, arches, &c., of which the following is a full, clear, and complete disclosure.

One object of my invention is to provide reinforced or composite concrete and metal bodies by which a trussed effect of the reinforcing parts may be obtained which will correspond as nearly as possible to the trussed formation of steel beams and other supporting parts in the usual steel building and other constructions without the disadvantages of having to cut and fit the parts when placing the same in position at the place where the structure is being erected and of joining and fixing of the positions and relations of the parts as is now usual solely by the cementitious material.

A further object of my invention is to provide such a construction in connection with the stirrups or minor members that the same is firmly and easily attached to the main longitudinal members, while at the same time the parts are simple and inexpensive to manufacture and may be standardized to afford speedy and easy application to different structures.

Briefly, my invention comprises the formation of a series of substantially parallel structural bars or elements which are united for the whole or part of their length by means of a transverse web which is attached to said bars in any suitable manner, said bars being separated at other portions or parts to form other or diverging longitudinal extending members, said bars also being engaged by stirrups which not only serve to support the former and to receive the internal stresses, but also serve to locate the bars both transversely and vertically within the body of the cementitious structure.

My invention further comprises certain constructions and detailed arrangement of parts hereinafter to be more fully set forth and claimed.

For a full, clear, and exact description of one embodiment of my invention reference may be had to the following specification and to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a transverse sectional view of a beam embodying one form of my invention. Fig. 2 is a similar transverse section, but taken near one end of the beam or upon the line 2 2, Fig. 3; Fig. 3, a longitudinal sectional view taken substantially upon the line 3 3, Fig. 1. Fig. 4 is a similar longitudinal sectional view, but showing the arrangement as applied to a complete beam and indicating the relation of the floor-slabs; Fig. 5, a plan view of a floor which is supported by beams, certain parts of the floor being shown broken away to disclose the reinforced bars within the same.

In the drawings the numeral 1 indicates a series of metallic structural elements or steel bars, which are connected by a longitudinally-extending plate or web 2. The bars 1 I have in this instance shown as consisting of L-shaped angle-irons, which are riveted or otherwise attached to each side of the intermediate plate or web. The longitudinally-extending members or bars 1 are also engaged by substantially vertical strips of metal 3, which form stirrups or extensions of said bars to take up the stresses in a transverse direction. These stirrups are preferably formed as shown and consist of a continuous strip which passes between the longitudinal elements or angle-irons 1, across the beam thereof, and then vertically between the opposite corresponding bars 1. By this construction it will be evident that a series of longitudinally-extending bars consisting of any number of elements consisting of angle or channel irons may be attached to a single set of stirrups. The stirrups, in addition to forming means for taking up the transverse stresses, also constitute means for keeping the bars in the correct distances apart transversely. The upper ends of the stirrups are provided with openings or other means for engagement with the transverse bars 5 of the floor-slabs. The bars or angle-irons 1 are also held in position vertically by means of sockets or blocks 6, which are adapted to be engaged by a screw or bolt 7, which passes through a plate 8 or other similar facing of

soft material which forms the lower surface of the beam and is adapted to form a base into which lag-screws or other similar devices may be inserted for attaching shaft-hangers or other supporting devices thereto. These means for holding the metallic portion of the beam in position are substantially the same as those described and claimed in my prior application, Serial No. 213,249, filed June 20, 1904.

The blocks 6 not only serve to support the soft facing for the beam, but also hold the longitudinal elements in position while the cement is being placed in position and while the same is hardening. The upper portion of the blocks or sockets 6 are provided with recesses 9, which, it will be seen, coöperate with the transverse portions of the strips 3 for holding the channel irons or bars in the requisite position. In adapting these forms of bars and strips to beams and other parts of buildings and other structures it will be seen that certain portions of the reinforcing means may be connected by the longitudinal web, as indicated in the central portion of Fig. 4. At this part of the beam it is not necessary to have the strips engage the longitudinal elements directly. I provide auxiliary strips 10, which are simply connected at their upper ends with the transverse bars 5 in the floor-slabs. The strips 3 are preferably connected with the upper longitudinal elements 1 by rivets or other similar means, as indicated at 11 in Fig. 3; but this is not necessary, as the cement in some instances is sufficient to retain the strips and elements in their relative positions. In anchoring the ends of the longitudinal members or elements I provide an overlapping arrangement, as indicated in Fig. 5. One of the channel-irons of each upper longitudinal member is cut off, so as not to extend across the intersection of the beam with the post or a transversely-extending beam or girder, while the other upper channel-iron extends across the same, as indicated at 12 in Fig. 5. The abutting end of the adjacent longitudinal element is treated in the same manner, and it will be seen that the two longer ends will overlap, and thereby cause the longitudinal reinforcing elements of two adjacent beams to form practical continuations of each other, the joints being staggered. These may be riveted together, which I consider to be the most preferable construction, although the same will be held strongly in position without having the overlapping ends riveted. The ends of beams extending at right angles to the ones above mentioned have their longitudinal reinforcing elements arranged in the manner just described, but are more separated or placed closer together in order to cross either outside or inside of the reinforcing elements of the other beam, as indicated at 13 in Fig. 4.

It will thus be seen that I have provided a built-up construction of reinforcing means for a cementitious body which is easily assembled, may be accurately designed, and which may be placed definitely and accurately in position during the operation of constructing the building. Furthermore, the parts act in substantially the same manner in relation to the stresses and strains as they would if made of integral or rolled pieces instead of having the parts riveted together and at the same time may be standardized and adapted to a great variety of uses and to a great number of different building parts—such as columns, arches, walls, &c.—without substantial change in the general methods and principles of arrangement.

Having thus described my invention, what I claim, and desire to protect by Letters Patent of the United States, is—

1. Reinforcing means for a cementitious body, comprising longitudinal main bars or members formed of metallic structural elements, longitudinally-extending plates connecting said elements, and transverse minor elements attached to said longitudinally-extending bars at points where the same are not connected by said longitudinal plates.

2. Reinforcing means for a cementitious body, comprising longitudinal main bars or members formed of metallic structural elements, longitudinally-extending plates connecting said bars, said bars being separated at other points, and transverse minor elements attached to said longitudinally-extending elements where not engaged by said longitudinal plates, said minor elements also connecting parallel longitudinal bars and holding the same in position transversely within the cementitious body.

3. Reinforcing means for a cementitious body, comprising pairs of longitudinal main bars formed of metallic structural elements, longitudinally-extending vertical plates connecting portions thereof, and transverse minor elements attached to and connecting pairs of parallel longitudinally-extending main bars, and also connecting said main bars where the same are separated and not connected by said longitudinal plates.

4. Reinforcing means for a cementitious body, comprising L-shaped angle or channel irons arranged in pairs to form longitudinal main members arranged in pairs, said pairs of strips being riveted to longitudinally-extending plates at their central portions, said members being separated at their end portions and being connected by transversely-extending strips which also extend at right angles to connect parallel pairs of said main members so as to leave definite spaces between the same.

5. In reinforcing means for a cementitious body, the combination of main bars or members formed of metallic structural elements, transverse stirrups rigidly connecting said main bars, a downwardly-projecting clamp or member adapted to clamp the main bars for holding the same rigidly in position in relation

to the walls of the mold during the formation of the cementitious body.

6. In reinforcing means for a cementitious body, the combination of main bars or members formed of metallic structural elements, transverse stirrups rigidly connecting the said main bars, a downwardly-projecting clamp or member having an attachable keyed portion adapted to engage between said main members to hold the same rigidly in position in relation to the walls of the mold during the formation of the cementitious body.

7. In reinforcing means for a cementitious body, the combination of main bars or members formed of metallic structural elements, members connecting said bars so as to leave spaces of definite width between said bars and T-headed bolts adapted to engage said elements and the forming-mold to hold the bars rigidly in position during the formation of said cementitious body and to allow one part of said mold to constitute a penetrable facing for said body.

In witness whereof I have hereunto set my hand this 30th day of August, A. D. 1904.

EMILE G. PERROT.

Witnesses:
JOHN B. RUTHERFORD,
EDW. W. VAILL, Jr.