W. B. BOLLES.

BUILDING BLOCK.

APPLICATION FILED NOV. 19, 1908.

950,609.

Patented Mar. 1, 1910.

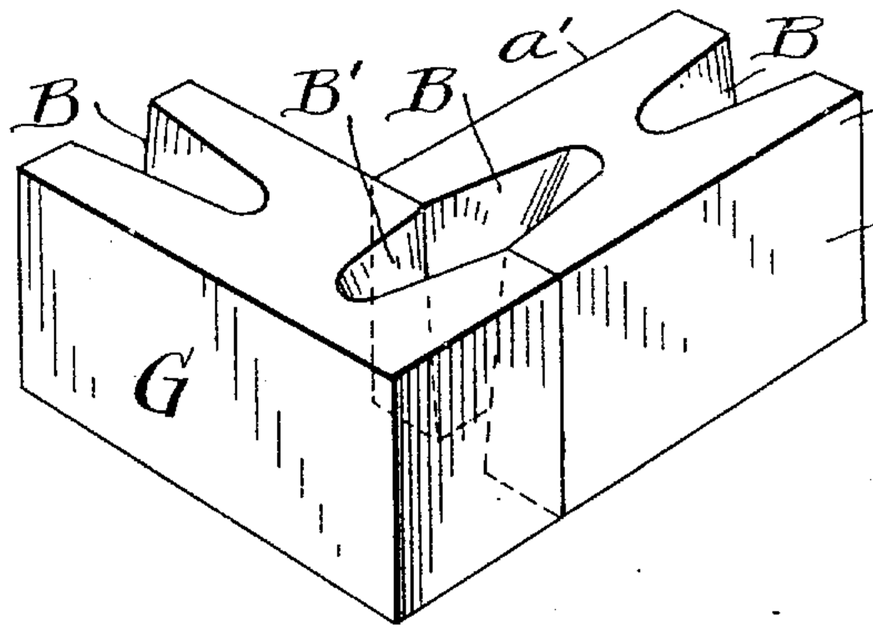


Fig. 1.

Fig. 2.

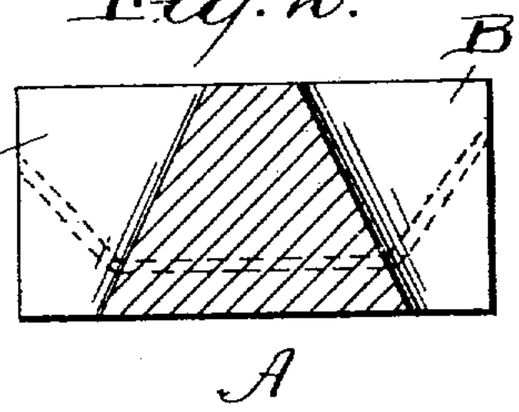


Fig. 3.

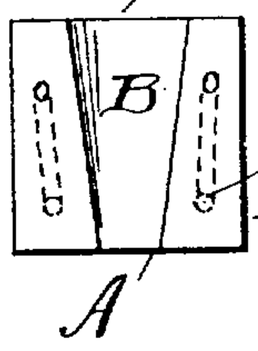


Fig. 4.

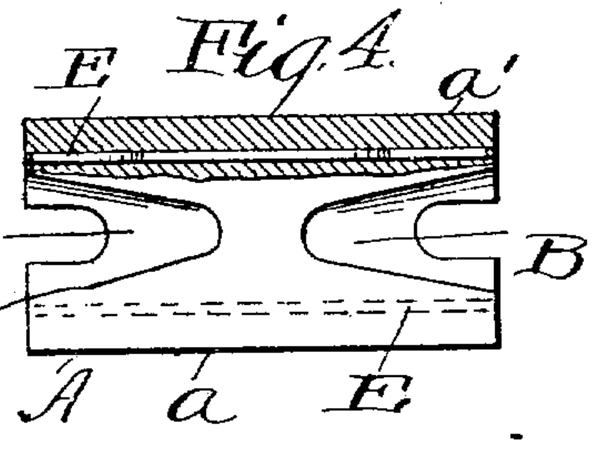
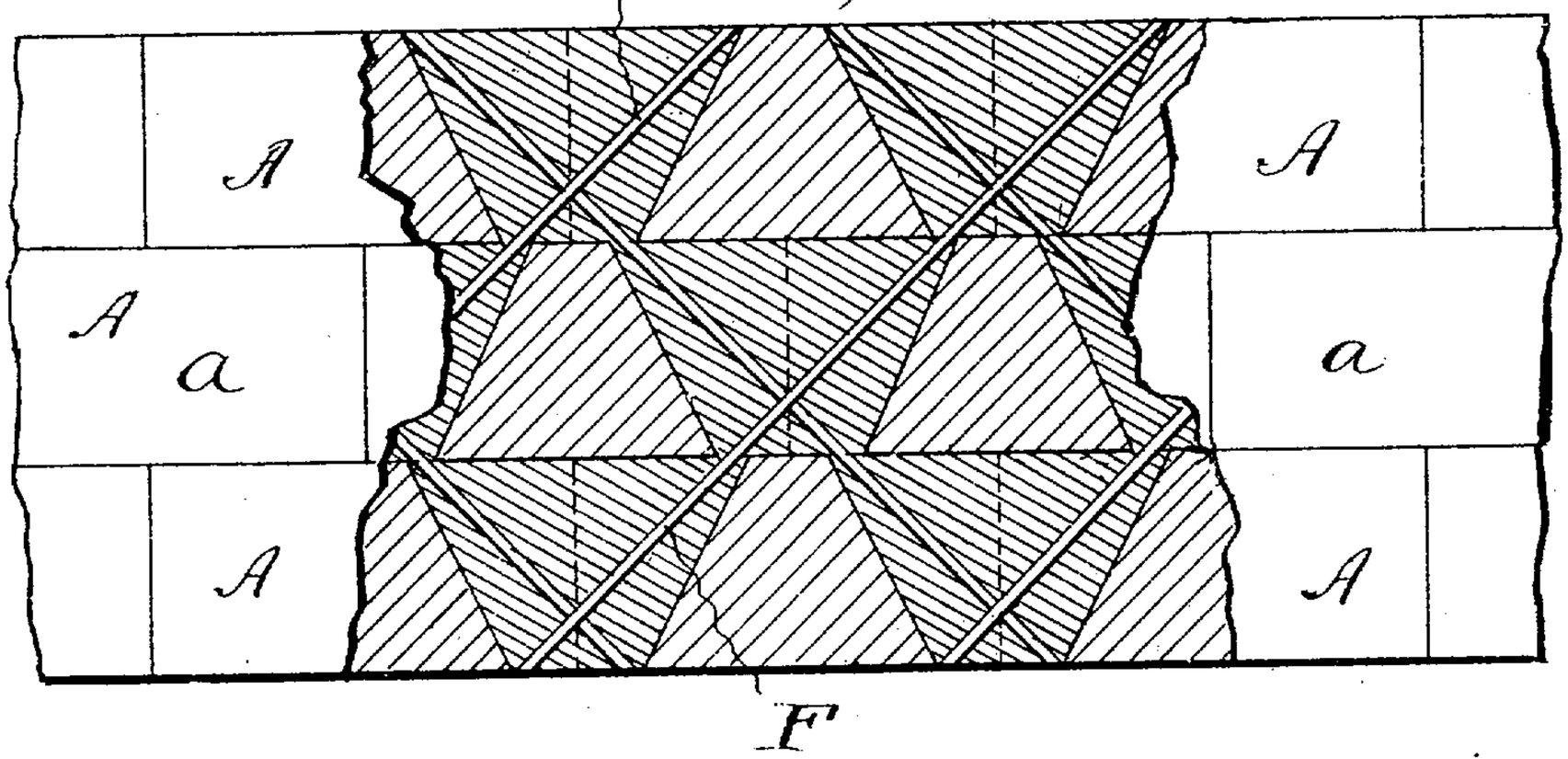


Fig. 5.



Witnesses.
E. B. Gilchrist
H. R. Sullivan

Inventor:
William B. Bolles
by
Thurston Woodward
Atty's

UNITED STATES PATENT OFFICE.

WILLIAM B. BOLLES, OF CLEVELAND, OHIO.

BUILDING-BLOCK.

950,609. Specification of Letters Patent. Patented Mar. 1, 1910.

Application filed November 19, 1908. Serial No. 463,381.

To all whom it may concern:

Be it known that I, WILLIAM B. BOLLES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Building-Blocks, of which the following is a full, clear, and exact description.

The primary object of this invention is to provide a concrete building block having the maximum useful strength for the material used in forming a block of a given size.

The essential characteristic of a building block embodying the invention is that the material of the block is of progressively increasing cross sectional area from the top downward by reason of the disposition of said material.

Another desirable result is or may be secured in a block embodying the invention, to wit, that the recesses in the blocks are so placed that as the blocks are laid these recesses or spaces may be filled with mortar or concrete or other material, thereby interlocking the blocks and the courses of blocks so as to form what is substantially a monolithic wall.

Obviously, the invention may be embodied in a variety of specific forms. In fact, the drawing shows two of such forms. The block A, as shown, is, in my judgment, and for reasons hereinafter set forth, the best form in which the invention may be embodied.

In the drawing, Figure 1 is a perspective view of two blocks of different specific forms, each embodying the invention, said blocks being arranged as they are intended to be at the corner of a wall. Fig. 2 is a central sectional front elevation of the block A. Fig. 3 is an end view of said block. Fig. 4 is a plan view partly sectioned thereof; and Fig. 5 is an elevation partly sectioned of a reinforced monolithic wall which may be made when said blocks are used.

The block A is molded with two cored-out recesses B in its ends. These recesses are of decreasing depth from the top surface of the block downward, and they are likewise of slightly decreasing width from the top downward, and the ends of the recesses are arch shaped. The depth (that is the measurement from the end of the block inward) of the recesses at the top surface of the block are a trifle greater than three-eighths of the length of the block; and at the lower surface of the block these recesses are a trifle greater than one-eight of the length of the block. The width of each recess at the top surface of the block is about one-half the thickness of the block, and a little less than that at the bottom surface of the block. The dimensions are given merely for the purpose of making clear the precise form of the preferred construction, but without any intention of limiting the scope of the appended claims to these precise dimensions. Generally speaking, these recesses B, B, are such size that to fill them will require about one-third as much additional material as is used in making the blocks.

The block recessed in its ends, as described, consists of the front and rear sides a, a', and a centrally placed tie a^2 which is in the form of a pier of gradually increasing cross sectional area from its top downward. The front and rear sides a, a', measured from front to back, are also of slightly increasing thickness from the top downward. The material is, therefore, of progressively increasing area in horizontal sections from the top downward; and also of progressively increasing area in vertical section from the ends toward the center.

The advantages of substantially the construction shown and described, grow out of the nature of the material such as concrete out of which these blocks are molded and of the capacity of this material to resist strains of various sorts; and of the further fact that each block is, when laid in the wall, in effect, a beam supporting a load. It is a characteristic of concrete or cement mortar that the maximum tensile strength obtained per unit of area is greatly less than the compression strength of the same area of the same material. A block, when laid, may be and should be supported uniformly throughout its length, but it often happens that because the mason work is not properly done, or for some other reason, a block in a wall is not uniformly supported. In the latter case it is obviously necessary that the block have sufficient tensile strength to stand the strains to which it will be then subjected, because the lower part of the block—that is to say, the part below the neutral axis thereof,

will be subject to greater or less tensile strain. The disposition of the material in the block is such that it is better adapted to resist that strain than is a block containing the same amount of material but having heretofore known construction. That is to say, the greater part of the material is below the neutral axis, because the cross sectional areas of the material increase from the top downward. Then, considering again the block as a beam which may be supported at its ends under certain circumstances, the moments, due to the loads, increase from the ends toward the center of the beam. To provide for these increases in external moments, the moment of internal resistance of the concrete should be increased, as it is with the described block, in which the material is so disposed as that the areas of the material in vertical planes increase from the end of the block toward the center thereof. Again treating the block as a beam, the shear is to be considered. The shear, in a beam supported at each end and uniformly loaded, decreases from the end of the beam toward the center. The shearing strength of cement mortar and concrete is intermediate between its tensile and compression strength. Sufficient material is placed in the front and rear portions of the block in the construction shown to resist shearing strains. In a word the block is so formed by the distribution of materials therein as to give it the best balance for resisting tensile, compression and shearing strains.

The block may be still further strengthened, especially so as to resist tensile strains, by embedding in the front or rear sides, or both, thereof, near its lower edge, reinforcing rods E of metal, and the ends of these rods may be bent up in the material so as to better carry the tensile stress due to shear in the beam.

When these blocks are laid to form a wall, the center of each block is directly under the meeting ends of the two blocks above it, and the walls so constructed will have diagonal lines of maximum and minimum strength, making thereby an exceedingly strong wall. When the blocks are so laid, the recesses between the blocks in one course may be filled with cement mortar or concrete or other suitable material, and the recesses in one course will communicate with the recesses in the courses above and below it. Therefore, diagonal reinforcing rods F may be placed in this filling material extending through as many courses of the blocks as desired. It is, of course, not necessary that these recesses shall be so filled, but when they are and when the reinforcing rods are employed, the result is a substantially reinforced monolithic wall of great strength.

The block G shown in Fig. 1 is designed particularly for use as the corner block. It has one recess B in its ends and another recess B′ in its side,—this latter recess being in such position that when the end of a block A is properly placed in contact with the recessed side of block G the side recess B′ will be alined with the end recess in block A. The recess B′ is like the recesses B in shape—that is to say, they are of progressively decreasing cross sectional area from top downward.

Having described my invention, I claim:

1. A molded concrete building block having in each end a cored out recess, which recesses are of progressively increasing depth and width from the top to the bottom of the block, whereby the block consists of front and rear members and a centrally placed connecting tie which extends from the top to the bottom of the block and is of progressively increasing area from the top to the bottom of the block,—the cubic space occupied by said recesses being about one-half the cubic space occupied by the material in the block.

2. A molded concrete building block having in its ends cored out recesses of decreasing depth and width from the top downward, whereby the block consists of front and rear sides and an integral centrally placed tie in the form of a pier of increasing cross sectional area from the top downward, the length of the top of said pier being slightly less than one-quarter of the length of the block and the length of the bottom of the pier being slightly less than three-quarters of the length of the block.

3. A molded concrete building block having in its ends cored out recesses of progressively decreasing area from the top downward, whereby the block consists of front and rear sides and an integral centrally placed connecting tie, and reinforcing bars embedded in said sides, the middle of said wires being below the neutral axis of the block, and the ends thereof being bent at an angle upward.

4. A molded concrete building block having in its ends cored out recesses of progressively decreasing area from the top downward, whereby the block consists of front and rear sides and an integral centrally placed connecting tie, and reinforcing rods embedded in the sides of said block, the greater portion of said rods being below the neutral axis of the block.

5. A molded concrete building block having cored out recesses in both ends, which recesses are of decreasing depth from the top downward, whereby the block comprises front and rear sides and an integral centrally placed tie which extends from the top to the bottom of the block and is of increasing area from the top of the block down-

ward,—the length of the base of the connecting tie being less than twice the depth of each recess at the top of the block, whereby when these blocks are formed into a wall with the courses laid so that the vertical ends of the block are alined with the middle points of the connecting ties of the blocks in the courses above and below, the recesses in any course will communicate with the recesses in the courses above and below it.

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

WILLIAM B. BOLLES.

Witnesses:
E. L. THURSTON,
H. R. SULLIVAN.

Correction in Letters Patent No. 950,609.

It is hereby certified that in Letters Patent No. 950,609, granted March 1, 1910, upon the application of William B. Bolles, of Cleveland, Ohio, for an improvement in "Building-Blocks," an error appears in the printed specification requiring correction as follows: Page 2, line 79, the word "increasing" should read *decreasing;* and that the proper corrections have been made in the files and records of the Patent Office and are hereby made in said Letters Patent.

Signed and sealed this 20th day of September, A. D., 1910.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

ward,—the length of the base of the connecting tie being less than twice the depth of each recess at the top of the block, whereby when these blocks are formed into a wall with the courses laid so that the vertical ends of the block are alined with the middle points of the connecting ties of the blocks in the courses above and below, the recesses in any course will communicate with the recesses in the courses above and below it.

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

WILLIAM B. BOLLES.

Witnesses:
E. L. THURSTON,
H. R. SULLIVAN.

Correction in Letters Patent No. 950,609.

It is hereby certified that in Letters Patent No. 950,609, granted March 1, 1910, upon the application of William B. Bolles, of Cleveland, Ohio, for an improvement in "Building-Blocks," an error appears in the printed specification requiring correction as follows: Page 2, line 79, the word "increasing" should read *decreasing;* and that the proper corrections have been made in the files and records of the Patent Office and are hereby made in said Letters Patent.

Signed and sealed this 20th day of September, A. D., 1910.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

Correction in Letters Patent No. 950,609.

It is hereby certified that in Letters Patent No. 950,609, granted March 1, 1910, upon the application of William B. Bolles, of Cleveland, Ohio, for an improvement in "Building-Blocks," an error appears in the printed specification requiring correction as follows: Page 2, line 79, the word "increasing" should read *decreasing;* and that the proper corrections have been made in the files and records of the Patent Office and are hereby made in said Letters Patent.

Signed and sealed this 20th day of September, A. D., 1910.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.