

979,776.

Fig. 1.

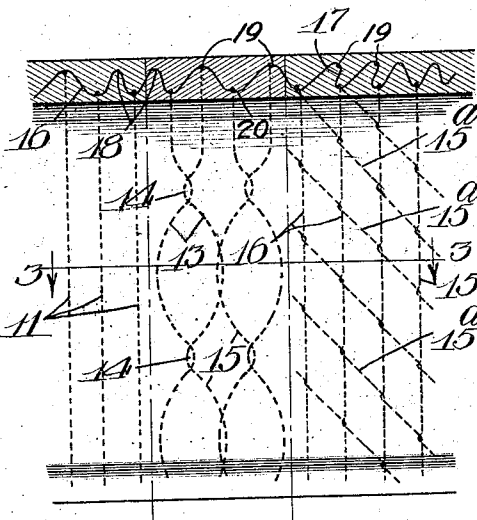


Fig. 3.



Witnesses:
Robert H. Weir
Alex. N. Lidders

Inventor:
Daniel B. Luten
By Robert Lewis Ames,
att'y.

UNITED STATES PATENT OFFICE.

DANIEL B. LUTEN, OF INDIANAPOLIS, INDIANA.

REINFORCED STRUCTURE.

979,776.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Original application filed May 17, 1902, Serial No. 107,812. Divided and this application filed July 23, 1904. Serial No. 217,767.

To all whom it may concern:

Be it known that I, DANIEL B. LUTEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Reinforced Structures, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to improvements in the construction of walls, columns, beams and the like employed in building structures of various sorts, my invention being more particularly, although not exclusively, designed for such members when used as parts of buildings, bridges, sewers, etc., which are commonly constructed of concrete, stone, brick, cement, mortar, and other materials; and the invention has for its general object to provide an improved structural member of the class and for the purposes above mentioned characterized by greater strength and durability and capacity to resist the various strains to which it may be subjected in any and all directions, together with greater economy in respect to cost of materials and construction as compared with similar structures at present in use.

To these and other ends my invention consists in general in a wall, column or beam structure principally characterized by the incorporation therein of tension or reinforcing members so disposed as to bond the structure against breakage in all directions in which it may be subjected to strains.

The present application constitutes a division of an application filed by me on the 17th day of May, 1902, Serial No. 107,812.

As above stated, my invention has to do with beam structures of concrete and generally similar materials; and contemplates the strengthening and reinforcement of such structures in a comparatively simple and inexpensive manner by embedding therein a series of tension or reinforcing rods so disposed as to resist strains existing in the direction of any or all of the dimensions of the structure. In the accompanying drawing I have illustrated several structural members thus equipped with tension members disposed in a variety of relations to secure effective resistance to disruptive strains occurring longitudinally, crosswise

and widthwise of the member; and referring thereto,—

Figure 1 shows a structure composed of vertical and horizontal members provided with tension rods disposed in accordance with the principles of my invention; Fig. 2 is a vertical sectional view of a similar structure on the line 2—2 of Fig. 1, illustrating a variety of arrangements of the tension or reinforcing rods; Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 2.

Referring to the drawings, Fig. 1, shows a floor or beam 12 supported on a wall or columns 10, and having embedded near its upper surface the compression members 19 and near its lower surface the tension members 20. Near the upper and lower surfaces of the beam, or the like, are embedded also shearing members each of which comprises a horizontal central portion 21, with inclined arms extending outwardly across the floor or beam of the like, from opposite ends of the central portion 21, and horizontal parts 23 extending outwardly from the ends of said inclined arms and extending over the columns 10, or down the opposite face of the column as at 26. The upward extension of the shearing members away from the lower tension member results in a tension chord in the lower edge of the beam, of decreasing section toward the ends of the beam, as is desirable for efficiency since the tension in the lower edge is a maximum near the middle and decreases toward the supports.

It is to be noted that because of the difference in length of the central portions 21, and the end portions 23, the arms of one shearing member cross the beam or the like, at a different point longitudinally from those of another shearing member, resulting in a bonding of the material through the diagonal shearing regions by members that alternate with one another in their points of crossing the beam. The same result is accomplished by shifting one shearing member longitudinally past the other longitudinally of the beam.

My invention consists of a beam reinforced with tension members near the lower surface, and combined tension and diagonal members arranged to alternate with one another in their points of crossing the beam, together with a compression member

near the upper surface of the beam as required in some cases. The diagonal shear members, after crossing to the upper surface of the beam, follow that surface closely for a considerable distance each side of the support, reinforcing the upper surface of the beam for approximately one-fourth of the span. Thus the upper surface of the beam continuous over the support, is reinforced with tension members which have diagonal members across the beam at alternating points, in the same way that the middle of the beam is reinforced below.

From the foregoing description it will be seen that the improvements herein described will be thoroughly efficient in securing the objects designed; and while other forms or other methods all within the spirit of the invention are apparent to those skilled in the art, those shown and described are deemed sufficient for purposes of illustration.

I claim:—

1. A reinforcement for concrete girders, beams, etc., comprising a lower horizontal tension rod and upper and lower shearing rods, each having a central horizontal part, inclined parts extending outwardly from opposite ends of the central part and hori-

zontal parts extending outwardly from the ends of said inclined parts, the central horizontal part of the lower shearing rod being longer than that of the upper shearing rod, and the horizontal ends of the upper shearing rod being longer than those of the lower shearing rod, substantially as set forth.

2. A reinforcement for concrete beams, girders, etc., comprising an upper compression rod, a lower horizontal tension rod, and upper and lower shearing rods, each having a central horizontal part, inclined parts extending outwardly from opposite ends of the central part and horizontal parts extending outwardly from the ends of said inclined parts, the horizontal part of the lower shearing rod being longer than that of the upper shearing rod, and the horizontal ends of the upper shearing rod being longer than those of the lower shearing rod, substantially as set forth.

Signed by me at Indianapolis, county of Marion and State of Indiana, in the presence of two witnesses.

DANIEL B. LUTEN.

Witnesses:

B. C. RINEHART,
A. C. BROWN.