

No. 756,471.

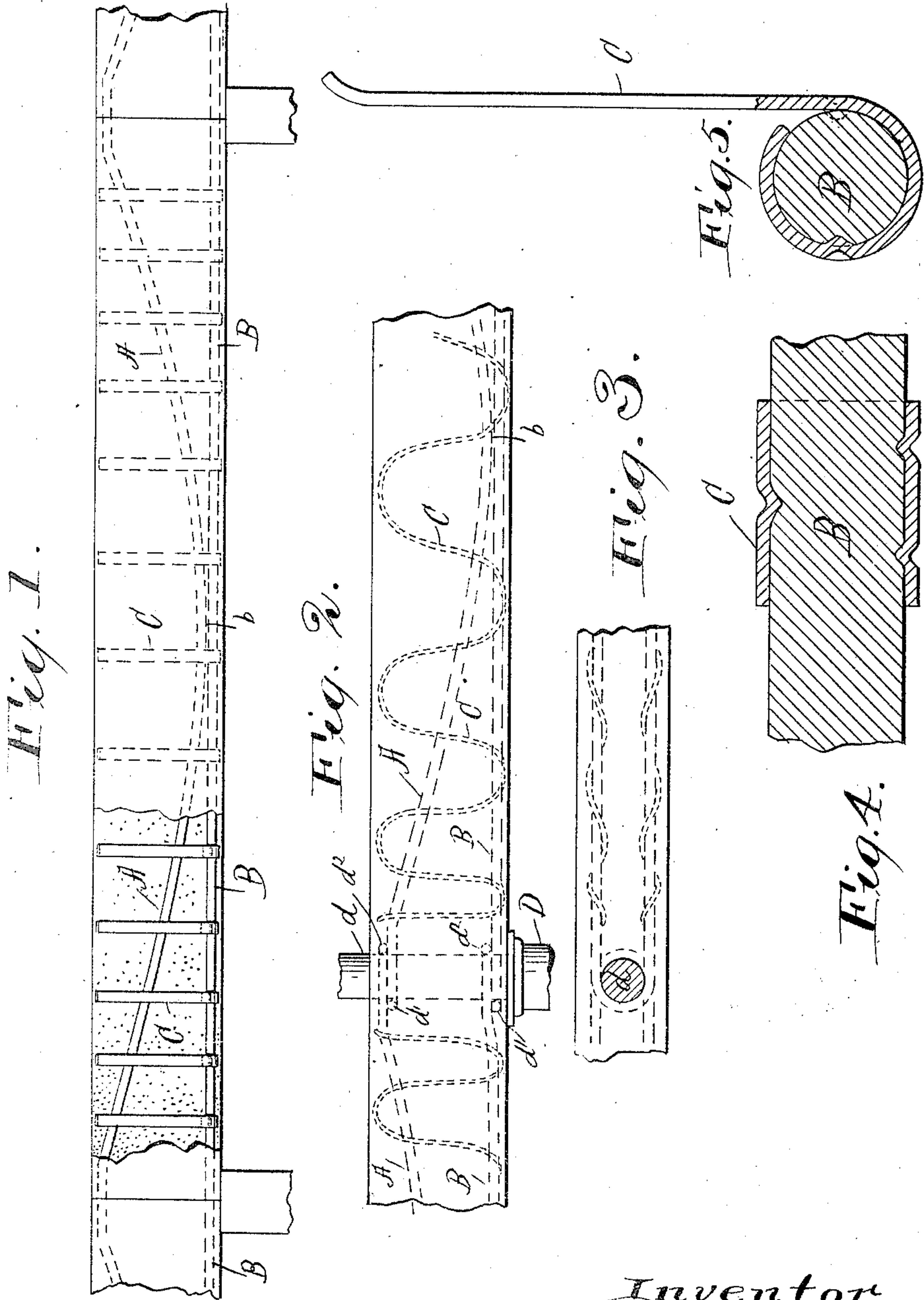
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J. D. CAREY.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

APPLICATION FILED NOV. 11, 1903.

NO MODEL.



Witnesses.
E. B. Gilchrist
E. B. Dannelly

Inventor:
James D. Carey
by
W. E. Dannelly
his Atty

UNITED STATES PATENT OFFICE.

JAMES D. CAREY, OF CLEVELAND, OHIO.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 756,471, dated April 5, 1904.

Application filed November 11, 1903. Serial No. 180,721. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. CAREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Construction of Joists, Girders, or the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to building construction wherein beton or cement form the base of the structure, the same being interwoven with metallic struts, braces, tie-rods, or strengthening elements arranged in predetermined order.

The objects of the invention are to attain the best results by the peculiar formation of what are called the "suspension-rods" and in connection with this a peculiar arrangement of stirrup-pieces or tie-pieces arranged vertically and extending from the chords into the body of the cement and in juxtaposition to the brace-rods.

Still another object of this invention is to adapt the structure to the use of the same in connection with supporting-pillars, whereby both the chords and the suspension-rods are caused to embrace the upper end of the pillars, bringing the strain upon the same in opposite directions.

Other objects of this invention will appear and be apparent in the drawings and specification.

This invention consists in the peculiar arrangement and structural features as a whole and which will be hereinafter fully set forth and claimed.

In the drawings, Figure 1 illustrates a joist or girder constructed of beton and illustrating the arrangement of suspension and chord rod and stirrup-pieces. Fig. 2 illustrates in side elevation the joist or girder construction employed in connection with a supporting-pillar, illustrating the upper end of said pillar extending through the joist or girder to receive the lower end of a pillar to be supported above it. This figure illustrates in modified construction a tie or lateral supporting element composed of spirally-arranged heavy wires and also

illustrates the manner in which the suspension-rods and chords embrace the upper end of the pillar. Fig. 3 is a plan view of a portion of Fig. 2, more clearly showing the manner in which the suspension-rods and chords surround the upper end of the pillar. Figs. 4 and 5 represent in section, longitudinal and cross, the manner of securing the stirrup-pieces to the chord-rods.

The manner of forming the girders or joists is the usual process employed in beton structures, and it is with the arrangement of the metallic element and their structural features that this invention refers. These are composed of suspension-rods A, which extend from wall to wall, pier to pier, or pillar to pillar, the same in cases where pillars are not used extending a short distance beyond the supporting parts and into the next structure, as is usual. However, in structures of this type heretofore made these suspension-rods have been so arranged and bent as that they run for a considerable distance parallel to or with the chord-rods B, and hence they were abruptly bent, forming sharp turns which strain the metal at these turning-points, decreasing its tensile value and also its value in resisting flexion, and this defect was located just at the portion needing the greatest strength of resistance.

In arranging my suspension-rods I gradually incline them toward the point central longitudinally of the beam, and preferably in a curved direction and causing them to meet the chord-rod B at the longitudinal center of the joist, girder, or structure. Usually two of the suspension-rods are employed; but more may be used, if desired or found necessary, and the cross-section of the same is predetermined according to the necessary strength desired.

Another very essential feature of my construction, as illustrated in Figs. 4 and 5, is the construction of the stirrup-pieces and their attachment to the stirrup-rod. Heretofore these stirrup-pieces C have been loosely connected to the chord-rods and in some cases have been formed U-shaped, the chord-rod lying on the bottom of the stirrup and not always in close contact therewith, and thus,

for instance, should the chord-rod be bent at any particular portion the stirrup-pieces would not come up to it, and when the cement was packed in the structure the cement would work between the under part of the chord-rod and the seat of the stirrup, and thus the stirrup would not support the chord-rod, and hence would detract from its value. Those familiar with structures of this nature will fully appreciate this objection where loosely-arranged stirrups are employed.

By my arrangement as illustrated in Figs. 4 and 5 the stirrup-pieces are located on the chord-rod and are pressed thereto and caused to positively engage the same at the lower end. Thus the disposing of the stirrups is predetermined positive and not left to or liable to be disarranged by the unskilled laborer employed in filling or tamping the beton.

As illustrated in Figs. 2 and 3 of the drawings, instead of using stirrup-pieces a continuous rod arranged so as to brace the chord-rods and the suspension-pieces may be employed. These figures also illustrate the manner in which the structure may be employed in connection with pillars D. In this case the suspension-rods A and chords B are caused to embrace the upper end of the column or pillar D at its impost portion, thus bringing the strain in both directions and in opposite directions, as at d' d'' , when the pillars are employed and allowing the pillar to pass through the structure to receive a superimposed pillar.

By disposing the metal as above described I attain great strength of structure, economy and positiveness in arrangement of the metallic element, and convenience in assembling the structure as a whole, as it will be seen that the elements of metal may be prearranged with their coacting parts previous to locating them and filling in the cement or beton.

In setting forth this invention I have called attention to particular arrangements and structural features of element, but do not wish to be limited to the same as they are described or set forth.

What I claim is—

1. In a combined cement and metallic structure, the combination with a chord member of a suspension member bent downwardly from each supporting portion of the structure to a point longitudinally central of the chord member meeting the chord member at said point, and vertically-disposed stirrup members supporting the chord member, and means integral with the said members adapted to positively engage the chord member to hold the stirrup members in fixed position, substantially as described.

2. In a combined beton and metallic structure, the combination with a chord member, of a curved suspension member which meets the first-named member at a point longitudinally central thereof, stirrup members secured to and supporting the chord member, and means formed integral with the stirrup members adapted to positively engage the chord member so as to retain said stirrup members in position.

3. In a combined cement and metallic structure, a chord member, a stirrup member supporting the same at one side thereof, and means formed integral with the stirrup member adapted to positively engage the chord member and retain the stirrup member in position, substantially as set forth.

4. In structures comprising combined cement and metal, the combination with a chord member, of a suspension member bent downwardly and meeting the chord member at a point longitudinally central thereof, a stirrup member supporting the chord member, and means formed integral with the stirrup member to retain the stirrup member in position, substantially as described.

Signed at Cleveland, in the county of Cuyahoga and State of Ohio, this 14th day of February, 1903.

JAMES D. CAREY.

Witnesses:

E. B. DONNELLY,
W. E. DONNELLY.