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D. T. DUBASSOFF

2,380,953

STRUCTURAL BEAM

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FIG. 1

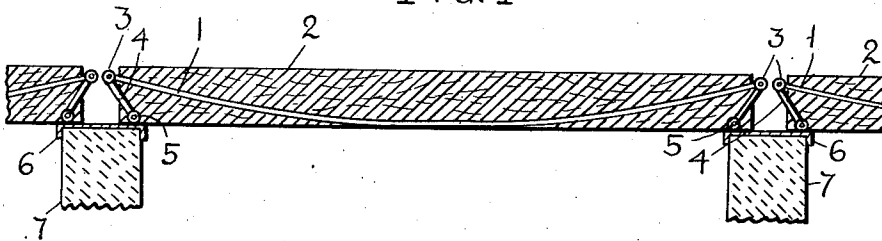


FIG. 2

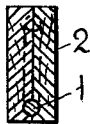


FIG. 3

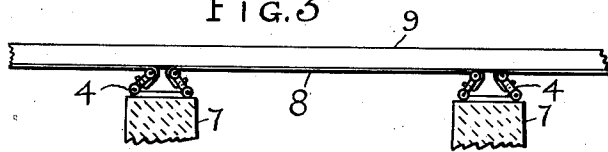


FIG. 4

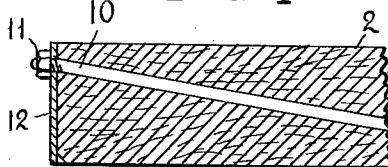


FIG. 6

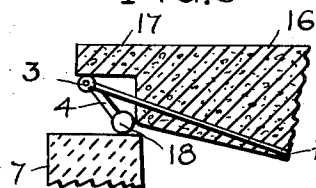


FIG. 5

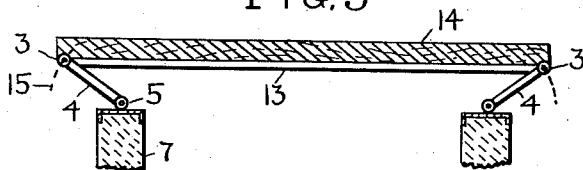
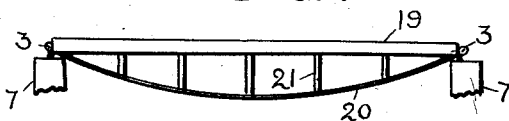


FIG. 7



DMITRI T. DUBASSOFF

INVENTOR

BY
John P. Wilson
ATTORNEY

UNITED STATES PATENT OFFICE

2,380,953

STRUCTURAL BEAM

Dmitri T. Dubassoff, New York, N. Y.

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4 Claims. (Cl. 72-61)

My invention relates to structural beams and has particular reference to beams employed in buildings, bridges, etc.

My invention has for its object to provide a beam in which strong metal such as steel is used only at points of the greatest tensile strength, the beam being so constructed that its metal portions are uniformly loaded in tension, compressible stresses being taken by other materials such as wood, concrete, stone, etc., which can withstand compression but cannot resist tension to any great extent.

As is well known, in ordinary steel beams only the lowest side of the beam is subjected to the greatest tensile stress, the intermediate portions being loaded only lightly, and the upper side being under maximum compression stress. Beams designed for more or less large spans must be therefore relatively large and heavy, especially in the portions subjected to compression in order to avoid their buckling.

In my beam I provide a single strand, rod or cable, subjected to tensile stress in such a manner that the tension automatically increases as the load on the beam is increased. It is therefore possible for the beam to resist bending or deflection under load although no part of this metal rod is subjected to compression.

Although a flexible strand such as a cable may be used with my beam, I prefer to encase the steel strand in a rigid beam made of compressible resisting material such as wood, concrete, etc. The ends of the steel core or strand are supported on pivoted arms which tend to rotate outward under load, causing further stretching of the strand and thereby resisting its bending.

My invention is more fully described in the accompanying specification and drawing in which:

Fig. 1 is a sectional elevational view of my beam;

Fig. 2 is a transverse sectional view of the same;

Fig. 3 is an elevational view of a modified beam;

Fig. 4 is a fractional sectional view of another modification;

Fig. 5 is a sectional elevational view of still another modification;

Fig. 6 is a fractional view of a modified beam;

Fig. 7 is an elevational view of another modification.

My beam as shown in Figs. 1 and 2 consists of a metal strand or rod 1 with an initial deflection calculated to reduce the tensile stress at the middle point of the rod. The rod is encased in a rigid beam 2 which may be made of wood, con-

crete or similar material lighter and less expensive than steel. The object of the enclosure 2 is to render the beam rigid to distribute the load more uniformly on the metal strand, and to provide a straight surface at the top for laying floor, etc., also to facilitate handling of the composite beam during erection of the building.

The ends of the rod 1 are pivotally connected at 3 to short metal arms 4, the other ends of the arms being pivoted at 5 to a base plate 6 on top of a foundation or wall 7. The arms 4 are inclined outward as shown so that they tend to rotate outward when load is applied to the beam 2, thereby stretching the rod 1 and increasing its tensile stress and preventing its bending or deflection.

Due to the fact that the rod 1 is subjected to the maximum tensile stress under a given load, considerable reduction in weight of steel is obtained as compared with an ordinary beam with its varying stresses.

A modified construction is shown in Fig. 3, cables 8 being used instead of the rod 1, the cables being tightly stretched between the inclined supporting arms 4 to which the ends of the cables are attached. A common beam 9 is placed on top anchored to the ends of the cables for providing rigid support for the floors above. The beam 9 passes over the ends of the cables on top of the walls 7.

In another modification shown in Fig. 4 the rod 10 is held by nuts 11 or by other fastening means in end plates 12, resting against the ends of the wooden beam 2. The rod 10 is not subjected to stretching under load but is prevented from sagging under load.

A straight rod 13 is shown in Fig. 5, reinforced by a stiffening compression beam 14 anchored at the ends to the ends of the rod 13. Path of rotation of the arms 4 is shown in dotted lines 15.

With my construction of beams considerable saving in steel is effected since the steel rod or strand is subjected only to the tensile stress and not to the bending or breaking as in ordinary beams.

Another construction is shown in Fig. 6, the beam 16 having an overhanging extension 17 resting on the pivoted end 3 of the strand 1. The link 3 is provided at the lower end with a rounded shoe 18, resting on top of the wall or pier 7. The end of the beam 16 is placed above the wall 7 and abuts the shoe 18 thereby preventing inward movement of the shoes 18. The beam 16 under load tends to rotate the links 4 downward, thereby stretching the strand 1.

In another modification, Fig. 7, the beam 19 is made of concrete or wood or other suitable material and is spaced from the strand 20 by vertical blocks 21. The strand 20 is anchored at the ends of the beams 19.

Sheet metal may be used instead of strands 8 or 13. The sheet may be held rigidly at two or four edges in the same manner as shown in connection with bars or strands.

It is understood that my structural beams may be further modified without departing from the spirit of the invention, as set forth in the appended claims.

I claim as my invention:

1. A structural beam comprising an elongated metal member; an enclosure for the metal member made of a non-metallic material adapted to resist longitudinal compression and forming a composite beam with the elongated member, the ends of the metal member protruding outwardly from the enclosure; links pivotally connected to the ends of the elongated member extending inwardly at an angle to the elongated member; supports for the lower ends of the links; the enclosure having vertical shoulders at the ends abutting the lower ends of the links and having further horizontal extensions resting on the pivoted ends of the elongated member.

2. A structural beam comprising an elongated metal member; an enclosure for the metal member made of a non-metallic material adapted to resist longitudinal compression and forming a composite beam with the elongated member; the ends of the metal member protruding outwardly from the enclosure; links pivotally connected to

the ends of the elongated member extending inwardly at an angle to the elongated member; supports for the lower ends of the links; the enclosure having shoulders engaging the lower ends of the links for resisting horizontal movement of the links; and means to move the upper ends of the links downward by the downward movement of the beam.

3. A structural beam comprising an elongated metal member; an enclosure for the metal member made of a non-metallic material adapted to resist a longitudinal compression and forming a composite beam with the elongated members; the ends of the metal member protruding outwardly from the enclosure; links pivotally connected to the ends of the elongated member extending inwardly at an angle to the elongated member; supports for the lower ends of the links; and means at the ends of the beam to depress the pivoted ends of the elongated member when the beam is under load.

4. A structural beam comprising an elongated metal member; an enclosure for the metal member made of a non-metallic material adapted to resist longitudinal compression and forming a composite beam with the elongated member; the end of the metal member protruding outwardly from the enclosure; links pivotally connected to the ends of the elongated member extending inwardly at an angle to the elongated member; supports for the lower ends of the links; and means at the ends of the beam to resist upward movement of the links.

DMITRI T. DUBASSOFF.