

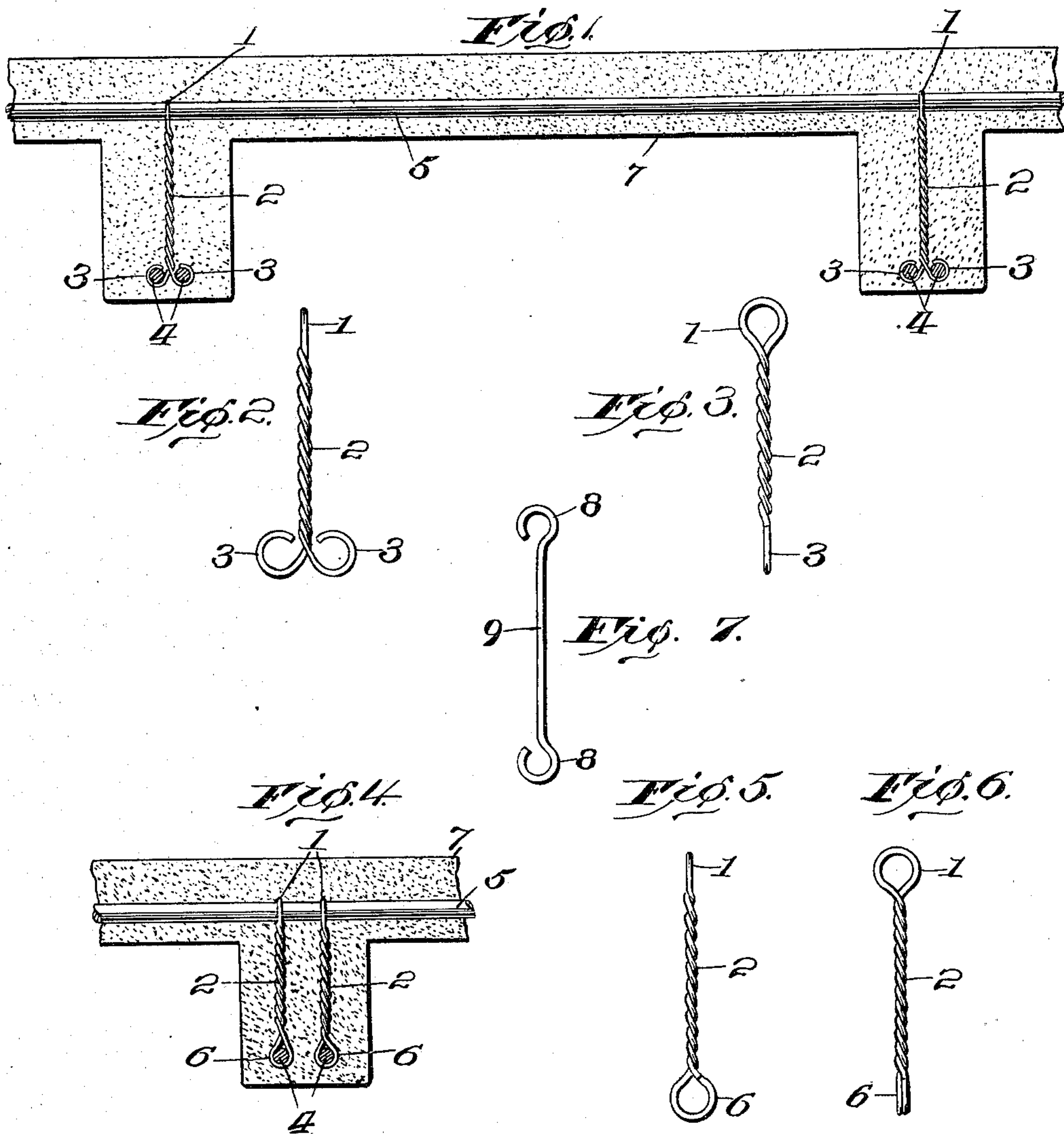
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J. O. ELLINGER.
COMPOSITE STRUCTURE.

APPLICATION FILED SEPT. 10, 1902.

NO MODEL.



Witnesses

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COMPOSITE STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 735,228, dated August 4, 1903.

Application filed September 10, 1902. Serial No. 122,835. (No model.)

To all whom it may concern:

Be it known that I, JULIAN O. ELLINGER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Composite Structures, of which the following is a specification.

This invention comprises improvements in composite structures, and it is particularly applicable to floors and their supporting beams or girders. These portions of buildings are now frequently formed of solid concrete or cement mortar with metal bars embedded in those portions which are subjected to tensile strains, such as the lower edges of the girders.

The object of the present invention is to simplify and cheapen these composite structures and to facilitate their erection.

Referring to the accompanying drawings, Figure 1 is a section through a portion of floor, taken at right angles to the girders. Figs. 2 and 3 are side and rear views of the vertical metal members shown in Fig. 1. Figs. 4, 5, and 6 are views similar to Figs. 1, 2, and 3, but illustrating a different form and arrangement of the vertical members. Fig. 7 is a side view of a third form of vertical member for concrete structures.

The present invention relates to the form and arrangement of the vertical metal members in composite structures and the manner of connecting them with the horizontal metal members, such as the metal members of the girders and flooring. Heretofore it has been difficult or troublesome to arrange the vertical members which take the shearing or transverse stresses in the girders so that they would remain properly in place while the concrete was placed and tamped about them. Furthermore, the connections between the said vertical members and the horizontal members have also been unsatisfactory. According to my invention, as illustrated in Figs. 1, 2, and 3, the vertical metal members each consists of a continuous rod, which is bent upon itself to form at one end an eye 1 and the two branches then twisted about each other to form the body 2, the free ends being curved in circles, forming a pair of eyes 3. Where the lower horizontal members are at

right angles to the upper horizontal members, the eyes at one end of the vertical member will be at right angles to the eye at the other, as shown in the drawings.

In assembling the metal members for flooring a series of the vertical members are strung on the lower tension members 4 of each girder, two of said tension members being preferably used for each girder and passed through the eyes 3. The concrete is then placed and tamped about the tension and vertical members, leaving the upper eyes of the latter members exposed. The horizontal metal members 5 of the floor are then passed through the upper eyes 1 of the vertical members, and the concrete for the flooring is then formed about said floor members.

In the form of the invention shown in Figs. 4, 5, and 6 the vertical members are formed by bending a metal rod upon itself to form the upper eye 1 and twisting the two branches of the rod together to form the body portion 2, exactly as in making the form shown in Figs. 2 and 3. The free ends are bent into parallel circles, forming an eye 6 at the lower end, consisting of two thicknesses of the rod. This vertical member has a single eye at each end and they are preferably used in pairs, as shown in Fig. 4, two rods 4 being strung through the lower eyes and a single rod 5 passing through the two upper eyes.

In Figs. 1 and 4, 7 indicates the concrete, which is suitably placed and formed about the metal skeleton structure.

In Fig. 7 I have illustrated a third form of vertical member, which consists of a plain rod of any suitable cross-section bent to form eyes 8 at its ends and having a straight body portion 9. This plain vertical member may be sometimes used, although I prefer the twisted members previously described, for the reason that they interlock with the concrete throughout their length and are therefore more reliable.

The vertical members illustrated and described are manufactured in the form shown and require no bending or change of form when they are applied in the erection of buildings.

It will be evident that my invention may be embodied in various forms. Several forms

are illustrated in the drawings accompanying this specification and others will readily suggest themselves to the skilled mechanic.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a composite structure, the combination of lower horizontal members, upper horizontal members arranged at right angles to said lower members, and vertical members, each vertical member consisting of a rod doubled upon itself and twisted and having integral eyes at its ends through which the said horizontal members pass.

2. In a composite structure, the combina-

tion of lower horizontal members arranged in pairs, upper horizontal members arranged at right angles to said lower members, and vertical members each having a twisted body, an upper eye integral with the body through which one of the horizontal members passes, and a pair of lower eyes integral with the body through which the lower horizontal members pass.

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

JULIAN O. ELLINGER.

Witnesses:

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