O. M. DAVIS.

STRENGTHENING MEMBER FOR COMPOSITE CEMENT AND METAL CONSTRUCTIONS.

APPLICATION FILED FEB. 19, 1906.

918,019.

Patented Apr. 13, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

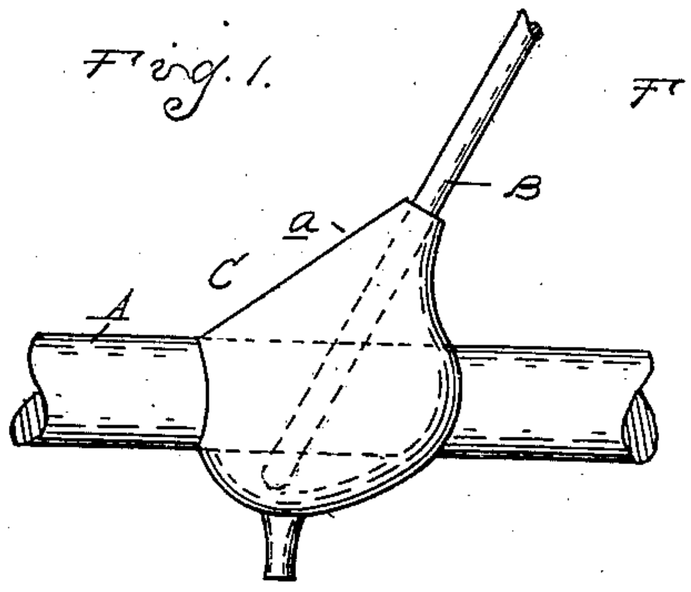


Fig. 2.

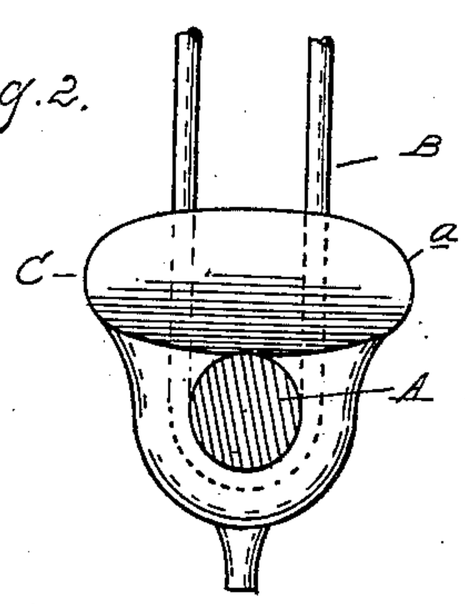


Fig. 3.

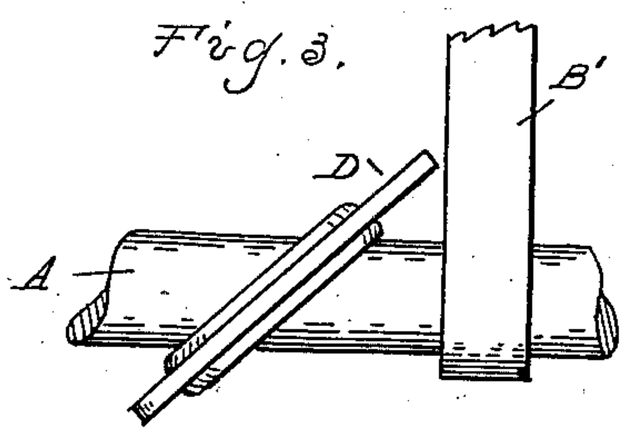


Fig. 4.

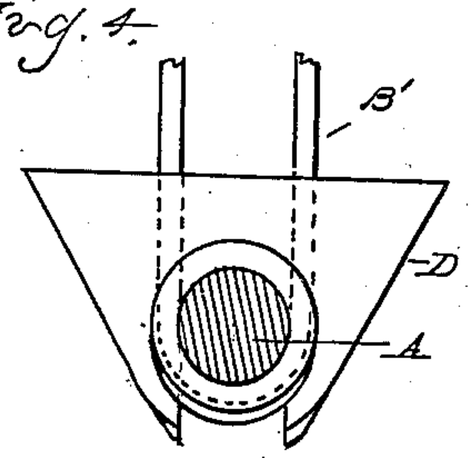


Fig. 5.

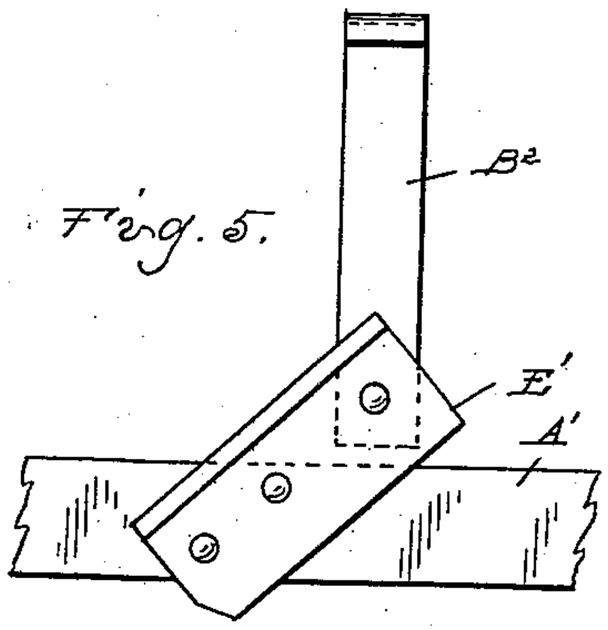
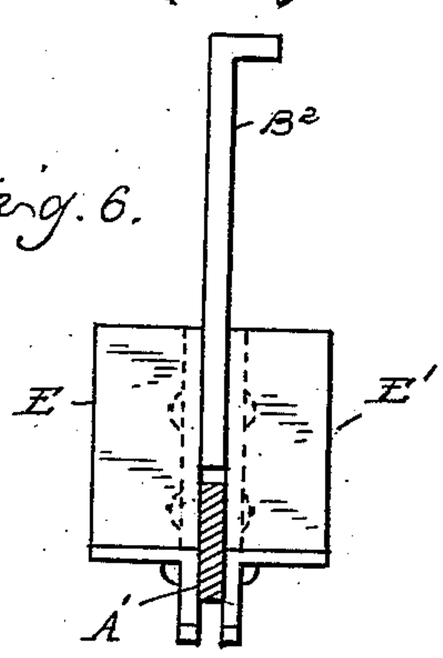


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

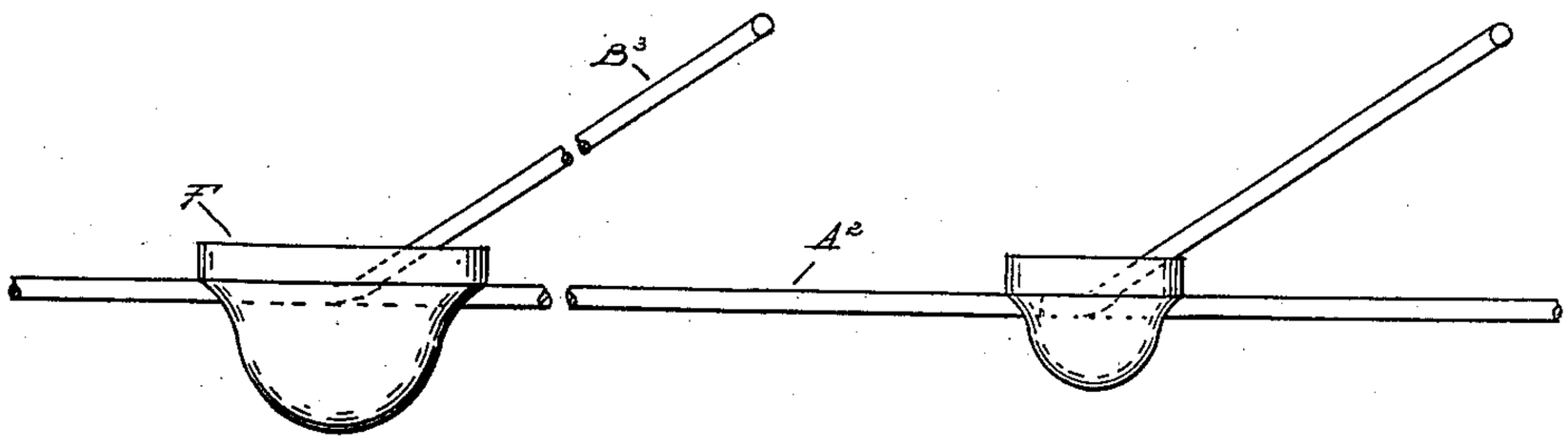


Fig. 8.

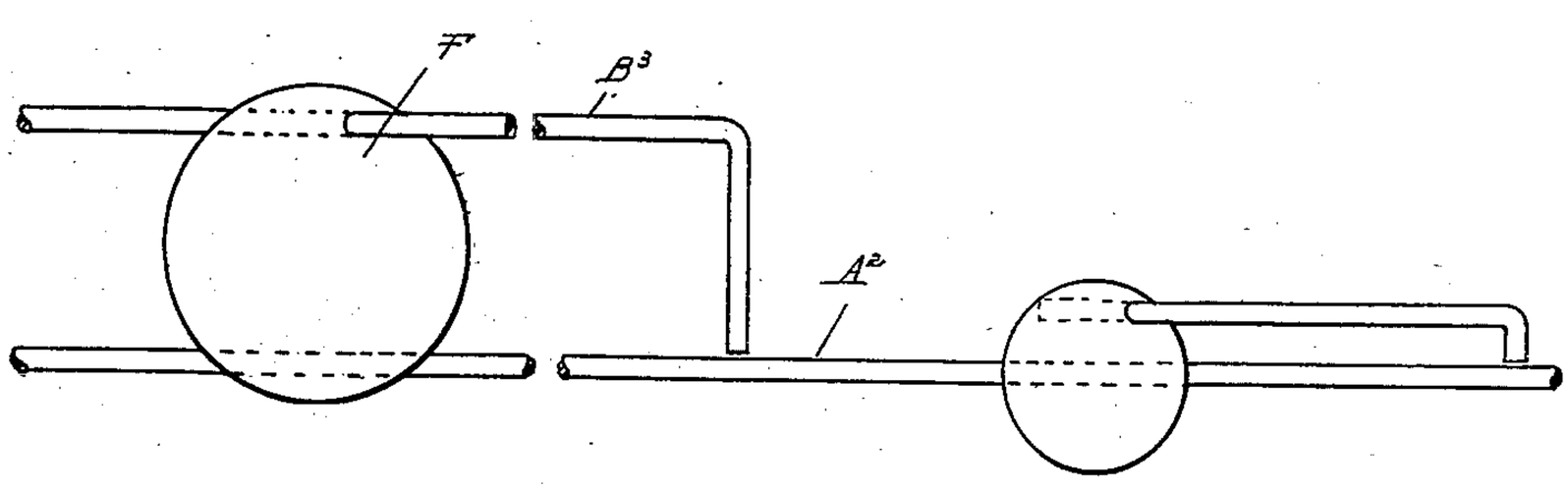


Fig. 9.

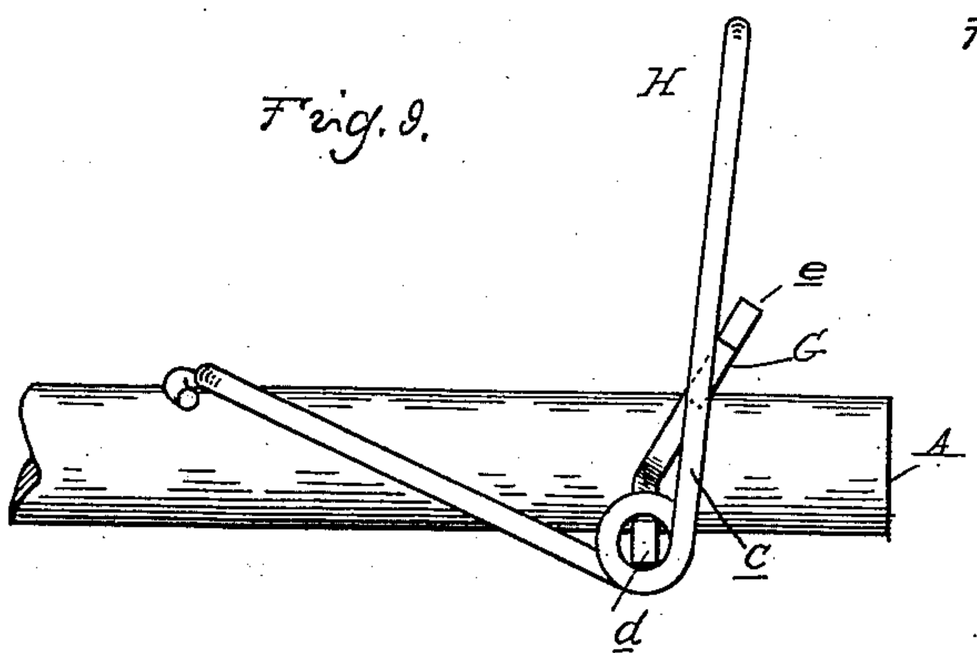
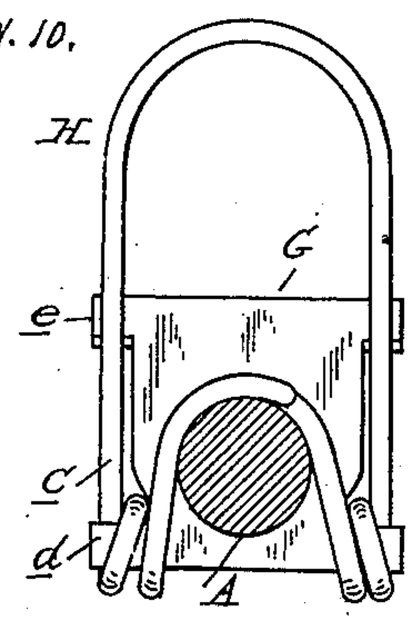


Fig. 10.



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UNITED STATES PATENT OFFICE.

OLIVER M. DAVIS, OF DETROIT, MICHIGAN.

STRENGTHENING MEMBER FOR COMPOSITE CEMENT AND METAL CONSTRUCTIONS.

No. 918,019. Specification of Letters Patent. Patented April 13, 1909.

Application filed February 19, 1906. Serial No. 301,938.

To all whom it may concern:

Be it known that I, OLIVER M. DAVIS, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Strengthening Members for Composite Cement and Metal Constructions, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to composite constructions, such as beams, girders, slabs, etc., in which a body formed of concrete or similar material is reinforced by an embedded metallic member.

It is the special object of the present invention to provide reinforcing means for the cement, by which it not only takes care of the tension stresses but also receives and localizes the compression stresses developed in the concrete body.

It is a further object to provide anchors for the strengthening member embedded in the cement, by which it does not necessitate the employment of strengthening bars of special construction, but may be attached to any standard construction.

Still further it is an object to provide means for quickly adjusting the anchors or chairs for receiving the compression stresses to any desired position upon the tension member, and for so clamping them in this position as to form a rigid connection.

With these objects in view, the invention consists in certain novel features of construction as hereinafter set forth.

In the drawings, Figure 1 is a side elevation, and Fig. 2 a cross section, of a metallic strengthening bar provided with a chair for receiving the compression stresses; Figs. 3 and 4 are similar views of modified constructions; Figs. 5 and 6 illustrate still other modifications; Figs. 7 and 8 are respectively a side elevation and plan of a further modification; Figs. 9 and 10 illustrate respectively in side elevation and cross section a strengthening member provided with a detachable and adjustable anchor.

As illustrated in Fig. 1, A is a main tension member and B an auxiliary tension member for a metallic reinforcement of a composite construction. These two members are secured to each other by a connection C, preferably formed of cast metal, in which the side bars are embedded. The member C is also shaped to provide a bearing face *a*, which is at such an angle to the axes of the members A B as to best receive the compression stresses from the cement body. Thus, when the entire member is embedded in the cement or concrete, the tension stresses developed in the main and auxiliary members will be communicated from the one to the other, and the compression stresses developed in the cement will be localized and received by the face *a* which constitutes a chair.

In Figs. 3 and 4, the auxiliary member B′ is arranged substantially at right angles to the main member A, instead of being inclined as in Figs. 1 and 2 and is not clamped to the main member. The chair D is in this construction attached to the main member only and is inclined as shown to receive the compression stresses from the cement.

In Figs. 5 and 6, the main member A′ and auxiliary member B^2 are secured to each other by angle plates E E′ attached to opposite sides thereof, the flanges of said plates constituting the chair for receiving the compression stresses.

In Figs. 7 and 8, the main member is formed of a plurality of parallelly-arranged bars A^2, which are united by cast chairs F and the ends of the bars being bent up at different points to constitute the auxiliary members B^3.

In Figs. 9 and 10, a construction of chair or anchor which is attachable to and adjustable upon the strengthening member is illustrated. As shown, G is a metallic plate which is apertured to be sleeved upon the tension member A, and H is a spring-clamp by which the said plate is turned at an angle to the bar and caused to frictionally clamp the same. This spring-clamp, as shown, consists of a wire *c*, which is bent about projecting lugs or ears *d* on the plate and embraces the bar A. The opposite ends of the wire bear against lugs *e* on the plate, so that the tension of the spring will incline the plate and clamp it to the bar. With this construction, the members G H may be quickly engaged with any bar of standard construction and adjusted longitudinally thereon to the desired position. During adjustment, the tension of the spring is relieved by bending the opposite ends thereof toward each other but, as soon as released, the plate G will be inclined, so as to frictionally clamp the bar. If desired, all possibility of slip-

ping is prevented by slightly notching the main bar A at the point of engagement of the plate G therewith.

It will be understood that by means of my improved construction, plain bars of standard construction may be as rigidly anchored in the cement, as twisted or otherwise deformed bars requiring special machinery for their manufacture. Furthermore, the use of anchors and chairs for receiving the compression stresses developed in the cement avoids depending upon the adhesion between the cement and the face of the metal, which is often an uncertain factor, especially where a structure is jarred before a complete setting of the cement.

What I claim as my invention is:—

1. In a composite cement and metal construction, a metallic strengthening member having portions extending in angular relation to each other, and a chair intermediate said angular portions for effecting an exchange of stress between the cement body and the metal, the bearing face of said chair being enlarged and extending substantially perpendicular to the lines of stress.

2. In a composite cement and metal construction, a plurality of coacting tension members in angular relation to each other and a chair intermediate said members for effecting an exchange of stress between the cement body and the metal, the bearing face of the chair being flat and extending substantially perpendicular to the lines of stress.

3. A strengthening member for composite cement and metal constructions comprising a main tension member and an auxiliary tension member connected at an angle thereto and a chair having an enlarged and flat bearing face at an oblique angle to said tension members and adapted to receive upon its face and transmit into said tension members the compression stresses developed in the cement body.

4. A strengthening member for composite cement and metal constructions comprising a plurality of tension members arranged in relative angular positions to each other, and a chair having a relatively large flattened bearing face located at the junction of said tension members, said face being at an oblique angle to said tension members and adapted to receive the compression stresses set up on said cement body and transmit the same into said tension members.

5. A strengthening member for composite cement and metal constructions comprising a plurality of tension members in angular relation to each other and an enlarged member adjustably secured to one of said tension members, having a flattened face at an oblique angle to said tension members and constituting a chair for the exchange of the stress between the cement body and said strengthening members and also an anchor for said tension member to which it is adjustably attached.

6. A strengthening member for composite cement and metal constructions comprising a plurality of tension members arranged in angular relation to each other, one of said members being a plain bar, and an anchor adjustably engaging and gripping said bar at any point in its length, said anchor having a flattened face at an oblique angle to said bar for effecting an exchange of stress between the cement body and the metal, the direction of said stresses being resultant from the relative magnitude and angular relation of said strengthening members.

7. A strengthening member for composite cement and metal constructions comprising a plurality of tension members in angular relation to each other, an anchor in the form of an apertured plate sleeved upon one of said tension members, and a spring for holding said plate at an oblique angle to the axis of said tension member whereby it will frictionally engage the same to prevent relative movement, the oblique face of said anchor constituting a chair for the exchange of stress between the cement body and the metal, the direction of said stresses being resultant from the relative magnitude and angular relation of the strengthening members.

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

OLIVER M. DAVIS.

Witnesses:

EDWARD P. AULT,

AMELIA WILLIAMS.