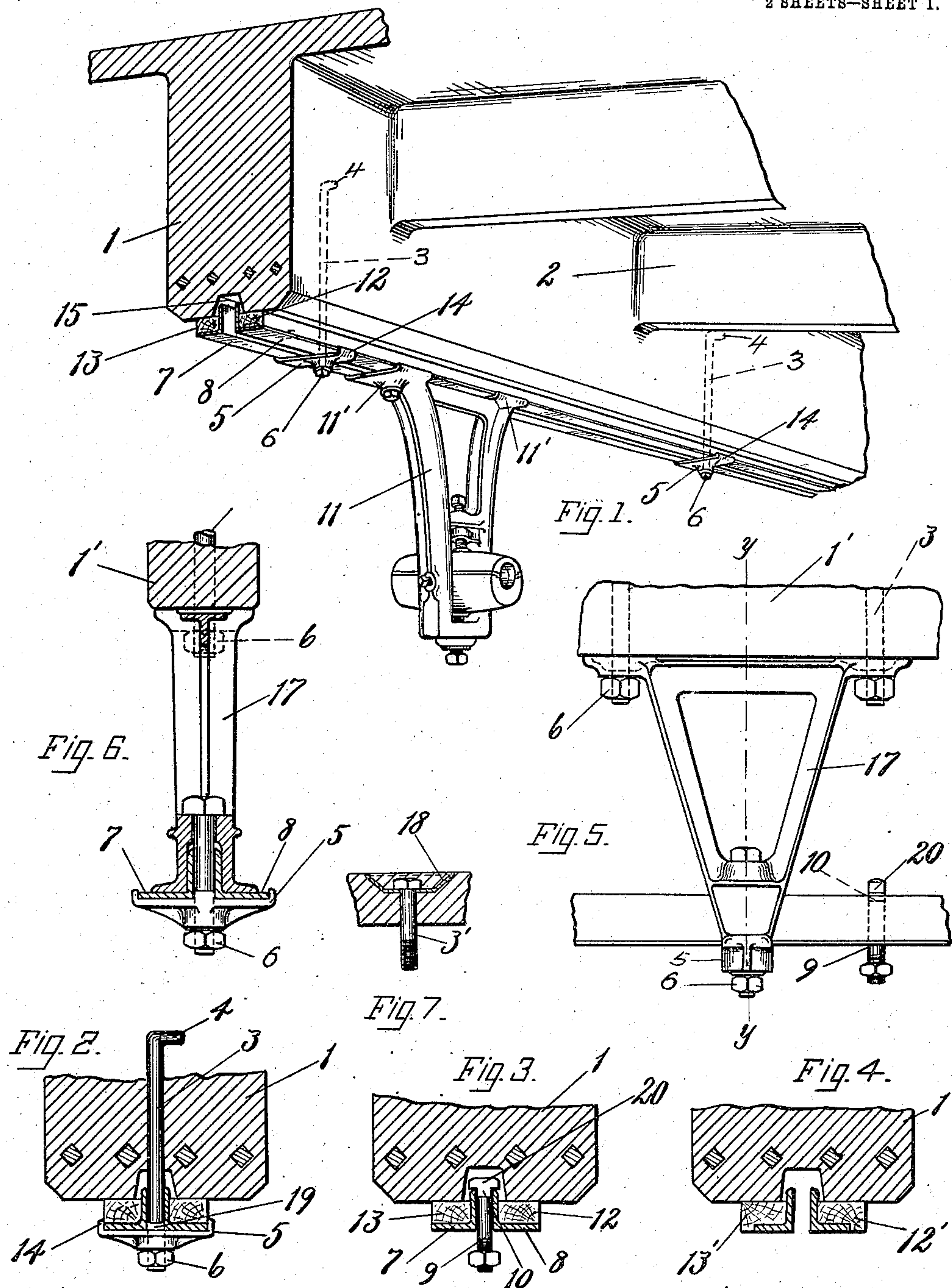


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 APPLICATION FILED MAR. 15, 1904.

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Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.



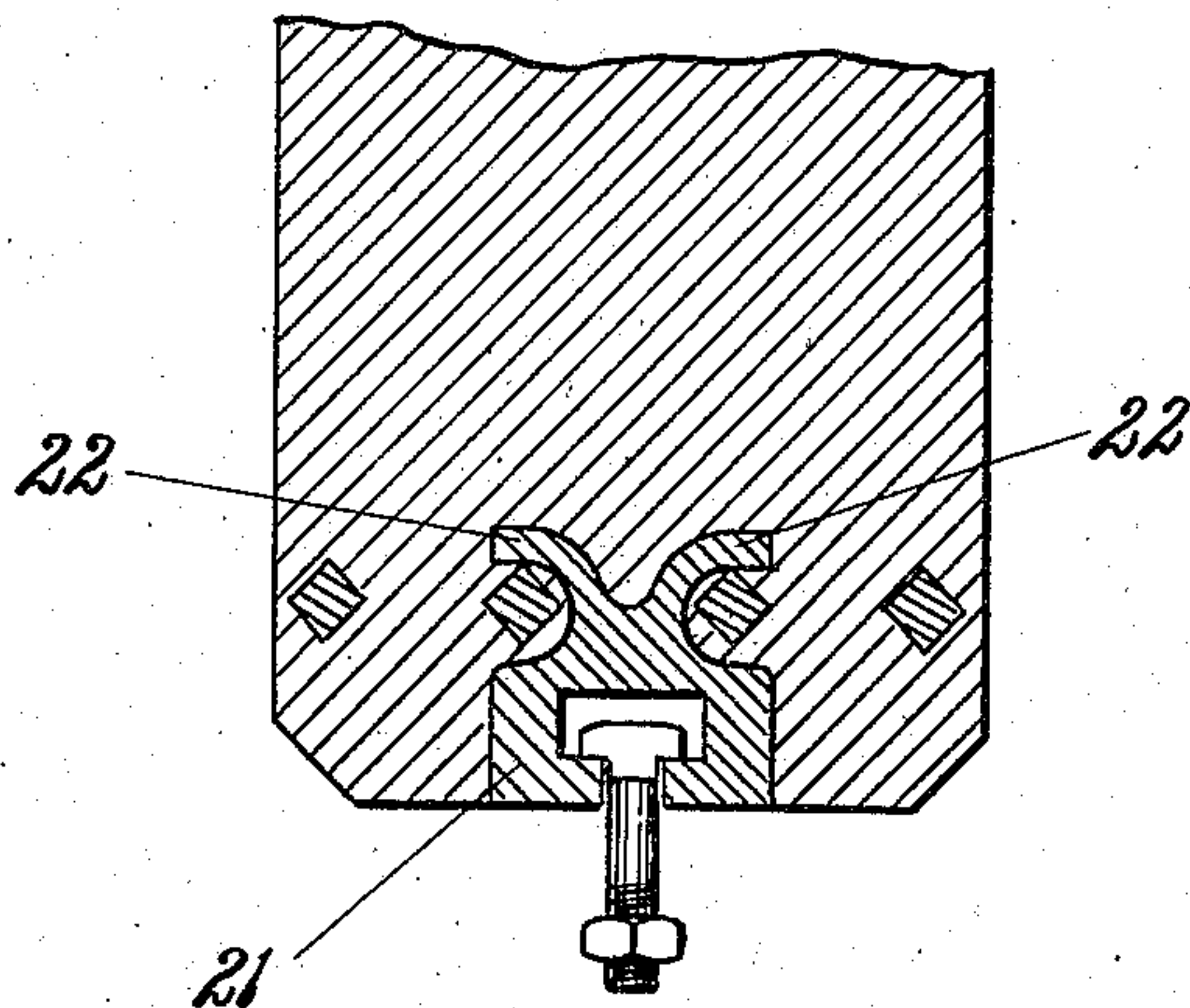
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 Bernard Barrows  
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INVENTOR.  
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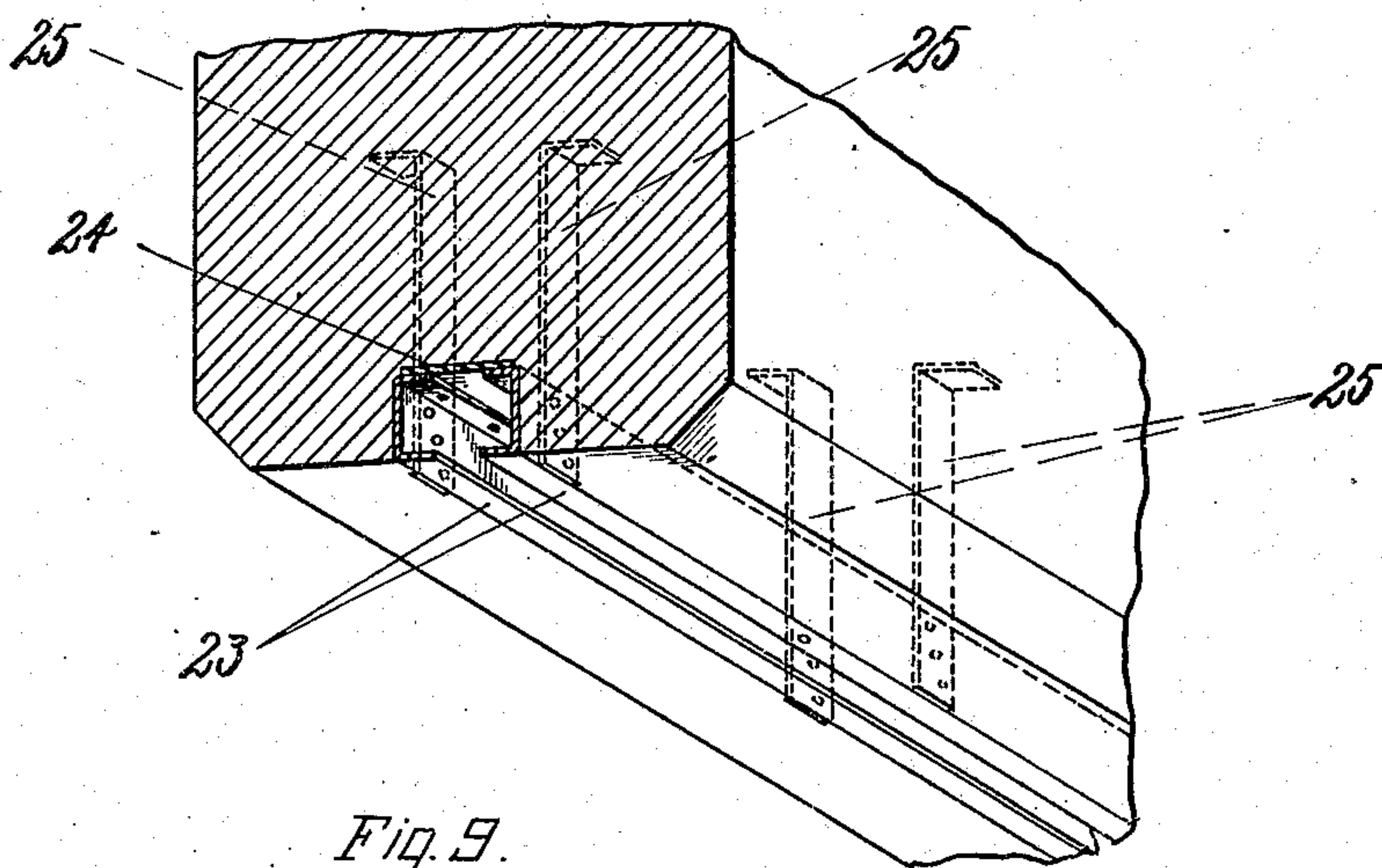
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*Fig. B.*



*Fig. 9.*

WITNESSES.

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Arthur L. Russell

INVENTOR.

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# UNITED STATES PATENT OFFICE.

LEON P. ALFORD, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FIXTURE-SUPPORT FOR CONCRETE-STEEL CONSTRUCTIONS.

936,690.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed March 15, 1904. Serial No. 198,301.

*To all whom it may concern:*

Be it known that I, LEON P. ALFORD, a citizen of the United States, residing at Beverly, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Fixture-Supports for Concrete-Steel Constructions, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to supporting means for shaft hangers, counter shaft harness work, and other fixtures, and more particularly to a support adapted to be used in concrete-steel constructions, otherwise known as armored concrete.

The advantages incident to the use of concrete as a building material as regards cost, durability and fire-proof qualities have led to the present construction from this material of the entire framework and floor system of buildings. Structures of this class are commonly termed concrete-steel, or armored concrete, on account of the use of steel members embedded in the concrete to furnish increased strength, particularly at those points where the concrete is to resist a tensile stress. Concrete-steel constructions compare favorably with steel structures as to cost, and increase in strength and durability with the lapse of time. In extending the use of this desirable form of building material to factory construction difficulties have been encountered with regard to making provision for supporting from the floors the numerous overhead fixtures forming a necessary part of a factory equipment. The location of the fixtures must be determined from considerations other than convenience in attaching a suspending means to the floor system, and the required arrangement of fixtures is invariably irregular and unsymmetrical with regard to the floor area. Moreover, the necessity of making changes from time to time in the arrangement of fixtures is certain to arise. The impracticability of embedding in the concrete an anchor bolt for each fixture, and the necessity on ac-

count of the depth of girders of using the least amount of space possible for a fixture support are considerations which heretofore have rendered the adoption of concrete-steel for factory floor systems of doubtful advisability.

The object of my invention is to provide a fixture support, particularly adapted for use in concrete-steel buildings, which will meet all the requirements due to the nature of this material, which will be of small first cost, durable, and convenient in use, and which will permit great elasticity in the arrangement of fixtures.

While I have shown the invention applied to concrete-steel constructions, many features thereof I regard as of more general application, and capable of use in connection with buildings of other material.

In the preferred embodiment of the invention, I support from a concrete floor element a fixture-supporting means which permits the location of a fixture-sustaining device at any point in the length of said element and the ready removal and change in location of the device and the fixture. The objections incident to the use of prior arrangements are completely avoided, the fixture-sustaining bolt being readily removable or freely adjustable longitudinally in the support to the desired point.

The fixture support preferably is provided with a member extending longitudinally of the girder or other floor element along which member the fixture-sustaining means is adjustable. In the preferred form this support comprises two bars or walls spaced apart, forming a slot to receive the stem of the securing devices and bearings or walls upon which the heads of the securing devices are rested. Instead of the separate bars arranged with a slot between them, a suitably-shaped support may be formed in one integral piece, and in place of a continuous slot such as I prefer to use a support provided with a longitudinal series of openings may be employed.

Other features of the invention, including details of construction and combinations of



parts will be hereinafter described and pointed out in the claims.

In the drawings, Figure 1 is a perspective view of the invention applied; Fig. 2 is a transverse vertical section taken at an anchor bolt; Fig. 3 is a similar view taken at a fixture-sustaining bolt; Fig. 4 is a similar view showing a modification in the arrangement of the fixture-supporting angle irons; Fig. 5 is a side elevation of a modified form of the invention; Fig. 6 is a vertical sectional view on the line  $y-y$  of Fig. 5; Fig. 7 is a detail view showing a modification in the arrangement of anchor bolts; and Figs. 8 and 9 are transverse sectional views showing modifications.

In the preferred embodiment of my invention illustrated in Figs. 1-3 inclusive, I have shown a portion of the floor system of a concrete-steel building, 1 representing a concrete girder provided with the usual tension bars and 2 the floor beams. Anchor bolts 3 are secured at intervals to the elements of the floor system from which any fixture is to be supported. They may be secured by being embedded in said elements, and said bolts may have the embedded portion roughened or corrugated, or, as shown, provided with a laterally extending portion 4. Any suitable supporting means other than anchor bolts may be employed, as will be obvious. The anchor bolts 3 may be provided at their lower ends with any suitable means for supporting the fixture-sustaining means to be hereinafter described. As shown in Figs. 1 and 2 a clamp 5 is supported on the anchor bolts in vertically adjustable position by a nut 6, and between the clamps 5 and the girder 1 is located longitudinally extended member to be engaged by the devices which sustain the fixture, said longitudinally extended member having provision for permitting the location of the sustaining devices at any desired point along the girder. This longitudinally extended member or support preferably is provided for this purpose with a slot or a longitudinal series of openings adapted to receive headed bolts or other fastening devices. A convenient form of support, and the one which I prefer to use, is shown in Figs. 1 to 6 inclusive, and comprises two members 7, 8 spaced apart to form the slot, and supported on the clamps 5 at either side of the anchor bolts 3, the anchor bolts and clamps securing the members 7 and 8 firmly to the girder. The members 7 and 8 may be spaced apart in any suitable way, the clamps 5 having this function in the structure shown, the projection 19 on said clamps extending upwardly between the members 7, 8. These members 7 and 8 are shown as L-shaped rails or angle irons, with their vertical faces adjacent to each other and their

horizontal portions extending in opposite directions. The fixture-sustaining bolts 9 may be inserted at the point in the slot where the fixture is to be secured or may be inserted at any point and longitudinally adjusted to the desired place. Any suitable provision may be made to permit insertion of these bolts and to prevent downward displacement thereof. As shown, the heads 20 of the bolts have one dimension sufficiently small to permit insertion of the bolt in the slot from below, and said bolts are provided with a squared portion 10 fitting in the slot to prevent accidental rotation of the bolt.

The shaft hanger 11 is shown as illustrative of the fixture to be supported. The feet 11 of this hanger may be of substantially the same form as the clamp 5. If it is desired to locate a hanger in such position that one of its feet interferes with the clamp the clamp may be removed and the foot take the place of the clamp.

I preferably insert between members 7, 8 and the girder 1 filling pieces 12, 13. These may be of wood and are shown as clamped between the horizontal portions of the members and the lower surface of the girder on opposite edges of the groove 15 to be hereinafter described. These filling pieces have among their advantages that of compensating for irregularities in the opposing surfaces. The filling pieces 12, 13 and also the angle irons 7, 8 may be held from lateral movement, if desired, by upwardly extending lips 14 on the clamps 5.

In Figs. 1 to 4 I have shown the girder 1 as provided with a longitudinally arranged groove 15 in its lower face into which groove the angle irons 7, 8, project. The groove 15 permits the bolt support to be located partially within the girder and therefore at a higher elevation than if it were secured to the lower face of the girder. The employment of this feature is particularly desirable when the element of the floor system is of considerable depth, as it renders the construction more compact. The groove 15 is preferably located centrally of the girder, and the anchor bolts 3 are arranged centrally of the groove.

In Fig. 4 I have shown a modification in the arrangement of angle irons and filling pieces. As shown in this figure, the horizontal portions of said angle irons are shorter than in the other figures of the drawing, the bearing surface for the hanger foot being in part formed by the filling pieces 12', 13'.

In Figs. 5 and 6 I have illustrated a modified form of means for supporting the fixture-sustaining means. This form may be employed where the element of the floor system from which the fixture is to be support-



ed is of less depth than other fixture-supporting elements. In these figures 1' represents such an element, as, for instance, a beam located between girders. To compensate for the difference in depth of the girder and beam I may employ an additional supporting element between the element of the floor system and the fixture-sustaining means. I have shown a casting 17, supported from the anchor bolts 3 and carrying the angle irons 7, 8 held between its lower surface and the clamp 5. The casting 17 may be of suitable vertical dimension to bring the members 7 and 8 carried thereby on the same level as those members supported from the girder 1.

In Fig. 7 I have shown a modified means for securing the anchor bolt in place, and particularly adapted for use where it is desired to locate a bolt in a panel of small vertical dimension. In this modification the cup-shaped member 18 serves as a supporting means for the anchor bolts 3'.

In Figs. 8 and 9 I have illustrated further modifications of my invention. In Fig. 8 I have shown a member 21 made in one piece, and provided with a slot in its lower portion to receive the fixture-sustaining bolts. The upper part of the slot is wider than its throat, thus forming walls for resting the heads of the bolts, as shown. The shape of the enlarged portion of the slot is immaterial so long as it affords a bearing for the fixture-sustaining bolts. The member 21 is embedded in the floor element, and is provided with arms 22 which may rest on the steel tension bars of said element. The lower face of member 21 is preferably flush with the lower surface of the girder or other element, so that the supporting means is wholly within the girder. In Fig. 9 I have shown a longitudinally extended supporting member comprising channel irons 23 embedded in the floor element and oppositely arranged to form a slot. The lower faces of the channel irons are also flush with the lower surface of the girder. A covering plate 24 may be riveted to the upper face of these channel irons to prevent entrance of the concrete into the slot in the process of casting the concrete element. Supporting straps or arms 25 are extended from said channel irons into the body of the concrete to secure the supporting member in place.

While in the specification and claims I have referred to the type of building in which my invention is employed as a concrete-steel structure, it is to be understood that the invention is not limited to any specific type of building construction, but is applicable as well to buildings containing concrete alone as to buildings in which steel or iron is combined with the concrete, and

therefore the term "concrete-steel" is to be construed as meaning any building construction of this class.

Having fully described my invention, what I claim and desire to secure by Letters Patent of the United States is:—

1. The combination with a concrete floor element, of a support extending longitudinally of the lower face of said element and adapted to bear on said face, a filling piece inserted between said face and the support, and means to clamp said support against said element.

2. The combination with a concrete floor element having a groove extending longitudinally of its lower face, of a support clamped against said face and extending upwardly into said groove, said support being adapted to carry fixture-sustaining devices.

3. The combination with a concrete floor element having a groove extending longitudinally of its lower face, of a support clamped against said element and extending upwardly into said groove, and a fixture-sustaining device adapted to extend into said groove and be carried by said support.

4. The combination with a concrete floor element having a groove extending longitudinally of its lower face, of a support extending longitudinally of said element comprising L-shaped members arranged with their vertical portions adjacent, extending into said groove and spaced apart to form a slot, and with their horizontal portions covering the parts of said face adjacent to said groove.

5. The combination with a concrete floor element having a groove extending longitudinally of its lower face, of a support extending longitudinally of said element comprising L-shaped members arranged with their vertical portions adjacent, extending into said groove and spaced apart to form a slot, and with their horizontal portions covering the parts of said face adjacent to said groove, and filling pieces inserted between said face and said horizontal portions and arranged on opposite edges of said groove.

6. The combination with a concrete floor element, of a support comprising L-shaped members arranged with their vertical portions adjacent and spaced apart to form a longitudinally extending slot, and filling pieces inserted between the horizontal portions of said members and said element.

7. The combination with a concrete floor element, of supporting means extending longitudinally of the floor element and secured thereto, and relatively yielding filling pieces intermediate the floor element and the support, said supporting means being arranged



to permit a fixture to be connected thereto at any desired point in the length of the floor element.

8. The combination with a body of concrete, having two members secured to said body provided with vertical surfaces and spaced apart to form a slot between said surfaces, a bolt having its head supported on said members and its shank projecting through said slot and outside said body, said bolt having an angular portion between

its head and shank formed to engage the vertical surfaces of said members and thereby prevent accidental turning of the bolt.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEON P. ALFORD.

Witnesses:

ARTHUR L. RUSSELL,  
BERNARD BARROWS.