

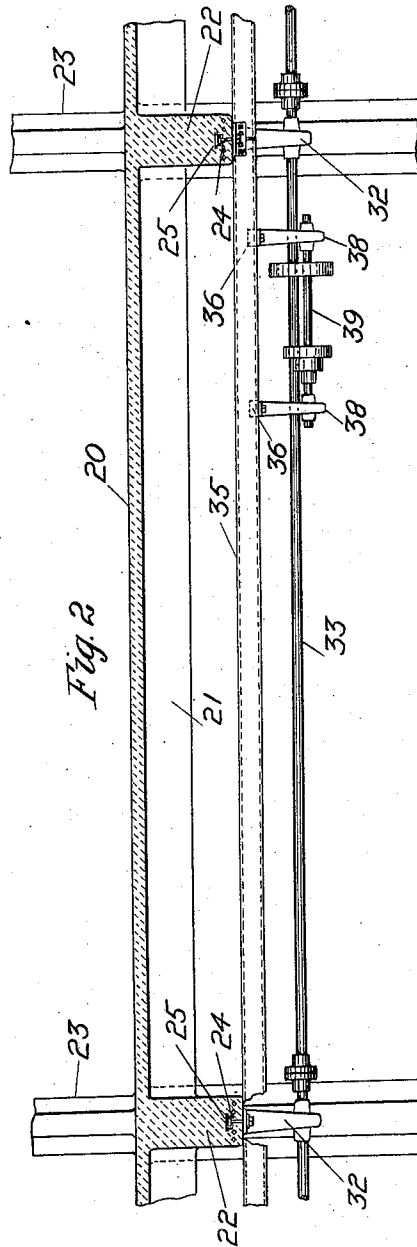
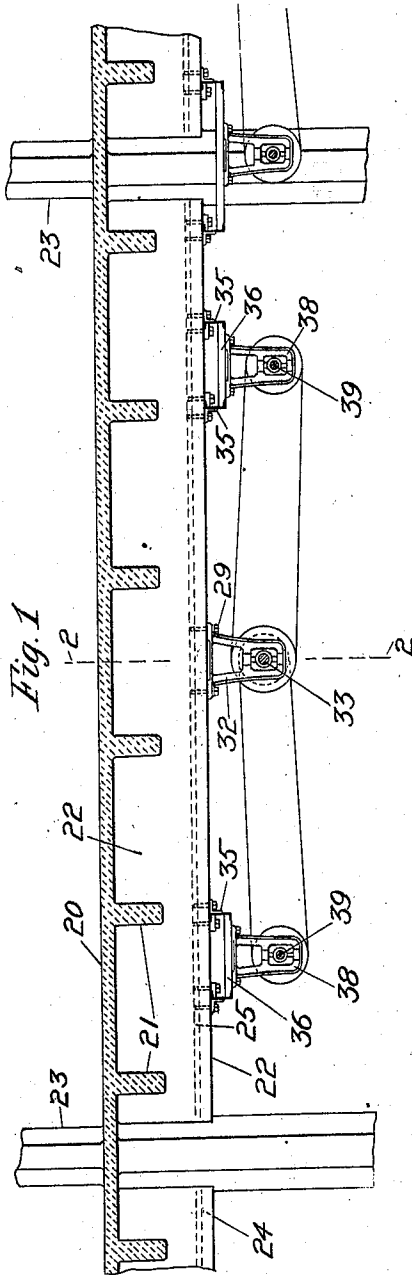
No. 861,860.

PATENTED JULY 30, 1907.

H. P. JONES.
GIRDER.

APPLICATION FILED JULY 31, 1903.

5 SHEETS—SHEET 1.



WITNESSES:

Albert G. Slaney
Franklin E. Low.

INVENTOR.

Henry P. Jones.
BY Charles S. Gooding.
ATTORNEY.

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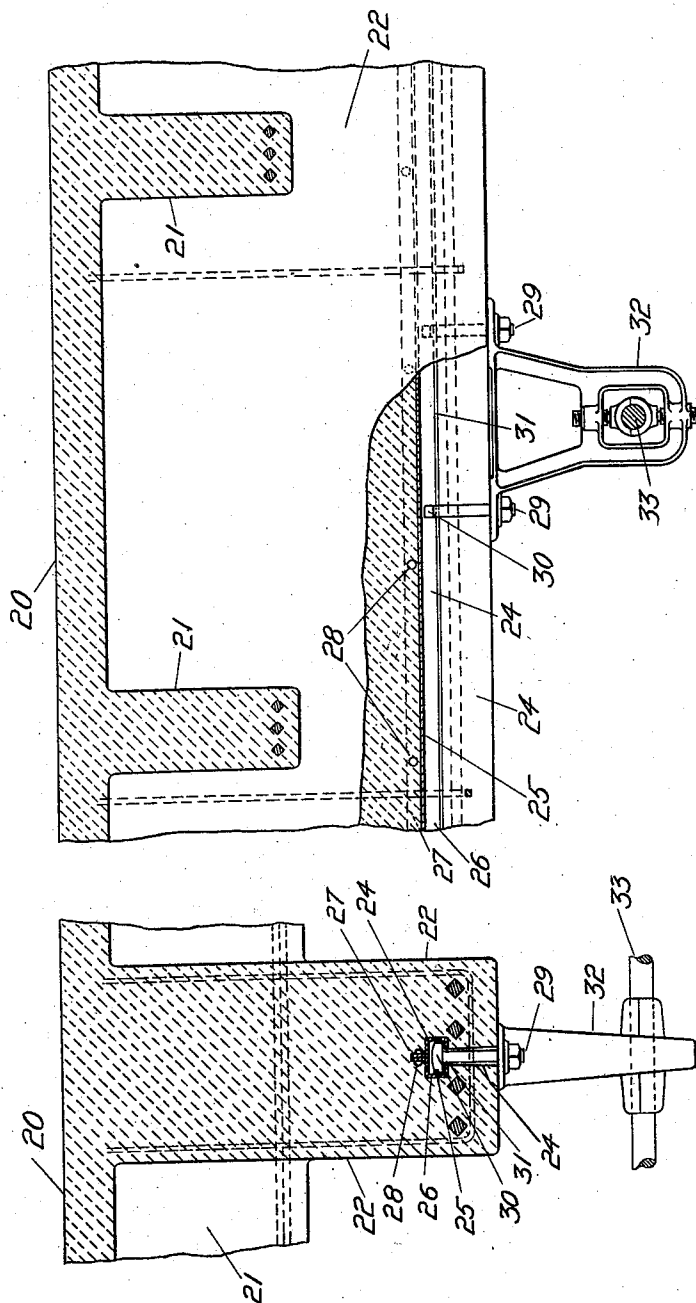


Fig. 4

Fig. 3

WITNESSES:
Albert G. Slaney
Franklin C. Low

INVENTOR.
Henry P. Jones.
BY Paul S. Hooding.
ATTORNEY.

No. 861,860.

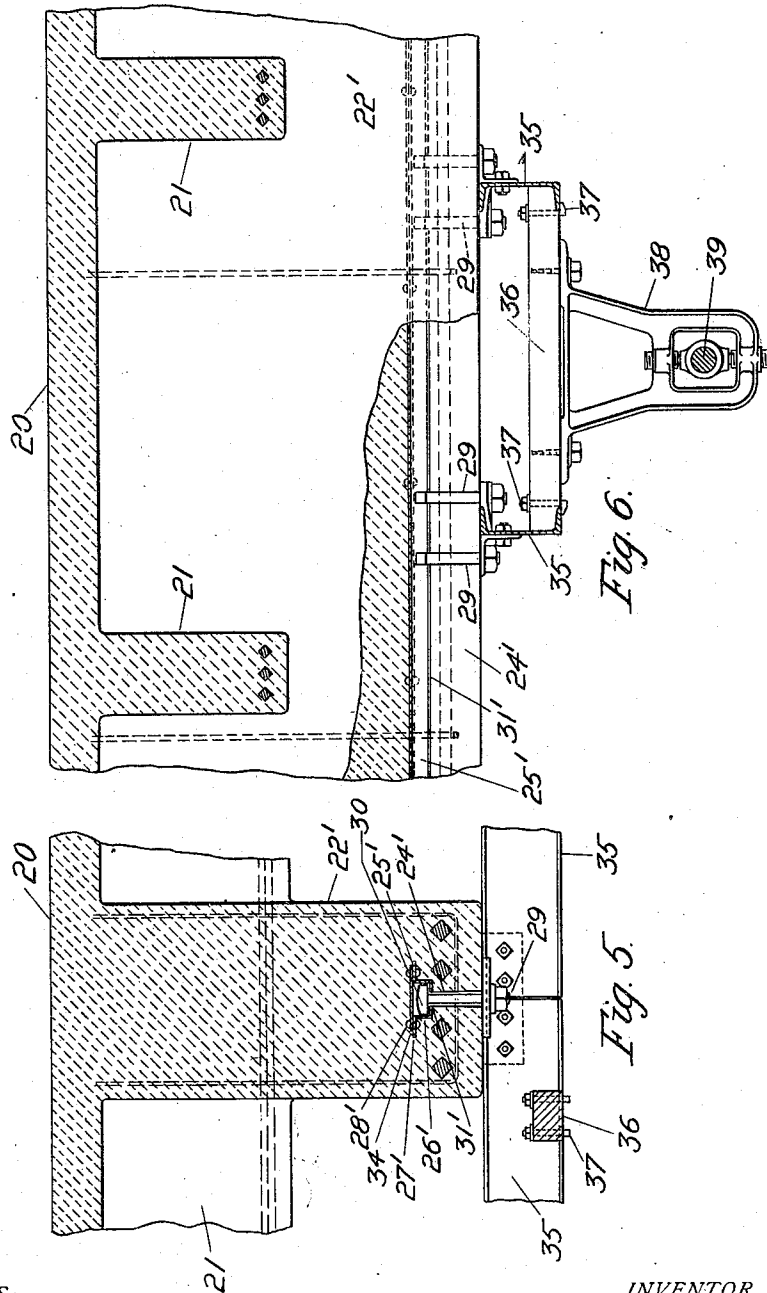
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6 SHEETS—SHEET 3.



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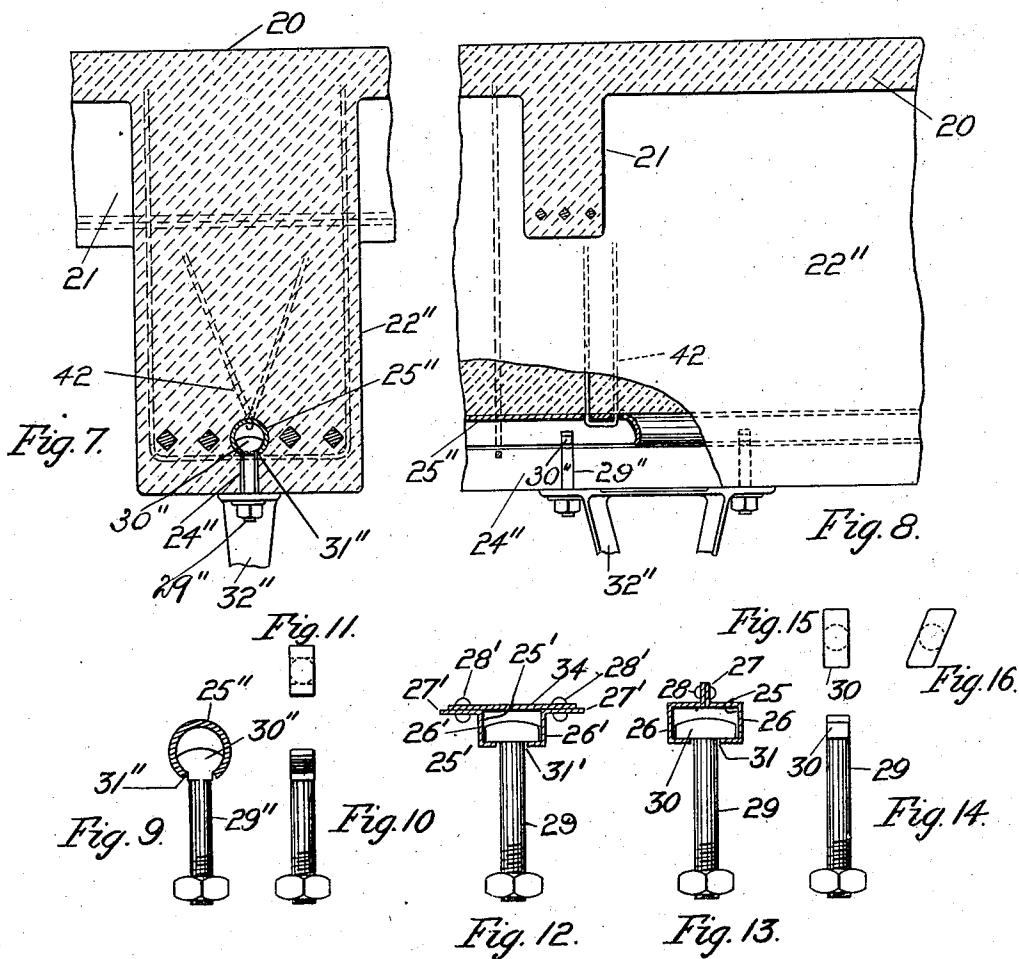
INVENTOR.

Henry P. Jones.
BY Charles S. Gooding.
ATTORNEY.

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WITNESSES:
Albert G. Slaney.
Franklin C. Low.

INVENTOR.
Henry P. Jones.
BY Charles V. Gooding
ATTORNEY.

No. 861,860.

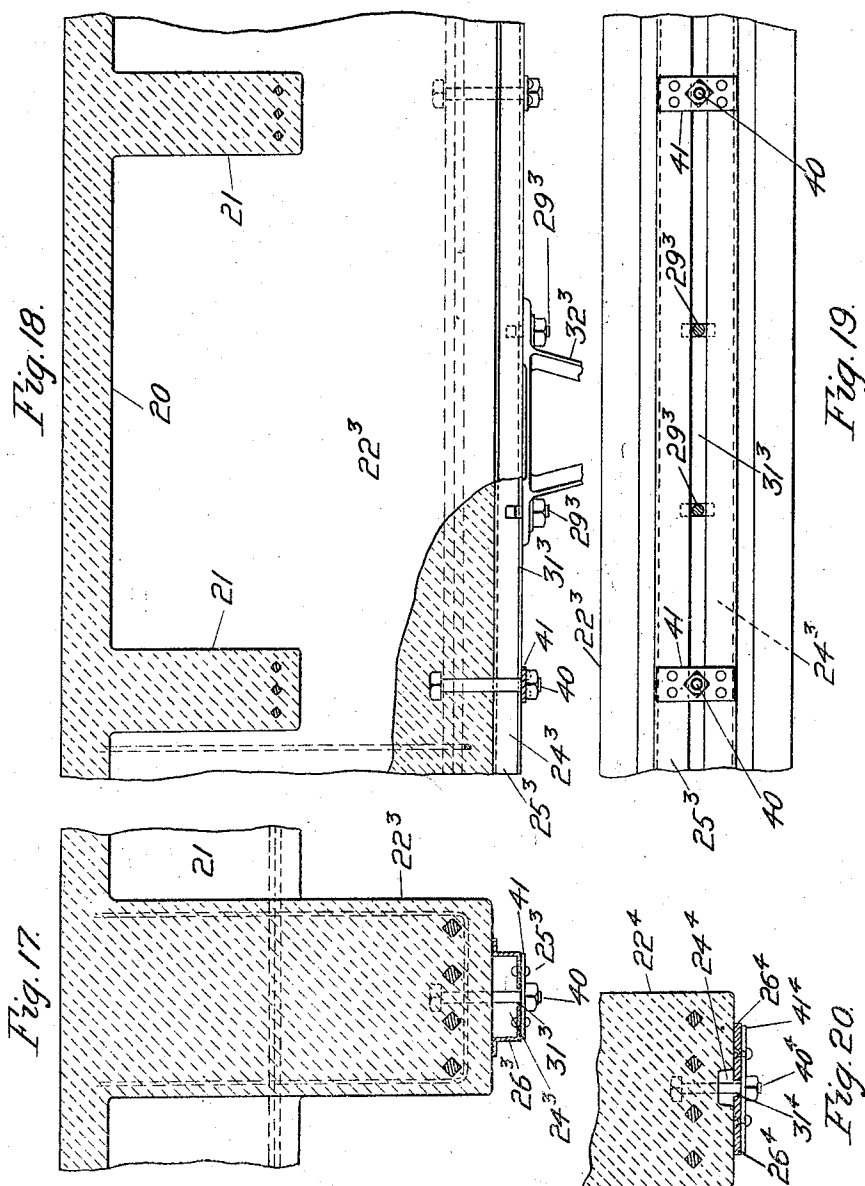
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GIRDER.

APPLICATION FILED JULY 31, 1903.

5 SHEETS—SHEET 5.



WITNESSES:
Albert G. Slaney
Franklin C. Low.

INVENTOR.
Henry P. Jones
BY Charles S. Gooding
ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY P. JONES, OF BRAINTREE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GIRDER.

No. 861,860.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed July 31, 1903. Serial No. 167,706.

To all whom it may concern:

Be it known that I, HENRY P. JONES, a citizen of the United States, residing at Braintree, in the county of Norfolk and State of Massachusetts, have invented 5 new and useful Improvements in Girders, of which the following is a specification.

This invention relates to an improvement in concrete girders used in the construction of fire proof buildings, the object of the invention being to so construct the girder that hangers for shafting and other fixtures may be easily and quickly attached to the 10 girder at any point throughout the length of said girder that may be desired.

In buildings of fire proof construction, various 15 systems of reinforced concrete, concrete steel, armored steel, etc. are used, and the problem of attaching various necessary fixtures, such as hangers for shafting and the like has become more complex and has even resulted in a wood floor being inserted with- 20 in an otherwise fire proof building in order to provide a practical means for the attachment of the fixtures aforesaid. In other cases, the location of shaft hangers and fixtures have been predetermined and bolts or nuts for bolts have been permanently embedded 25 in the structure during construction to serve as a means of attaching hangers or other fixtures thereto. To locate all of the necessary bolts in a large factory before building the same, for the attachment of hangers and other fixtures is a very difficult piece of 30 work, and where bolts are placed in a certain predetermined position, it is impossible to change the location of the hangers, if for any reason this is found to be necessary or desirable.

The object of the invention is further to provide 35 means whereby the bolts which attach the hangers to the girders may be moved longitudinally of said girders to any desired point, so that hangers may be attached at any point throughout the length of a girder after the building has been finished, or, if desired, 40 the location of hangers may be changed after having once been put in position without difficulty.

To this end the invention consists in so constructing the girder that a casing or slot is provided to receive the heads of bolts, said slot extending longitudinally 45 of the girder throughout its entire length, or throughout such portion of the length thereof as may be desired.

The invention again consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims 50 thereof.

Referring to the drawings:—Figure 1 is a transverse section taken through the floor of a building of fire proof construction, illustrating a main shaft and counter shafts attached to a girder in accordance with my 55 invention. Fig. 2 is a section of a portion of the flooring and girders taken on line 2—2 of Fig. 1, the hang-

ers and shafting being left in elevation. Fig. 3 is an enlarged detail transverse section of a concrete girder and a portion of flooring constructed in accordance with my invention and having a hanger with a portion of 60 the main shafting attached thereto and shown in elevation. Fig. 4 is a transverse section of a portion of the flooring illustrating a girder constructed in accordance with my invention, partly in elevation and partly in section as viewed from the right of Fig. 3, a hanger 65 for the main shaft being shown in elevation attached thereto, the main shaft being shown in section. Fig. 5 is a sectional elevation, similar to Fig. 3, illustrating a portion of two sections of channel iron attached to the main girder with a wooden cross-beam in section at- 70 tached to one of said channel irons. Fig. 6 is a view similar to Fig. 4 illustrating a section taken through the flooring, with a girder partly in section and partly in elevation, and with channel irons attached to said girder by my improved attaching means, together with 75 a cross-beam extending from one of said channel irons to the other and a hanger for a counter-shaft fast to said cross-beam. Fig. 7 is a sectional elevation similar to Fig. 3 illustrating a modified form of means for attaching a hanger to the girder. Fig. 8 is a sectional elevation, similar to Fig. 4, illustrating in side elevation and partly in section the means of attachment shown in Fig. 7. Fig. 9 is an enlarged front elevation of an at- 80 taching bolt similar to that shown in Fig. 7, together with a section of a slotted pipe shown in connection therewith. Fig. 10 is a side elevation of the bolt shown in Fig. 9 and Fig. 11 a plan view of the same. Figs. 12 and 13 illustrate modified forms of bolt-receiving casings with the bolts in elevation connected therewith. Fig. 14 is a side elevation of the T-bolt illustrated in 90 Figs. 12 and 13. Fig. 15 is a plan view of the bolt illustrated in Fig. 14, and Fig. 16 is a plan view of a modified form of bolt similar to that shown in Fig. 14. Fig. 17 is a sectional elevation similar to Fig. 3 and Fig. 18 a sectional elevation similar to Fig. 4, illustrating another modification of my invention. Fig. 19 is an under- 95 neath plan of the form illustrated in Fig. 18, with the hanger bolts shown in section. Fig. 20 is a section of a portion of a girder and bolt retaining plates illustrating a modified form of my invention, the section being 100 taken transversely of the girder.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, Figs. 1, 2, 3 and 4, 20 is a flooring of fire proof construction of any desirable style, preferably of concrete. 21 are the stringers of said floor, 22 the main girders and 23 the columns. The girders 22 are each provided with a slot 24 extending longitudinally of said girder and having inclosed therein a metal bolt-retaining casing 25. Said bolt-retaining casing 110 illustrated in enlarged detail in Fig. 13 and consists of two rectangular plates of metal 26, 26, provided

with flanges 27 and joined together by rivets 28. The hanger bolt 29 is provided with a T-head 30, which is inserted into the interior of the bolt-retaining casing 25 by passing the same through the auxiliary slot 31 located between the adjacent lower edges of the plates 26, and then turning the head of the bolt until it stands in the position shown in Figs. 3 and 13. It will be seen that by making the head 30 of sufficient length, the bolt cannot be turned entirely around, but will abut against the side walls of the plates 26, 26, so that the nuts upon the bolts 29 may be turned without rotating the bolt itself.

In Fig. 16 a modified form of T-head bolt is illustrated, particularly adapted to prevent the rotation of said bolt during the setting of the nut thereon. It will be seen that the plates 26, 26, which form together the bolt-retaining casing 25, extend longitudinally of the girder 22 and that the slot 24 of said girder extends downwardly from the bolt-retaining casing to the under side or face of the girder 22, so that the slot 24, as a whole, is a T-slot in the particular form illustrated in Figs. 1 to 4 inclusive.

The bolts 29 fasten the hangers 32 to the girder 22, as shown in Figs. 3 and 4, said hangers forming a well-known means for supporting the main shaft 33.

In Figs. 5 and 6 I have illustrated a slightly modified form of bolt-retaining casing and in Fig. 12 I have illustrated an enlarged section of this particular form of bolt-retaining casing, with one of the hanger bolts attached thereto, said bolt-retaining casing 25' consisting of two plates 26', 26' having their adjacent edges parallel and separated one from the other to form an auxiliary slot 31'. The plates 26', 26' have horizontal flanges 27', 27', said flanges being connected by a plate 34, which is fastened thereto, by means of rivets 28'. The bolt-retaining casing 25' is contained in a slot 24' formed in the girder 22'. To the bottom of this girder are fastened channel irons 35 by means of the T-bolts 29, the heads of said bolts being retained within the casing 25', as illustrated in Figs. 5 and 6. Cross-beams 36 extend from one of the channel irons 35 to the other and are secured thereto by clamp-bolts 37, and to these cross-beams are fastened the hangers 38 for the counter-shafts 39.

In Figs. 7, 8 and 9 I have illustrated a modified form of bolt-retaining casing consisting of a tube or pipe 25'' embedded in a girder 22'' and provided with an auxiliary slot 31'' extending longitudinally thereof. The pipe 25'' is embedded in the girder 22'' in a slot 24'' which extends longitudinally of the girder 22'' and extends from the auxiliary slot 31'' downwardly to the lower face of the girder 22''. The hanger bolts 29'' are provided with heads 30'' having a curvilinear form upon the under side thereof adapted to fit the interior of the pipe 25''. The hanger 32'' is attached by the bolts 29'' to the girder 22'', as shown in Figs. 7 and 8.

In Figs. 17, 18 and 19, the bolt retaining casing 25³ consists of two angle plates 26³ having an auxiliary slot 31³ between their adjacent edges, said angle plates being held against the under face of the girder 22³ by means of bolts 40 and cross plates 41, said bolts 40 being anchored permanently in the girder 22³. The hanger 22³ is held against the plates 26³ by T-headed hanger bolts 29³, as illustrated in Fig. 18. The heads of said bolts project upwardly into a slot 24³.

In Fig. 20 another form of my invention is illustrated in which a slot 24⁴ is formed in the lower face of the girder 22⁴, said slot being partly inclosed by two flat plates 26⁴, 26⁴. The plates 26⁴ are fastened to the under side of the girder 22⁴ by means of bolts 40⁴ and plates 41⁴. The adjacent edges of the plates 26⁴, 26⁴ are separated one from the other, forming an auxiliary slot 31⁴ through which the hanger bolts project, the heads of said bolts entering the slot 24⁴ and the under side of said heads resting upon the upper faces of the plates 26⁴, 26⁴.

In each of the different forms illustrated a bolt-retaining casing is provided, said casing partly surrounding a slot constructed to receive the heads of the hanger bolts, both casing and slot extending longitudinally of the girder. The bolt-retaining casing is preferably anchored in the girder in each case by any desirable and practical means, and in Figs. 7 and 8 I have illustrated such anchoring means, the same consisting of a U-shaped rod 42 embedded in the concrete composing the girder 22'', with the bend of the rod inside the bolt-retaining casing 25''.

I do not wish to be understood as limiting my invention to any particular form of bolt-retaining casing or to any particular means for attaching the same to a concrete girder. Neither do I wish to be understood as limiting myself to any particular form of slot extending longitudinally of said girder and partly surrounded by said casing, my invention consisting, broadly, in so constructing a concrete girder, or girder of any fire proof construction, that a slot will be provided in said girder adapted to receive and retain the heads of bolts projecting from said girder through said slot and beyond one face of said girder, forming a practical, convenient, and strong means for readily attaching to the girder hangers or fixtures of different kinds and styles, said means being adjustable to varying positions and requirements.

In carrying my device into practical operation, the girders are provided with a metallic casing of any desirable form, as in some of the forms hereinbefore described and illustrated, and after the building is constructed the head of the hanger bolt is passed upwardly through the auxiliary slot 31 and through the slot 24 and into the portion of the slot surrounded by the bolt retaining casing 25. The bolt head is then turned at an angle of ninety degrees so that it will extend across the casing 25 and the hanger is then attached to the girder by means of the bolts 29 and the nuts thereon. It will be readily seen that the bolts 29 may be moved longitudinally of the girders to any desired location, thus affording a ready means of attaching the hangers to the girders at any desired point.

While I have referred, for convenience, to a girder in both the specification and claims, I do not wish to be understood as limiting myself to the particular portion of a building known technically as a girder, as it is evident that without departing from the spirit of my invention the device hereinbefore described and illustrated in the drawings may be applied to columns, walls, floors, and floor beams of a fire proof building for the attachment thereto of hangers and fixtures of various kinds. I have throughout the specification and claims referred to a girder as a "concrete girder," this being a term known to the trade as re-

ferring to a girder formed as a whole or in part of cement or like material, which, at one time in the process of construction, is soft and finally becomes hardened by setting.

5 Having thus described my invention what I claim and desire by Letters Patent to secure is:

- 10 1. A concrete girder provided with a groove in one face, extending longitudinally thereof, and two parallel plates extending longitudinally of said girder and fast thereto, with a space between their adjacent edges, said space forming, in combination with said groove, a T-shaped slot.
- 15 2. A concrete girder provided with a groove in one face, extending longitudinally thereof, and two parallel plates extending longitudinally of said girder and fast thereto, with a space between their adjacent edges, said space forming, in combination with said groove, a T-shaped slot, and a bolt, the head of said bolt located in said groove and the shank projecting through said space and outside said girder.
- 20 3. A concrete girder provided with a groove in one face, extending longitudinally thereof, two parallel plates extending longitudinally of said girder and fast thereto, with a space between their adjacent edges, said space forming, in combination with said groove, a T-shaped slot, and a bolt the head of said bolt located in said groove and the shank projecting through said space and outside said girder, said head being of greater length than the distance across said groove.
- 25 4. A concrete girder provided with a groove in one face, extending longitudinally thereof, two parallel plates extending longitudinally of said girder and fast thereto, with a space between their adjacent edges, said space forming, in combination with said groove, a T-shaped slot, a hanger, bolts fastening said hanger to said girder, the heads of said bolts located in said groove and the shanks projecting therefrom through said space.
- 30 5. A concrete girder provided with a groove in one face, extending longitudinally thereof, and bolts with their

headed ends permanently anchored in said girder and projecting outwardly through said groove beyond one face of said girder and adapted to serve as means for attaching metal plates to said girder.

6. A concrete girder, bolts with their headed ends permanently anchored in said girder and with their screw-threaded shanks projecting outwardly beyond one face of said girder, nuts on said screw-threaded shanks, two parallel plates extending longitudinally of said girder, with a space between their adjacent edges, and cross plates extending across said space and clamped to said parallel plates by said bolts and nuts.

7. A concrete girder provided with a groove in one face, extending longitudinally thereof, bolts with their headed ends anchored permanently in said girder and with their screw-threaded shanks projecting outwardly beyond one face of said girder, nuts on said screw-threaded shanks, two parallel plates extending longitudinally of said girder, with a space between their adjacent edges, and cross plates extending across said space and clamped to said parallel plates by said bolts and nuts, said space forming, in combination with said groove a T-shaped slot adapted to receive the head of a bolt for the purpose specified.

8. The combination with a concrete floor element having a groove extending longitudinally of its lower face, of a slotted support clamped against said face, in position to bring the slot in alinement with said groove.

9. The combination with anchor bolts, of clamps carried thereby and fixture-supporting members supported on the clamps on either side of the anchor bolts and spaced apart to form a longitudinally extending slot adapted to receive fastening devices for connecting the fixture to the supporting means.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY P. JONES.

Witnesses:

CHARLES S. GOODING,
ANNIE J. DAILEY.