

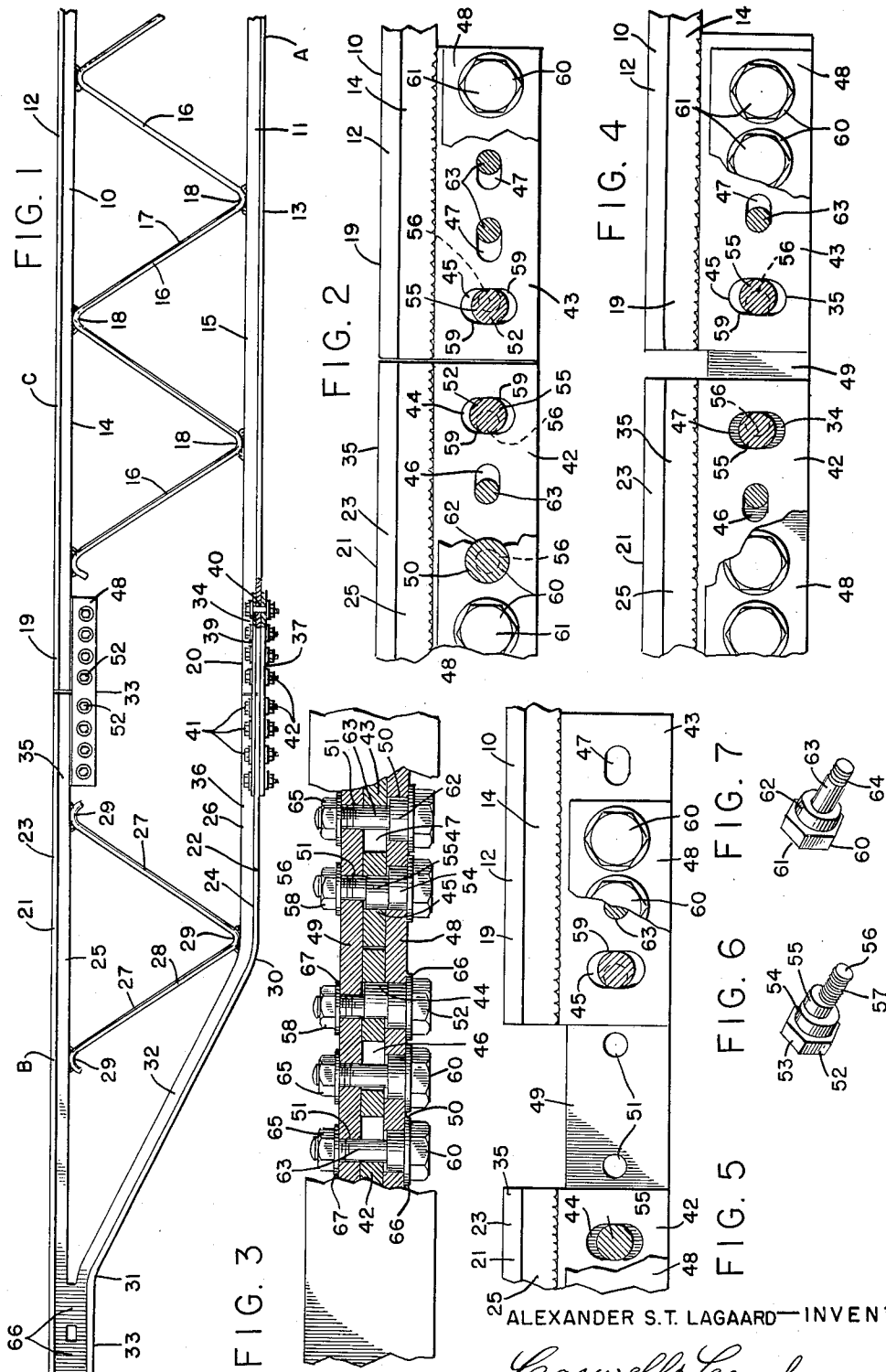
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ADJUSTABLE JOIST

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ADJUSTABLE JOIST

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The herein disclosed invention relates to adjustable joists and particularly to the type having adjacent joist sections each constructed with an upper and a lower chord and with diagonal truss members therebetween and has for an object to provide adjusting means between the chords whereby the length of the joist may be varied.

Another object of the invention resides in providing adjusting means between the upper chords of the joist sections whereby the camber of the joist may be varied.

Another object of the invention resides in constructing the adjoining ends of the upper chord of the two adjacent chord section with cooperating parts utilizing eccentrics movable to vary the spacing of the chords.

A still further object of the invention resides in constructing the upper chords of the adjacent sections with depending flanges having slots therein, in disposing along said flanges plates having holes adapted to register with said slots and in further providing bolts extending through said holes for clamping the parts together.

An object of the invention resides in constructing some of said bolts with eccentrics engageable with said slots, said bolts upon rotation serving to vary the spacing between the upper chords and thus varying the camber of the joist.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings has been illustrated a portion of a joist including one end section and a part of one intermediate section. These sections are constructed in the form of trusses and have upper and lower chords with diagonal chord members therebetween. The lower chords of adjacent sections are connected together by means of plates bolted to the flanges thereof. These plates and the flanges of the lower chords have a number of holes in them whereby the sections may be bolted together to vary the length of the truss by increments depending upon the spacing of the holes. The upper chords of adjacent sections have flanges depending from the webs of said chords and lying in continuation of one another. In these flanges are formed adjacent the adjoining ends of said flanges vertical slots. Outwardly from the vertical slots are formed in said flanges horizontal slots. Overlying these flanges are two plates which are constructed with holes registering with the slots of said flanges. A number of bolts extend through these holes and clamp the parts together. The two bolts extending through the vertical slots are constructed with eccentrics adapted to vary the spacing of the ends of the upper chord and thus vary the camber of the joist.

In the drawings:

Fig. 1 is an elevational view of a portion of a joist illustrating an embodiment of the invention.

Fig. 2 is a view of a portion of the structure shown in Fig. 1 with parts broken away and drawn to a greater scale.

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Fig. 3 is a plan view of the portion of the upper chord of the truss shown in Fig. 2 with portions thereof broken away to show the construction of the attaching means therefor.

Fig. 4 is a view similar to Fig. 2 showing the parts in adjusted position.

Fig. 5 is a view similar to Fig. 4 with the parts disposed to provide a truss of greater length.

Fig. 6 is a perspective view of one of the bolts having the eccentric formed thereon and used with the invention.

Fig. 7 is a perspective view of one of the other bolts of the invention.

The joist illustrated in the drawings has been designated in its entirety by the reference numeral A and consists of two joist sections B and C. The section C is an intermediate section while the section B is an end section. It will readily be comprehended that another end section, similar to section B will be employed, that the section C will be the same at both ends and that other sections similar to section C may be utilized if found desirable.

The joist section C comprises an upper chord 10 and a lower chord 11 arranged in parallel relation. These chords are constructed from structural members T-shaped in cross section and which have flanges 12 and 13 and webs 14 and 15 facing one another and with the flanges 12 and 13 outermost. Between the webs 14 and 15 are arranged diagonal truss members 16 which are constructed from a single rod 17 provided with bends 18 and which form the truss members 16. The bends of said rods are welded to the webs 14 and 15 or may be secured therein in any suitable manner. The diagonal truss members 16 terminate short of the ends 19 and 20 respectively of the chords 10 and 11 as best shown in Fig. 1 for a purpose which will presently become apparent.

The end joist section B is constructed similar to the joist section C and consists of an upper chord 21 and a lower chord 22. These chords are also constructed of structural members T-shaped in cross section and have flanges 23 and 24 and webs 25 and 26. These chords are arranged with the webs 25 and 26 extending toward one another and are disposed in alignment with the chords 11 and 12. Diagonal truss members 27 extend between the chords 21 and 22 and are similar to the truss members 16 being constructed from a rod 28 formed with bends 29 which are welded to the webs 25 and 26 of the chords 21 and 22. The lower chord 22 is formed with bends 30 and 31 which form in said lower chord an upwardly inclined member 32 and a horizontal portion 133 which lies adjacent the upper chord 21. These parts are welded to spacers 166 to form a bearing by means of which the joist may be supported on the supporting structure. The ends of the chords 22 and 23 of this joist section are indicated by the reference numerals 35 and 36 respectively.

Between the chords 10 and 21 of the truss section C and B is provided a connection 33 and between the chords 11 and 22 is provided a connection 34. The connection 34 permits of adjusting the length of the truss A by certain increments. The connection 33 likewise permits of adjusting the length of the truss by certain increments but in addition permits of further adjusting the chord to procure the desired camber therein.

The connection 34 consists of a plate 37 which underlies the end 20 of the chord 11 and the end 36 of the chord 22. This plate fits up against the underside of the flanges 13 and 24 of said chords. On the upper sides of these flanges are arranged bars 39 which are of the same length as the plate 37. The bars 39, the flanges 24 and 13 and the plate 37 all have registering holes 40 therein.

Bolts 41 may be inserted through the said holes and nuts 142 screwed on said bolts clamp the parts together. The holes 40 are spaced equal distances apart in all of the flanges, plates and bars so that the truss sections may be extended to different lengths and the bolts inserted through the appropriate holes to give the desired lengths.

The connection 33 consists of two plates 42 and 43 which are welded to the webs 25 and 14 respectively of the chords 21 and 10 and which form extensions of said webs constituting flanges depending therefrom. These flanges have vertically extending slots 44 and 45 formed in the same and disposed close to the ends of the chords 21 and 10. The said flanges have a number of horizontal slots 46 and 47 which are disposed substantially in alignment and which are spaced apart the same distance as the spacing of the holes 40. Overlying the flanges 42 and 43 are two plates 48 and 49. These plates have holes 50 and 51 in the same which are adapted to register with the slots 44, 45, 46 and 47. The holes 50 are larger than the holes 51 for a purpose to be presently explained.

Extending through the slots 44 and 45 in the flanges 42 and 43 and through the corresponding holes 50 and 51 in the plates 48 and 49 are bolts 52, one of which is shown in detail in Fig. 6. This bolt has a head 53 either hexagonal as shown or square and is formed with a collar 54 adjacent said head and of a size to be snugly received in any of the holes 50 of plate 48. Adjacent this collar the bolt is formed with an eccentric 55 which is of lesser diameter than the collar 54 and which is eccentrically disposed with reference to the axis of said collar. The outer element of this eccentric may lie in alignment with the corresponding element of the collar 54 so as to give the maximum possible throw to the eccentric. Issuing outwardly from the eccentric 55 is a shank 56 which is threaded as indicated at 57 to receive a nut 58. The shank 56 is concentric with the collar 54 and it likewise has its outer element lying in continuation of the corresponding element of the eccentric 55. By means of this construction the shank 56 is of maximum diameter to give the maximum strength to the bolt. The shank 56 is snugly received in the holes 51 of plate 49. It will be readily comprehended when the bolts 52 are rotated that the eccentrics 55 engage the vertical walls 59 of the slots 44 and 45 and procure relative movement between the plates 48 and 49 and the flanges 42 and 43. This correspondingly produces relative movement between the ends 19 and 35 of the chords 10 and 21 and varies the camber of the joist.

Extending through the slots 46 and 47 of the flanges 42 and 43 are bolts 60, one of which is shown in detail in Fig. 7. This bolt has a head 61 similar to the head 53 of bolt 52 and a collar 62 adjoining said head and of the same diameter and length as the collar 54 of bolt 52. Issuing outwardly from this collar is a shank 63 concentric with the collar 62 and having threads 64 formed thereon. The collar 62 is adapted to fit in any of the holes 50 of the plate 48 while the shank 63 is adapted to fit in any of the holes 51 in plate 49 and also in any of the slots 46 and 47 of the flanges 42 and 43. It will be noted that these slots are of a width substantially equal to the diameter of the shanks 63 so that the plates 48 and 49 are properly supported with reference to the flanges 42 and 43 and restrained from vertical movement relative thereto. Nuts 65 are screwed on the ends of the shanks 63. Between the heads 53 and 61 of the bolts 52 and 60 and the plate 41 are disposed washers 66. Similar washers 67 are disposed between the nuts 58 and 65 screwed on said bolts and the plate 49. These washers increase the bearing area against the said plates and permit of tightening up the bolts without marring the plates.

The use of the invention is obvious. If the truss is to be of minimum length the parts are assembled as shown in Fig. 1, 2 and 3. The nuts 142 are first tightened up

on the bolts 41 and the lower chords 11 and 22 rigidly held secured to one another. The nuts 58 and 65 are then loosened and the two bolts 52 rotated until the desired camber is procured. In the rotating of said bolts the eccentrics 55 move up and down in the slots 44 and 45 while the shank 63 of bolts 60 slide horizontally in the slots 46 and 47. When the desired camber has been procured the nuts 58 and 65 are tightened down and the entire structure becomes rigidly tied together.

The advantages of the invention are apparent. The camber of the joist can be easily adjusted within the limits of the eccentric employed. Ordinary wrenches may be used for assembling the parts and for procuring adjustment. The truss is extremely rigid and will support appreciable loads. If desired, adjustment of the camber can be procured after the joist has been loaded thus permitting of eliminating sag in floors or other structure supported on the truss. The invention can be manufactured at a nominal expense and will function indefinitely without appreciable wear. The invention is positive in action and foolproof in operation.

Changes in the specific form of the invention, as herein described, may be made within the scope of what is claimed without departing from the spirit of the invention.

Having described the invention, what is claimed as new and desired to be protected by Letters Patent is:

1. In an adjustable joist, two joist sections disposed end to end, each comprising upper and lower chords and diagonal truss members therebetween, a connection for connecting the lower chords of the section together, the upper chord of one of said sections having a part formed with a transverse slot therein, a clamp member overlying said part and secured to the upper chord of the other truss section, and an eccentric rotatable relative to said clamp member and extending through said slot, said eccentric engaging a wall of said part at the slot to shift the ends of the upper chords relative to one another in a longitudinal direction and clamping means for clamping said clamp member and part together.

2. In an adjustable joist, two joist sections disposed end to end, each comprising upper and lower chords and diagonal truss members therebetween, a connection for connecting the lower chords of the section together, the upper chords of said sections having parts formed with transverse slots therein, a clamp member overlying said parts, eccentrics rotatable relative to said clamp member, and extending through said slots, said eccentrics engaging opposite walls of said slots to shift the ends of said upper chords relative to one another in a longitudinal direction and clamping means for clamping the parts and clamp member together.

3. In an adjustable joist, two joist sections disposed end to end, each comprising upper and lower chords and diagonal truss members therebetween, a connection for connecting the lower chords of the section together, the upper chord of one of said sections having a flange extending along the same and formed with a transverse slot therein, a plate overlying said flange and secured to the upper chord of said other truss section, said plate having a round hole therein overlying said slot, an eccentric disposed in said slot and having a collar received in said hole, and clamping means for clamping the parts together.

4. In an adjustable joist, two joist sections disposed end to end, each including upper and lower chords, a connection for connecting the lower chords of the section together, the upper chord of one of said sections having a flange extending along the same and formed with a transverse slot therein, plates overlying said flange on opposite sides thereof and secured to the upper chord of said other truss section, said plates having circular holes therein registering with one another and with said slot, the hole in one of said plates being greater in diameter than the hole in the other of said plates, a bolt extending through said holes and slot, said bolt having a head disposed

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adjacent to the plate having the larger hole, a collar on said bolt received in the larger hole, an eccentric on said bolt disposed within said slot, a threaded shank extending outwardly from said eccentric, coaxially disposed with reference to said collar and extending through said smaller hole, a nut screwed on the end of said shank, said nut and bolt holding said eccentric in adjusted position and assisting in clamping said plates in position on said flange and other clamping means acting between said plates for further clamping said plates in position on said flange.

5. In an adjustable joist, two joist sections disposed end to end, each including upper and lower chords, a connection for adjustably connecting the lower chords of the sections together, the upper chords of said sections having aligning longitudinally extending flanges thereon, the flange of one of said upper chords having a transverse slot therein and a plurality of longitudinal slots, said slots being spaced equal distances from one another, plates overlying both of said flanges and disposed one on each side thereof, said plates having circular holes therein registering with the various slots in said flanges, the holes in one of said plates being greater in diameter than the holes in the other plate, the holes in each of said plates respectively being of substantially the same diameter, a bolt extending through said transverse slot and through the holes registering therewith, other bolts extending through the other registering holes and slots, collars formed on all of said bolts and received in said larger holes, threaded shanks on said bolts adapted to extend through any of said smaller holes, heads on said bolts adjacent said collars, nuts screwed on the ends of said shanks, an eccentric on the bolt received in said transverse slot, the shanks of the other bolts being received in said longitudinal slots and means for securing said plates to the flange of the upper chord of said other joist section.

6. In an adjustable joist, two joist sections disposed end to end, each including upper and lower chords, a connection for adjustably connecting the lower chords of the sections together, the upper chords of said sections having aligning longitudinally extending flanges thereon, the flange of one of said upper chords having a transverse slot and a plurality of longitudinal slots, said slots being spaced equal distances from one another, plates overlying both of said flanges and disposed one on each side thereof, said plates having circular holes therein registering with the various slots in said flanges, the holes in one of said plates being greater in diameter than the holes in the other plate, a bolt extending through said transverse slot and through the holes registering therewith, other bolts extending through the other registering holes and slots, collars formed on all of said bolts and received in said larger holes, threaded shanks on said bolts extending through said smaller holes, heads on said bolts adjacent said collars, nuts screwed on the ends of said shanks and an eccentric on the bolt passing through said transverse slot and disposed in said transverse slot, the shanks of the other bolts being received in said longitudinal slots and being slidable along the same, the shanks of all of said bolts being of the same diameter, the larger holes being all of the same diameter and substantially equal to the diameter of said collar and receiving said collars and the smaller holes being substantially equal to the diameter of said shanks and receiving said shanks, and means for securing said plates to the flange of the upper chord of said other joist section.

7. In an adjustable joist, two joist sections disposed end to end, each including upper and lower chords, a connection for adjustably connecting the lower chords of the sections together, the upper chords of said sections having aligning longitudinally extending flanges thereon, the flange of one of said upper chords having a transverse slot and a plurality of longitudinal slots, said slots being spaced equal distances from one another, plates overlying both of said flanges and disposed one on each side thereof, said

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plates having circular holes therein registering with the various slots in said flanges, the holes in one of said plates being greater in diameter than the holes in the other plate, a bolt extending through said transverse slot and through the holes registering therewith, other bolts extending through the other registering holes and slots, collars formed on all of said bolts and received in said larger holes, threaded shanks on said bolts extending through said smaller holes, heads on said bolts adjacent said collars, nuts screwed on the ends of said shanks and an eccentric on the bolt passing through said transverse slot and disposed in said transverse slot, the shanks of the other bolts being received in said longitudinal slots and being slidable along the same, the shanks of all of said bolts being of the same diameter and the collars of all of said bolts being of the same diameter, the larger holes being all of the same diameter and substantially equal to the diameter of said collar and receiving said collars and the smaller holes being substantially equal to the diameter of said shanks and receiving said shanks, said eccentrics being of a radius substantially equal to the eccentricity plus the radius of said shank and said collars being of radius substantially equal to the eccentricity plus the radius of said eccentric, and means for securing said plates to the flange of the upper chord of said other joist section.

8. In an adjustable joist, two joint sections disposed end to end, each including upper and lower chords, a connection for connecting the lower chords of the section together, the upper chord of one of said sections having a part formed with a transverse slot therein, a clamp member overlying said part and secured to the upper chord of the other truss section, and a cam rotatable relative to said clamp member and extending through said slot, said cam engaging a wall of said part at the slot to shift the ends of the upper chords relative to one another in a longitudinal direction and clamping means for clamping said clamp member and part together.

9. A connection comprising an elongated plate-like first part and a second part disposed at the end of the first part, plates on opposite sides of and overlying said first part and secure to said second part, said first part having a transverse slot therein near the end thereof and a plurality of longitudinally extending slots disposed outwardly of said transverse slot and in alignment therewith, the centers of all of said slots being equally spaced, said plates each having a series of aligning holes therein spaced apart the same distance as the spacing of said slots, the holes in one of said plates being all substantially the same diameter and the holes in the other of said plates being all substantially the same diameter and lesser in diameter than those in the first named plate, an eccentric disposed in the transverse slot and having a collar adapted to be rotatably mounted in any of a number of said larger holes, and bolts extending through said holes and certain of said longitudinal slots, said bolts having collars received within said larger holes, and shanks extending through said longitudinal slots and through said smaller holes, heads on the ends of the said bolts adjacent said collars and disposed adjacent the plate in which the larger holes are formed and nuts on said shank reacting against the other of said plates.

10. A connection comprising an elongated plate-like first part and a second part disposed at the end of said first part, plates overlying said first part on opposite sides thereof and secured to said second part, said first part having a transverse slot therein near the end thereof and a plurality of longitudinally extending slots disposed outwardly of said transverse slot and in alignment therewith, the centers of all of said slots being equally spaced, said plates each having a series of aligning circular holes therein registering with one another and with said slots, the holes in each plate being of substantially the same diameter and the holes in one plate being greater in diameter than the holes in the other plate, a bolt extending

through the transverse slot and the holes registering therewith, said bolt having a head disposed adjacent to the plate having the larger hole, a collar on said bolt received in the larger hole, an eccentric on said bolt disposed within said transverse slot, a threaded shank extending outwardly from said eccentric, coaxially disposed with reference to said collar and extending through said smaller hole, a nut screwed on the end of said shank, said nut and bolt holding said eccentric in adjusted position and assisting in clamping said plates in position on said flange and other clamping means acting between said plates and utilizing said longitudinal slots and the holes registering therewith for further clamping said plates in position on said first part.

11. A connection comprising an elongated plate-like first part and a second part disposed at the end of the first part, plates on opposite sides of and overlying said first part and secured to said second part said first part having a transverse slot therein near the end thereof and a plurality of longitudinally extending slots disposed outwardly of said transverse slot and in alignment therewith, said longitudinal slots being of a width less than the transverse slot, the centers of all of said slots being equally spaced, said plates each having a series of aligning holes therein spaced apart the same distance as the spacing of said slots, the holes in one of said plates being all substantially the same diameter and substantially equal in diameter to the width of said longitudinal slots, and the holes in the other of said plates being all substantially the same diameter and greater in diameter than the width of said transverse slot, an eccentric disposed in the trans-

verse slot and having a collar adapted to be rotatably mounted in any of a number of said larger holes, and bolts extending through said holes and certain of said longitudinal slots, said bolts having collars received within said larger holes, and shanks extending through said longitudinal slots and through said smaller holes, heads on the ends of the said bolts adjacent said collars and disposed adjacent the plate in which the larger holes are formed and nuts on said shank reacting against the other of said plates.

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