

Nov. 23, 1965

B. H. GORDON

3,219,157

KEY CLAMP WITH LOCK PIN

Filed July 18, 1960

2 Sheets-Sheet 1

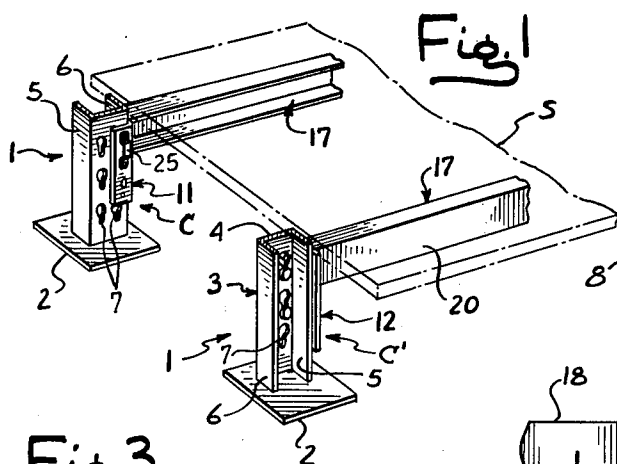


Fig. 3

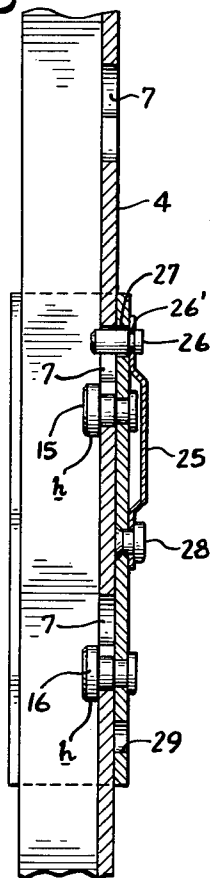
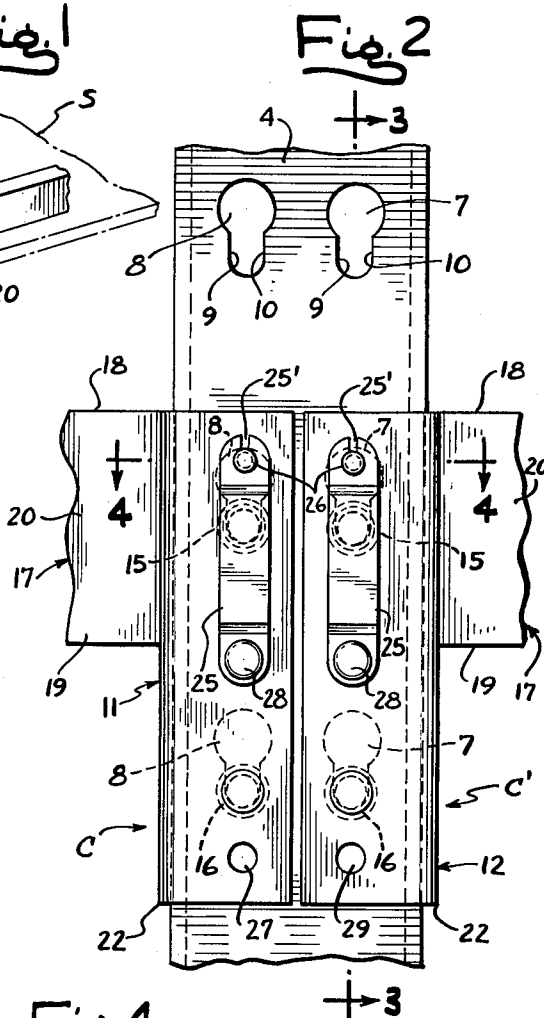
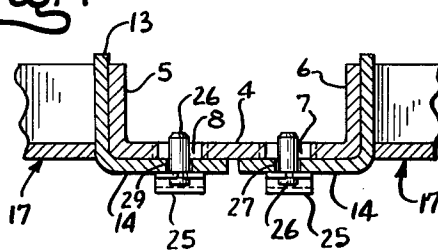


Fig. 4



INVENTOR.
BERNHARD H. GORDON
BY *Morris Spector*
ATTY.

Nov. 23, 1965

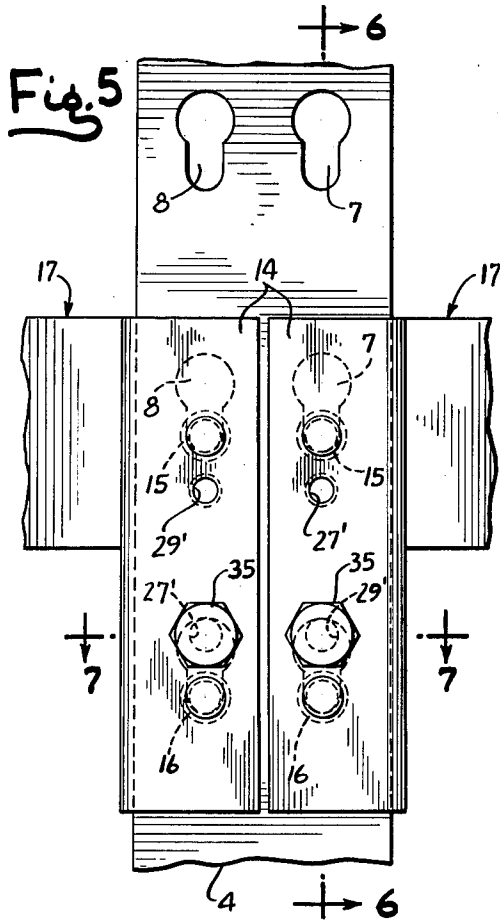
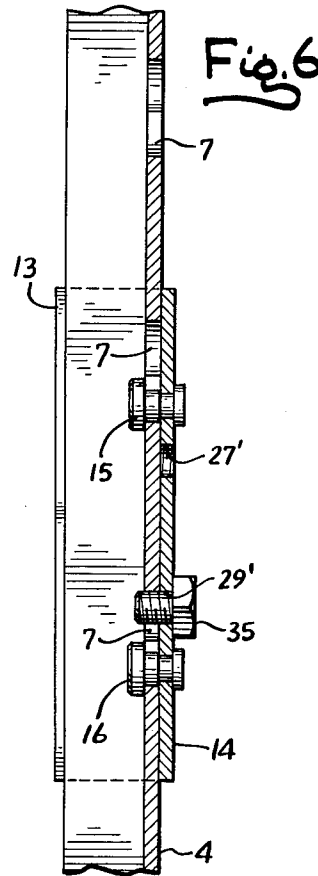
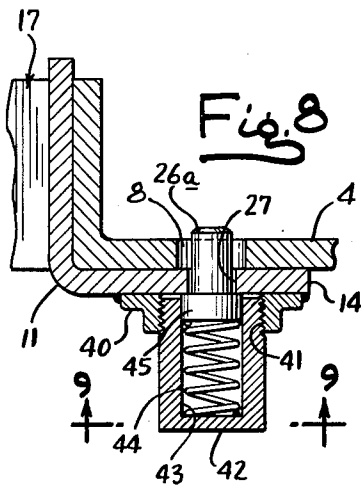
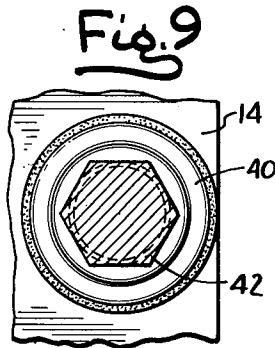
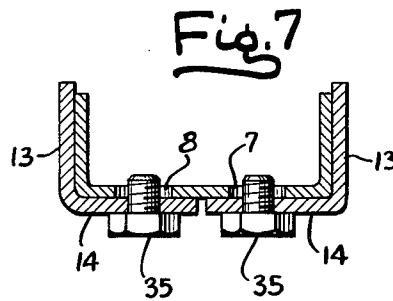
B. H. GORDON

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2 Sheets-Sheet 2



INVENTOR.
BERNHARD H. GORDON
BY *Morris Spector*
ATTY.

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3,219,157

KEY CLAMP WITH LOCK PIN

Bernhard H. Gordon, 49 Oakmont Road,
Highland Park, Ill.

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2 Claims. (Cl. 189—36)

This invention relates to structural supporting members and, more particularly, to a construction device having a key-clamp with a lock pin.

It is a primary object of the present invention to provide a constructional device capable of forming a sturdy adjustable rack or framing, and wherein the members are secured together in such a manner as to prevent accidental separation thereof.

It is a further and more specific object of the present invention to provide a device of the type stated having a column and a beam or stringer attached to the column by a key-clamp fitting, the latter having studs cooperating with key-hole slots in the column to secure the key-clamp to the column. The fitting also has a locking pin or bolt which projects through one of the keyhole slots in the column to prevent accidental unclamping of the fitting from the column.

It is also an object of the present invention to provide a device of the type stated wherein the lock pin automatically shifts into the keyhole slot to lock the key-clamp in place when the latter is mounted on the column. The lock pin may, however, be easily retracted when it is desired to dismantle the framing.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

FIG. 1 is a fragmentary perspective view of a constructional device having a key-clamp and lock pin constructed in accordance with and embodying the present invention;

FIG. 2 is a fragmentary elevational view of the device and showing two key-clamps mounting two beams or stringers onto the column;

FIGS. 3 and 4 are fragmentary sectional views taken along lines 3—3 and 4—4, respectively, of FIG. 2;

FIG. 5 is an elevational view similar to FIG. 2 and showing a modified form of the present invention;

FIGS. 6 and 7 are fragmentary sectional views taken along lines 6—6 and 7—7 of FIG. 5;

FIG. 8 is a fragmentary horizontal sectional view showing a further modified form of the present invention; and

FIG. 9 is a fragmentary sectional view taken along line 9—9 of FIG. 8.

Like reference numerals designate like parts throughout the drawings.

Referring now in more detail and by reference characters to the drawing which illustrate preferred embodiments of the present invention, 1 designates a constructional device comprising a base plate 2 and a support-forming column 3, the latter including a web 4 terminating at its opposite ends in spaced parallel flanges 5, 6. The column 3 is preferably welded to the base plate 2 and extends upwardly at right angles therefrom. Formed in the web 4 is a plurality of pairs of keyhole slots 7, 8 which are wider at their upper ends than at their lower ends, the slots 7, 8 preferably being located in horizontal alignment and having downwardly converging side wall portions 9, 10 which define the narrower parts of the slots. Each of the slots 7 is in spaced vertical alignment and, similarly, the slots 8 are also in vertical alignment. The web 4 contains at least two pairs of keyhole slots 7, 8 but, as shown in the drawing, a larger number of pairs of

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slots 7, 8 may be employed depending upon the overall height of the column 3.

Provided for cooperation with the column 3, are key-clamps C, C' which include angle-shaped fittings 11, 12 each having legs 13, 14 disposed at right angles to each other and adapted to fit substantially flush against the flanges 5, 6 and web 4. Rigidly mounted on the legs 14 and forming part of the clamps C, C' is a pair of vertically spaced studs 15, 16, the shanks of which are adapted to be removably fitted within any selected pair of vertically aligned slots. Since the walls 9, 10 of the slots are tapered, the shanks of the studs 15, 16 will form a snug, frictional fit therewith. It will be apparent that the heads h of the studs 15, 16 are of such size as to permit withdrawal of the studs through the upper or enlarged parts of the keyhole slots but prevent retraction of the studs from between the walls 7, 8.

Welded or otherwise rigidly secured to the legs 13 at the upper ends thereof and extending outwardly at right angles therefrom are stringers 17 each having top flanges 18 and bottom flanges 19, the flanges 18, 19 being integrally joined by a vertical web 20. The upper surface of the top flange 18 is preferably in approximate alignment with the upper edges 21 of the fittings while the lower flanges 19 are spaced upwardly a substantial distance from the lower edges 22 of the fittings 11, 12. Furthermore, the stud 15 is preferably located at a point on the leg 14 which is approximately midway between the upper and lower flanges 18, 19 while the stud 16 is located intermediate the lower flange 19 and bottom edge 22.

Mounted on the leg 14 of each fitting by a leaf spring 25 is a locking pin 26 which projects through a hole 27 in the leg 14 and also into the upper or enlarged part of the keyhole slots 7, 8. One end of the leaf spring 25 may be slotted at 25' to permit mounting of pin 26 onto the spring 25, and the pin has an annular undercut 26' into which the spring seats. The leaf spring 25 is pivotally mounted at one end to the leg 14 by a rivet 28 so that the pin 26 can be optionally disposed in a similar hole 29 formed in the leg 14. Thus, in the fitting 12 the locking pin 26 projects through the hole 27 while in the fitting 11 the pin 26 projects through the hole 29. By reason of this construction, the fittings 11, 12 may be constructed alike and the pin 26 disposed through either hole 27, 29, depending upon at which end of the fitting the stringer 17 is mounted.

In mounting the fittings 11, 12 onto the column 3 the heads of the studs 15, 16 are inserted within the upper ends of the keyhole slots 7, 8 and thereafter the fittings 11, 12 are allowed to drop downwardly so that the shanks of the studs 15, 16 engage the side wall portions 9, 10 of the keyhole slots.

The engagement between the shanks of the studs 15, 16 and the tapered slots 7, 8 provides a self-aligning fit between the fittings 11, 12 and the column 3. The dimensions of the studs and slots are such as to insure that the legs 13, 14 are drawn into firm flatwise contact with the flanges 5, 6 as well as with the web 4, thereby providing a rigid framework which does not tend to skew. When the studs 15, 16 are inserted into the upper ends of the keyhole slots 7, 8, the end of the locking pin 26 will abut the surface of the web 4 and the leaf spring 25 will flex outwardly, that is, to the right as viewed from FIG. 3. When the fittings 11, 12 are lowered to move the study into the lower or narrow part of the keyhole slots 7, 8, the locking pins 26 will ride along the surface of the web 4 until the pins 26 reach the upper ends of the keyhole slots 7, 8, whereupon the pins 26 will, under the action of the springs 26, automatically snap into the keyhole slots.

The presence of the locking pin 26 in each fitting pre-

vents accidental separation of the fitting from the column. If, by accident, a blow or other force is applied outwardly on the fittings or the stringers, the locking pin 26 will abut the upper end of the keyhole slot and prevent movement of the enlarged heads *h* of the studs 15, 16 into the enlarged or upper ends of the keyhole slots 7, 8. The fittings 11, 12 may, however, be easily dismounted from the column 3 by pressing axially on the pin 26 against the force on the spring 25 so that the pin is withdrawn from the upper end of the keyhole slot, whereupon the fitting and its associated stringer may be lifted upwardly until the heads of the studs 15, 16 are at the enlarged upper ends of the keyhole slots, whereupon the fitting may be pulled away from the column.

It is also possible to provide a modified form of the present invention as shown in FIGS. 5 and 6. In this form of the invention the two holes 27', 29' are similar to the holes 27, 29 previously described, except that the holes 27', 29' are threaded for receiving bolts 35. The threaded shanks of the bolts 35 project into the enlarged upper ends of the keyhole slots 7, 8 so that if the fittings are accidentally shifted upwardly, the bolts 35 will abut the upper ends of the keyhole slots 7, 8 and prevent the fittings from accidentally falling off of the column 3. When it is desired to mount or demount the fittings from the column 3, the bolts 35 may be easily removed or reinserted into either hole 27' or 29'.

In the form of the invention shown in FIGS. 8 and 9 the leg 14 is formed with two holes, one of them being shown at 27 in FIG. 8. A locking pin 26*a* projects through the enlarged upper end of the keyhole slot 8 and functions in the same manner as the pin 26 to prevent accidental removal of the fitting 11 from the column 3. The leg 14 has a sleeve 40 welded or otherwise permanently secured thereto and the sleeve 40 has a threaded bore 41 which is concentric with the hole 27. A spring housing 42 is threaded into the bore 41 and is provided with a cavity 43 for receiving a compression spring 44. The head 45 of the pin 26*a* is seized for axial sliding movement within the cavity 43. A compression spring 44 is mounted in the cavity 43 and automatically biases the pin 26*a* into the upper end of the keyhole slot 8 when the fitting 11 is assembled with the column. When it is desired to remove the fitting 11 from the column 3 the pin 26*a* may be pressed axially so that the end of the pin clears the keyhole slot 8, whereupon the fitting may be lifted upwardly and removed from the column in the manner previously described. The spring housing 42, except at the threaded end thereof, has a hexagonal external shape (FIG. 9) so that the housing, together with the spring 43 and pin 26*a* can be threaded into the sleeve 40 which surrounds the hole 27, or into a similar sleeve surrounding an additional hole in the leg, the latter hole being similar to the hole 29.

One use of the constructional device is illustrated in FIG. 1 wherein the stringers 17 support a shelf S at any desired height upwardly from the base plates 2. While the shelf S and stringers 17 are broken off in FIG. 1, it will be apparent that the other ends of the stringers are supported by columns and attached thereto by key clamps which are similar to the columns 3 and key clamps C, C' described herein.

In compliance with the requirements of the patent statutes I have herein shown and described a preferred embodiment of the invention. It is, however, to be understood that the invention is not limited to the precise construction herein shown, the same being merely illustrative of the principles of the invention. What is considered new and desired to be secured by Letters Patent is:

1. A system for connecting a pair of support members which comprises: a first support member and a second support member; said first member defining a pair of

vertically spaced slots, said slots having a wide portion and a narrow portion; said second member having a pair of vertically spaced studs, said studs each having an enlarged head which is smaller than said wide portion and larger than said narrow portion whereby said stud can be inserted into the wider portion of said slot and moved laterally to said narrow portion for engagement with the wall adjacent said narrow portion thereby preventing straight line separation of said members; said second member defining a first aperture adjacent at least one of said studs and positioned for alignment with said wide portion when said stud is engaging the wall adjacent said narrow portion; means connected to said second member for preventing lateral movement between said members, said lateral movement preventing means comprising a pivotable spring member having a pin extending from its free end, said pin being spaced a distance from the pivot point of said spring whereby said pin is insertable into said aperture; and a second aperture defined by said second member, said second aperture being located the same distance from said pivot point as the distance from which said first aperture is located therefrom, said first and second apertures being located on directly opposite sides of said pivot point.

2. A system for connecting a pair of support members which comprises: a first support member and a second support member; said first member defining a plurality of vertically spaced slots, said slots having a wide portion and a narrow portion; said second member having a pair of vertically spaced studs, said studs each having an enlarged head which is smaller than said wide portion and larger than said narrow portion whereby said studs can be inserted into the wide portion of said slots and moved laterally to the narrow portion for engagement with the wall adjacent said narrow portion thereby preventing straight line separation of said members; said second member defining a first aperture positioned for alignment with the wide portion of one of said slots when said studs are engaging the walls adjacent the narrow portion of two of said slots; means connected to said second member for preventing lateral movement between said members, said lateral movement preventing means comprising a pivotable spring member having a pin extending from its free end, means for pivotally connecting said spring member to said second member, said pin being spaced a distance from the pivot point of said spring member whereby said pin is insertable into said aperture; and a second aperture defined by said second member, said second aperture being located the same distance from said pivot point as the distance from which said first aperture is located therefrom, said first and second apertures being located on directly opposite sides of said pivot point.

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RICHARD W. COOKE, JR., *Primary Examiner*.

EARL C. DARSCH, JOEL REZNEK, JACOB L. NACKENOFF, *Examiners*.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,219,157

November 23, 1965

Bernhard H. Gordon

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 66, for "study" read -- studs--; column 3, lines 2 and 3, for "outwardly" read -- upwardly --; line 39, for "siezed" read -- sized --.

Signed and sealed this 20th day of September 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents