

Jan. 24, 1967

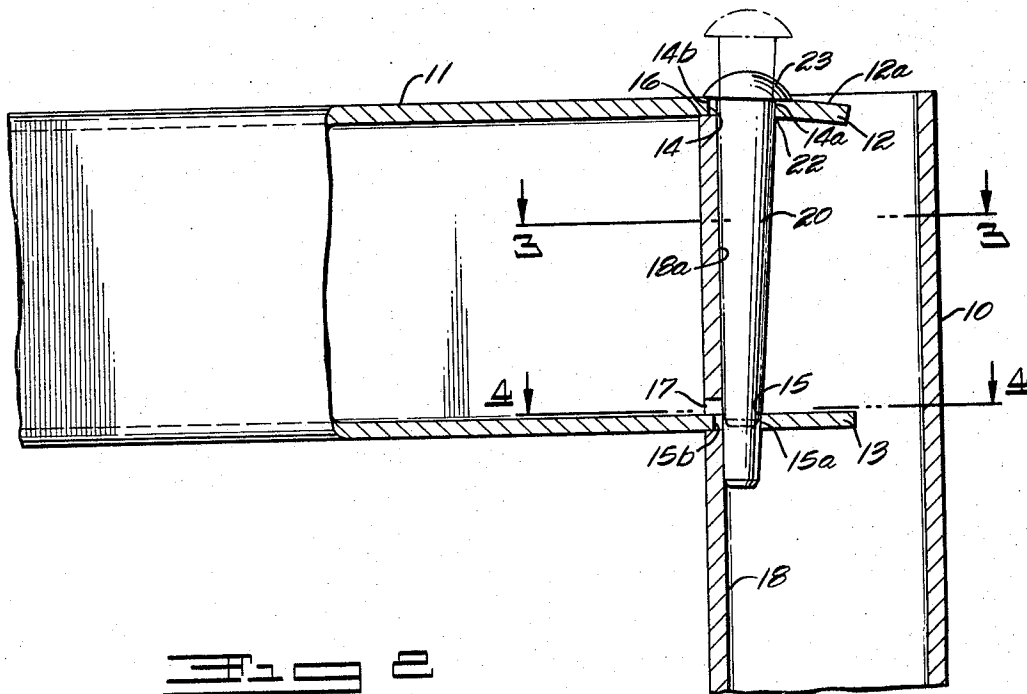
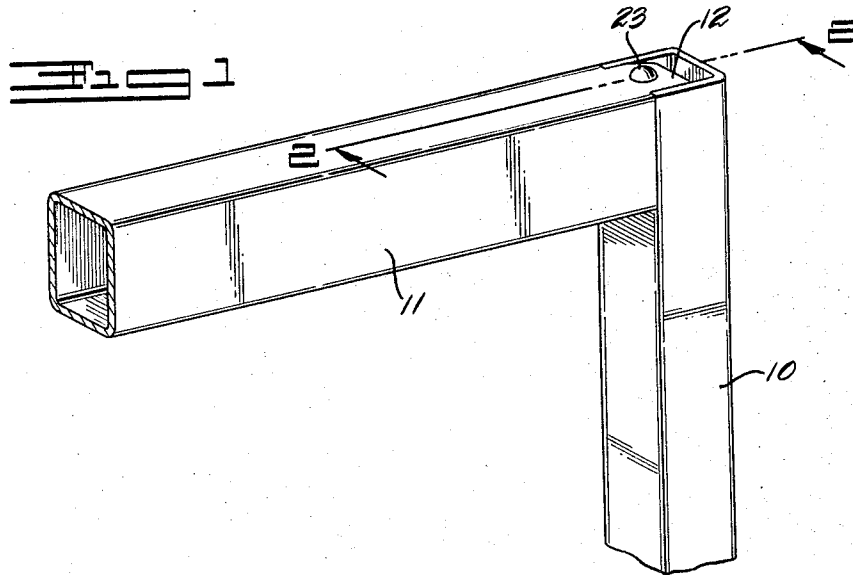
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3,300,237

CONNECTED COLUMN AND BEAM CONSTRUCTION

Filed May 21, 1964

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

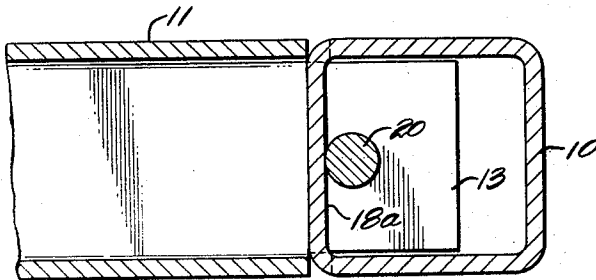


Fig. 3

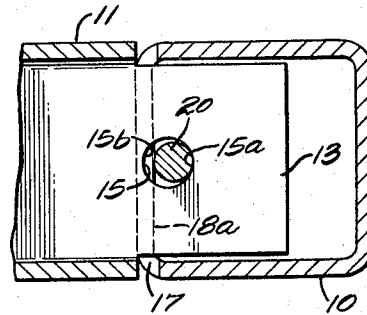


Fig. 4

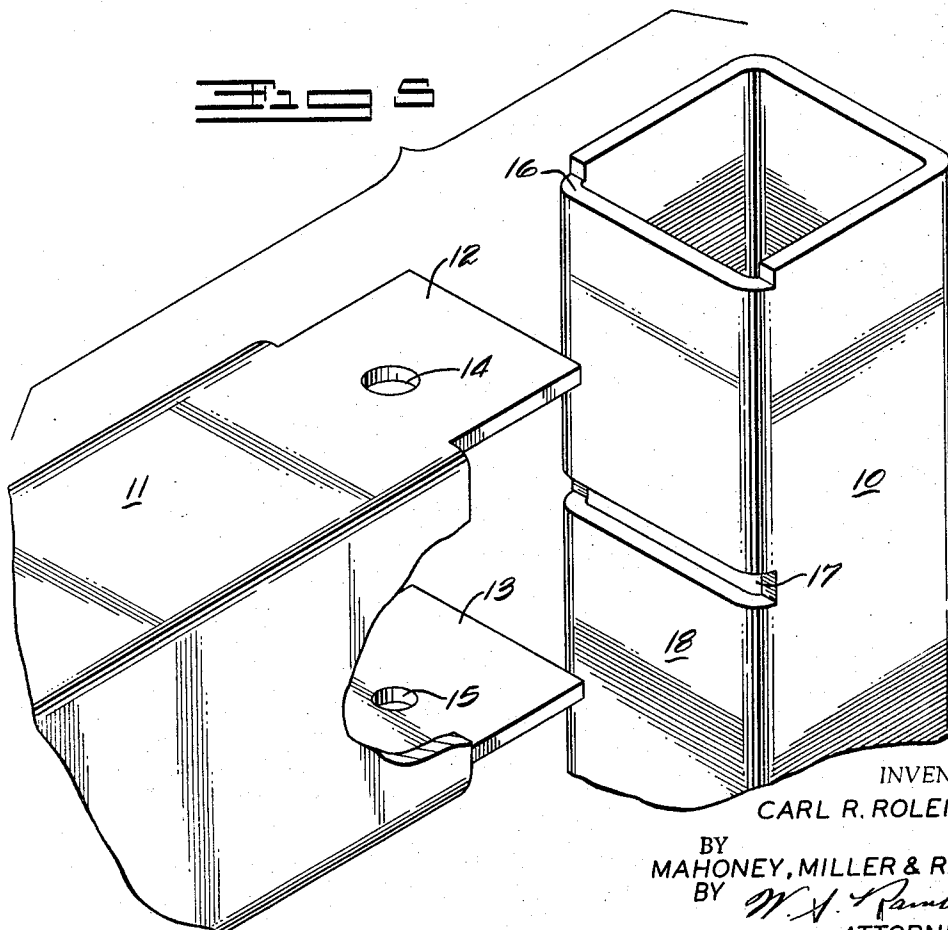


Fig. 5

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CONNECTED COLUMN AND BEAM CONSTRUCTION

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4 Claims. (Cl. 287—189.36)

The present invention relates to a connected column and beam construction. It has to do, more particularly, with a metallic column and beam which are provided with means for rigidly connecting them together for use in a building or other structure with such connecting means being so designed and of such a nature that the column and beam may be readily disconnected from each other to permit ready dismantling of a building or other structure in which they are incorporated.

According to this invention, both the supporting column, which is adapted to be disposed upright, and the supported beam, which is adapted to extend horizontally from the upper end of the column and be supported thereby, may be of simple closed sections of metal such as steel. The column is preferably of square cross section whereas the beam is preferably of deeper or rectangular cross section although they both could be of identical right-angular parallelogram cross section. The end of the beam is provided with connector tongues adjacent its upper and lower edges which are adapted to project into the interior of the column through suitably disposed apertures in the inner wall of the column adjacent the said end of the beam. These tongues are provided with pin-receiving openings which are so located and the pin is so formed that when it is forced into position, the adjacent end of the beam is drawn into firm interlocking relationship with the upper end of the column with a wedging action created by the pin. To disconnect the column and beam, it is merely necessary to withdraw the wedge pin and pull the connector tongues of the beam outwardly of the column. Thus, the column and beam can be readily connected in rigid condition but they can also be easily disconnected from each other when desired.

A preferred embodiment of this invention is illustrated in the accompanying drawings in which:

FIGURE 1 is a perspective view of a fragment of a removably connected column and beam construction in which this invention is embodied.

FIGURE 2 is an enlarged vertical sectional view taken along line 2—2 of FIGURE 1.

FIGURE 3 is a horizontal sectional view taken along line 3—3 of FIGURE 2.

FIGURE 4 is a horizontal sectional view taken along line 4—4 of FIGURE 2.

FIGURE 5 is a perspective view showing the beam disconnected from the column.

With reference to the drawings, this invention is shown in FIGURE 1 as comprising generally a supporting column 10 which is disposed upright and a supported beam 11 which is disposed horizontally at a right angle to the column 10. The beam 11 has its end connected to and supported by the upper end of the column 10. The column 10 is preferably made of metal and is preferably of square hollow cross section. Similarly, the beam 11 is preferably of metal and of hollow cross section but is preferably of a deeper rectangular cross section. The connection of the end of the beam and the cooperating upper end of the column is such that although the connection is a rigid, effective load-supporting connection when made, the column and beam can be disconnected readily when desired. Consequently, the beam and column construction can be readily assembled in a building or similar structure which can be knocked down for removal to a different location, if desired.

2

The beam at its end is provided with the connector tongues 12 and 13 which are continuations of the upper and lower walls or webs respectively of the hollow beam. These tongues are initially in parallel relationship. The upper tongue is provided with a pin-receiving vertical opening 14 located therein and the lower tongue is provided with a similar but smaller opening 15 located therein and the two openings are coaxially disposed. The width of each of the tongues 12 is just slightly less than the distance between the walls of the column 10 so that the tongues will fit between two opposed walls of the square column as will later be understood more fully.

For receiving the beam tongues 12 and 13, respectively, the inner wall of the column 10 is provided with an upper recess 16 and a lower slot 17. The upper recess 16 is provided by removing the extremity of the inner wall or web 18 of the column down to the thickness of the upper flange or tongue 12. The slot 17 is formed in the inner wall 18 downwardly a distance from the recess 16 which corresponds to the vertical spacing of the tongue 13 below the tongue 12.

For cooperating with the openings 14 and 15, a wedge locking pin 20 is provided. This pin has a head 23 and gradually tapers continuously from the head to a smaller or pointed lower end.

In assembling the beam 11 with the column 10, the two members are located relatively, as indicated in FIGURE 5, with the tongues 12 and 13 located level with and directed toward the apertures 16 and 17. The tongues are then slipped into the apertures and it will be apparent from FIGURES 2 and 5 that although the tongues do extend almost to the opposite wall of the column 10, they are of such length that they terminate short of that wall. As indicated in FIGURES 3 and 4, at this time, the end of the member 11 will abut the side wall 18 of the member 10. The openings 14 and 15 at this time will be positioned mainly beyond or inwardly of the wall 18 but the outer edges 14b and 15b, respectively, of the openings will be behind or outwardly of the inner surface 18a of such wall, as indicated best in FIGURE 2. The openings 14 and 15 are sufficiently large that the pin 20 can now be dropped thereinto but before the head 23 contacts the upper surface of the tongue 12, the outer tapered surface of the pin 20 will contact with the vertical inner surface 18a of the wall 18, as indicated by broken lines in FIGURE 2. At this time, the lower pointed end of the pin will extend into the lower opening 15. The pin is now driven downwardly until its head firmly seats on the tongue 12 and this will create a gradually increasing wedging action between the wall surface 18a and the leading edges 14a and 15a, respectively, of the openings 14 and 15. It will be noted that the diameters of the respective portions of the pin positioned in the upper and lower openings 14 and 15 which are finally located in the openings are less than those of the respective openings, as shown best in FIGURE 2. This gradually increasing wedging action produces a tight locking action which draws the beam 11 into tight contact with the column 10. However, the members can be readily separated by withdrawing the pin 20. To aid in keeping the pin in place while the structure is to be maintained in assembled relationship, the upper tongue 12 may be bent downwardly slightly as indicated at 12a in FIGURE 2. This will produce a biting action which will notch or indent the surface 22 of the bolt or pin 20 and will hold it in place. To remove the pin, it is merely necessary to pry upwardly on the outer end of the bent portion 12a of the tongue.

It will be apparent that the above described invention provides a beam and column assembly of simple form but one which will effectively sustain various loads and forces to which it is subjected. The joint is such that the

beam will be drawn tightly into engagement with the column and will be maintained in such engagement. However, whenever it is necessary or desirable to disassemble these members, it is a very simple matter to do so. Repeated assembling and disassembling of the structure may occur.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described this invention, what is claimed is:

1. In combination, an upright column of hollow wall cross section having an upper open end, a horizontal beam of hollow cross section having an end abutting a wall of said column and having vertically spaced connector tongues extending through correspondingly vertically spaced apertures in said wall into the interior of said column adjacent its upper open end and bearing on said wall at said apertures, and a locking pin extending through pin-receiving openings in said tongues and wedging against the interior of said wall, the upper open end of the column having one of the apertures formed as a notch in the wall for receiving the upper tongue and other aperture formed as a slot at a location in said wall spaced below the notch for receiving the lower tongue, said pin being a wedge pin having a head and being tapered from the head to a lower end, the upper opening being larger than the lower opening, said openings being positioned mainly beyond an inner surface of said wall but having outer edges disposed behind said surface, said openings being larger than the portions of the pin finally positioned therein respectively.

2. The combination of claim 1 in which the upper tongue is bent downwardly so as to bite into said pin at its adjacent surface.

3. In combination, an upright column of hollow wall cross section, a horizontal beam of hollow closed box-like

cross section with upper and lower webs and connecting side webs and having an end abutting a wall of said column, vertically spaced connector tongues which are continuations of said upper and lower webs extending through correspondingly vertically spaced apertures in said wall into the interior of said column and bearing on said wall at said apertures, and a locking pin extending through pin-receiving openings in said tongues and wedging against the interior of said wall, said pin being a wedge pin having a head and being tapered from the head to a lower end, the upper opening being larger than the lower opening, said openings being positioned mainly beyond an inner surface of said wall but having outer edges disposed behind said surface, said openings being larger than the portions of the pin finally positioned therein respectively.

4. In combination, an upright column of hollow wall cross section, a horizontal beam of hollow closed box-like cross section with upper and lower webs and connecting side webs and having an end abutting a wall of said column, vertically spaced connector tongues which are continuations of said upper and lower webs extending through correspondingly vertically spaced apertures in said wall into the interior of said column and bearing on said wall at said apertures, and a locking pin extending through pin-receiving openings in said tongues and wedging against the interior of said wall, said openings being positioned mainly beyond an inner surface of said wall but having outer edges disposed behind said surface, said openings being larger than the portions of the pin finally positioned therein respectively.

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