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B. H. GORDON

3,208,778

INTERLOCKING STRUCTURAL MEMBERS

2 Sheets-Sheet 1

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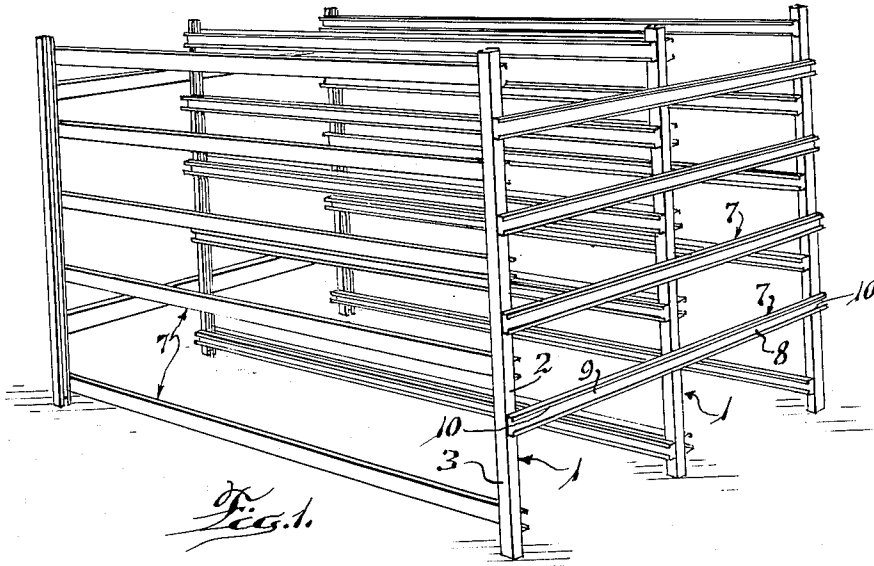


Fig. 1.

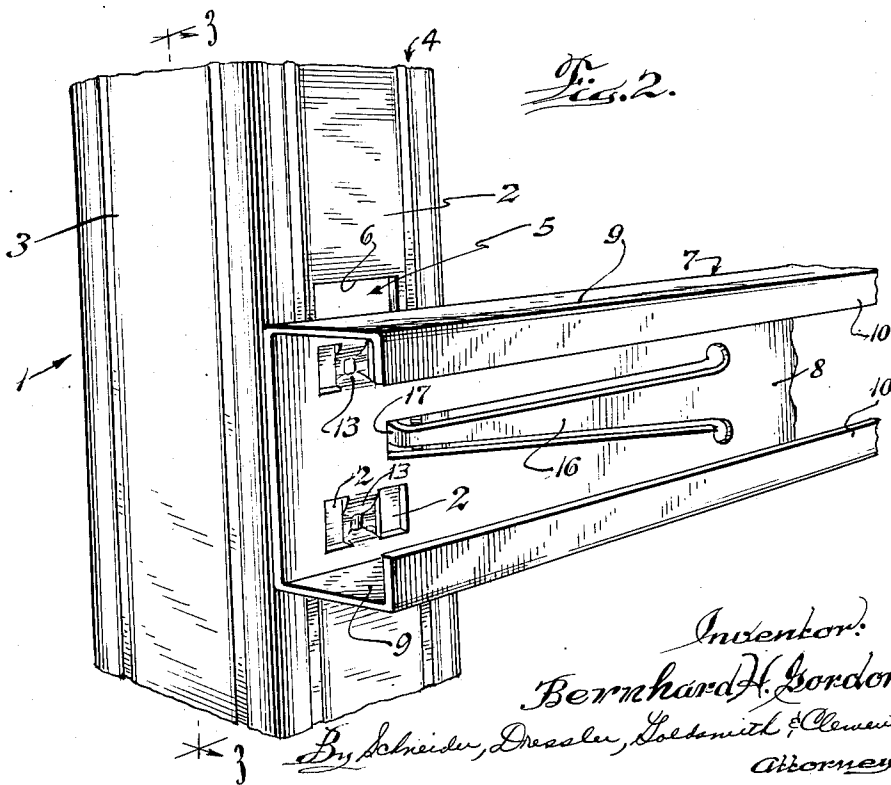


Fig. 2.

Inventor:
Bernhard H. Gordon
By Schneider, Dressler, Goldenrich & Clement
Attorneys

Sept. 28, 1965

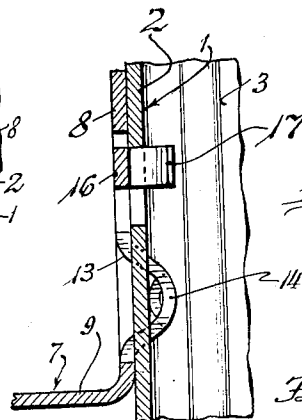
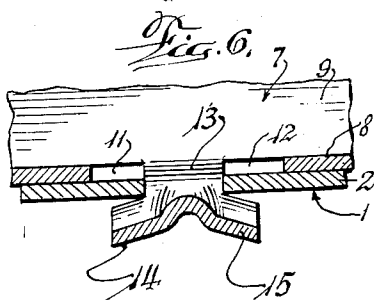
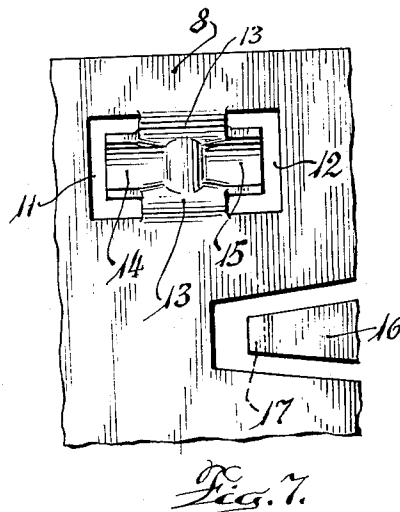
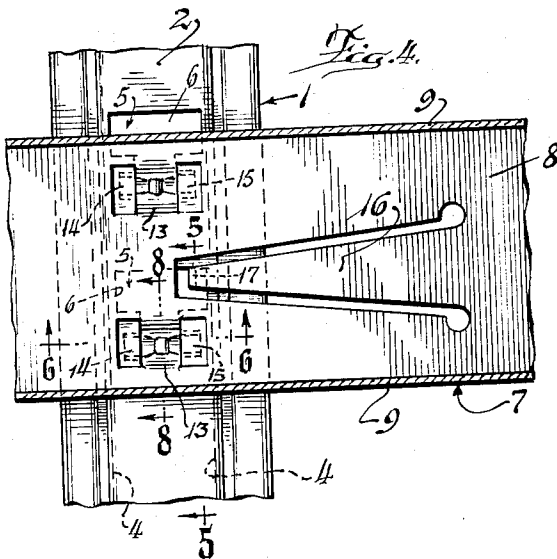
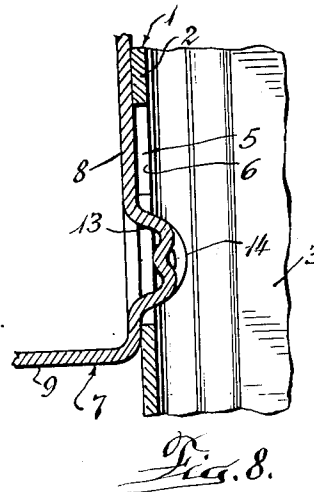
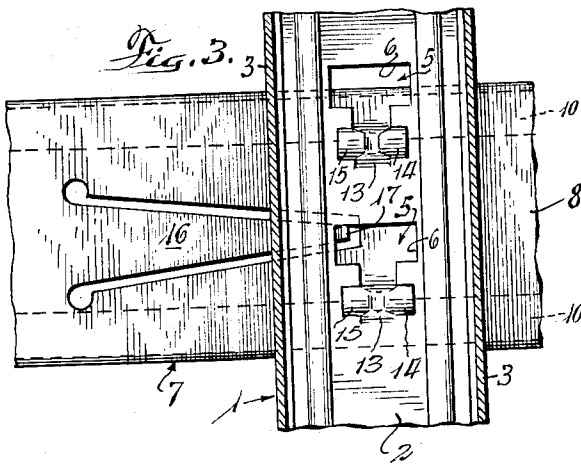
B. H. GORDON

3,208,778

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Inventor:
Bernard H. Gordon
By Schneider, Dussler, Gordon & Clement
Attorneys.

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INTERLOCKING STRUCTURAL MEMBERS

Bernhard H. Gordon, Highland Park, Ill., assignor to Storack Corporation, a corporation of Illinois
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This invention relates to interlocking structural members, and is particularly concerned with means integral with two structural members for interlocking them without tools, said means being capable of holding the structural members against accidental relative movement in any direction.

Although the interlocking means may be used with structural members of many different cross sectional shapes, channel members are generally preferred, and the invention will be described in connection with channel members.

The interlocking structural members may be used as framing members in any desired structure. They may also be used as bunk beds, as supports for any type of racks or shelving for storing or displaying merchandise, or as a lunch counter with seating platforms on opposite sides thereof. In the drawings, one of the interlocking channel members is shown in vertical position and the other in horizontal position. It will be understood that either channel member may be used in vertical position and the other channel may be used in horizontal position.

The back wall of one of the channel members is provided with two spaced T-shaped slots, and the back wall of the other channel member is provided with a lug engageable with each of the slots. Both T-shaped slots have a wide portion at one end, and a narrow portion extending in the same direction from the wide portion of its slot. The lugs are inserted into the wide portions of the slots, and the channel members are then slid relative to each other in one direction to move the lugs into engagement with the narrow portions of the slots. In this position the channel members are held against straight line separation, but they may be separated by sliding the channel members in the reverse direction to align the lugs with the wide portions of the slots and then moving them in opposite directions perpendicular when the lugs are in registration with the wide portions of the slots.

The channel member having the lugs struck therefrom also has a resilient pawl-like latch struck inwardly from the back wall of the channel. The free end of the latch is bent at substantially right angles to the plane of the latch and projects through an opening that extends around three edges of the latch. Each end of the opening is rounded into circular form to protect the ends of the opening from tearing. The free end of the latch extends slightly beyond the line defining the adjacent edge of the openings from the material of which the lugs are formed. When the channel members are slid as far as possible to move the lugs into the narrow ends of the T-shaped slots toward the closed ends of the slots, the free end of the latch moves into registration with the wide portion of one of the T-shaped slots. The resilience of the latch causes it to snap into the slot with which it registers. When the free end of the latch is engaged with the slot in the other channel member, neither channel member can be moved laterally relative to the other. The free end of the latch must be disengaged from the slot engaged by it, and then the channel members may be slid in the reverse direction until the lugs are aligned with the wide ends of the slots before the channel members can be separated from each other.

Structure by means of which the above mentioned and other advantages of the invention may be attained is fully described in the following specification, taken in conjunction with the accompanying drawings, showing a

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preferred illustrative embodiment of the invention, in which:

FIGURE 1 is a perspective view of a rack assembled from structural members embodying the invention;

FIGURE 2 is an enlarged fragmentary perspective view of two channel members in interlocked engagement;

FIGURE 3 is an enlarged vertical sectional view, taken along the line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged sectional view, taken along a line through the horizontal channel member and looking toward the vertical channel member;

FIGURE 5 is a cross sectional view, taken along the line 5—5 of FIGURE 4;

FIGURE 6 is a cross sectional view, taken along the line 6—6 of FIGURE 4;

FIGURE 7 is an enlarged fragmentary elevational view of the back wall of the horizontal channel member; and

FIGURE 8 is a cross sectional view, taken along the line 8—8 of FIGURE 4.

In the drawings, a channel member 1 comprises a back wall 2, two side walls 3, and an inwardly extending flange 4 at the outer edge of each side wall. The back wall is provided with a pair of aligned T-shaped slots 5 with the wide portion 6 of each slot at the same end of the slot. If channel member 1 is used as a vertical member, it is preferred to arrange the T-shaped slots with the wide portion uppermost. Such arrangement facilitates interlocking two channel members because the second channel member can have lugs arranged so that they can be inserted into the wide portions of the T-shaped slots and then merely dropped into engagement with the narrow portions of the slots. When the lugs are engaged with the narrow portions of the slots they prevent straight line separation of the channel members.

A second channel member 7 comprises a back wall 8, side walls 9, and an inwardly extending flange 10 at the outer edge of each side wall. The back wall 8 is provided adjacent each side wall with a pair of U-shaped slots 11 and 12 facing each other with the ends of the slots spaced apart to leave a band 13 integral with the back wall between each pair of slots.

Slot 11 forms a tab 14 projecting from one edge of band 13, and slot 12 forms a tab 15 projecting from the opposite edge of said band. Tabs 14 and 15 are both centrally disposed, relative to the length of band 13. The band 13 is embossed outwardly from the back wall of its channel member so that only the extreme end portions of the band are in the plane of back wall 8.

The center portion of band 13 cooperates with tabs 14 and 15 to form a locking lug spaced outwardly from back wall 8. The vertical distance between the lug and back wall 8 is greater than the thickness of the back wall of the channel member. The spacing between the locking lugs on channel member 7 is the same as the spacing between the T-shaped slots on channel member 1, so that both locking lugs may be fitted into the wide end of the T-shaped slots of the other channel member simultaneously. The length of each locking lug is slightly less than the width of the wide portion, but greater than the width of the narrow portion of the T-shaped slots 5. The width of the band 13 is less than the width of the narrow portion of the T-shaped slot. Accordingly, the channel members may be secured together by inserting the locking lugs into the wide portions of the T-shaped slots, and then sliding one channel member relative to the other to move the band 13 into the narrow portion of the T-shaped slot. The interengagement of the locking lugs with the narrow portions of the slots prevents straight line separation of the channel members.

In order to prevent the channel members from sliding in the reverse direction to return the locking lugs to the position in which they are aligned with the wide portions

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of the slots, and thereby permit straight line separation of said channel members, a resilient pawl-like latch 16 is struck inwardly from back wall 8 of channel member 7. Latch 16 is of triangular configuration and has considerable length so as to make it resilient. Latch 16 is inclined inwardly from back wall 8, and its free end 17 is bent outwardly to project a short distance beyond the outer surface of the back wall of its channel. The plane in which the free end 17 is bent intersects the tab 15 of each locking lug struck from channel member 7.

T-shaped slots 5 are so arranged relative to latch 16 that when the locking lugs are in registration with the wide portions of slots 5 the free end 17 of the latch engages the back wall 2 of channel member 1 adjacent one of the slots 5. Back wall 2 presses latch 16 inwardly so that its free end 17 is flush with the outer surface of said back wall. When the channel members are slid relative to each other in one direction the locking lugs move into engagement with the narrow portions of slots 5 and prevent straight line separation of the channel members. However, the channel members may be slid in the reverse direction until the locking lugs are positioned in registration with the wide portions of slots 5, and the channel members may then be easily separated by straight line movement in opposite directions.

When the channel members are slid relative to each other to position the locking lugs near the closed ends of the narrow portions of slots 5, the wide portion of one of the T-shaped slots 5 moves into registration with free end 17 of latch 16. The resilience of latch 16 causes said free end 17 to snap into said one slot, thereby preventing reverse sliding movement of the channel members relative to each other. If desired, the resilient latch may be struck from either channel member, and a projection extending from the latch and may be so located that it will engage a suitable recess or opening in the other channel member when the channel members are interlocked by the interengagement of the locking lugs and the narrow portions of the slots. The interengagement of latch 16, or a projection extending therefrom, with any suitable recess or opening in the other channel member will prevent relative lateral movement between the channel members in any direction.

T-shaped slots are preferred, but it should be noted that slots of other shapes may be used. It is possible to use any slot having an enlarged portion into which the lugs may be inserted, and a restricted portion adapted to cooperate with the lugs to prevent straight line separation of the channel members. It is possible also to use a single slot and a single lug.

If it is desired to separate the channel members, latch 16 is pressed to move the free end 17 of latch 16 out of engagement with the slot 5 with which it is engaged. While the free end 17 of latch 16 is held out of engagement with said slot 5, the channels may be slid relative to each other until the locking lugs are in registration with the wide portions of T-shaped slot 5. The channel

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members may then be separated by moving them along a straight line in opposite directions.

Although I have described a preferred illustrative embodiment in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as many details of construction may be modified or changed without departing from the spirit. Accordingly, I do not desire to be restricted to the exact structure disclosed.

I claim:

1. A structural assembly which comprises: a first structural member having a pair of aligned slots spaced from each other, said slots having a relatively wide and a relatively narrow portion; a second structural member having a web carrying a pair of lugs having heads of a size and shape to fit in said wide portion of said slot, but of a size and shape different and larger than said narrow portion, said head being secured to said second structural member by a neck portion of a size and shape to slide in said narrow portion of said slot, a resilient latch struck from said web and integrally attached at one of its ends thereto; the other, free end being disposed between said lugs and having the terminal end thereof bent out of the plane of said web toward the side carrying said lugs, said free bent end positioned to engage said first structural member intermediate said slots when said lugs are inserted into the wide portions of said slots, said structural members being relatively slidable to cause said lugs to move into engagement with the narrow portions of said slots with the free bent end of said latch automatically moving into engagement with one of said slots when said lugs are moved adjacent the closed ends of the narrow portions of said slots, the free end of said latch preventing said structural members from lateral movement when engaged with said one slot.

2. The structural assembly of claim 1 wherein said lugs are struck outwardly from said web and integrally attached thereto.

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CARL W. TOMLIN, *Primary Examiner*.

THOMAS F. CALLAGHAN, *Examiner*.