FRAMING SYSTEM FOR A SUSPENDED CEILING

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This invention relates to a system of perpendicularly intersecting framing members and more particularly has reference to improvements in the framing members in a conventional suspended ceiling system.

Most suspended ceiling systems are comprised of interlocking perpendicularly intersecting metal framing members which form a plurality of rectangular openings in which the acoustical panels, lighting fixtures and other ceiling elements are supported. The framing members are suspended from the roof by means of wires which are tied at spaced points along the length of the framing members.

The most important and troublesome problem associated with these ceiling systems is that of properly locking the intersecting framing members together. This locking should ideally be accomplished simply, quickly and with a minimum of skill required of the workman installing the system. However, the locking system presently in wide use employs a wire clip or locking device which is mounted in place straddling a main framing member with each leg projecting into an opening in a transversely extending framing member. The clip thereby secures the intersecting members together and maintains them in their transverse orientation.

However, the latter system has not proved to be satisfactory with respect to manufacturing and assembly cost. One of the locking clips described above must be provided at each joint, thereby substantially increasing the cost of materials for the assembly. In addition, mounting the clips has proved to be an inconvenient and time-consuming process, and since the installer is often not in a position to view where the holes or slots which receive the clips, the installer must insert the clip into place “blindly” or by feeling the joint. This is a considerable waste of time in installing the system, thereby considerably affecting the cost of installation.

Various other suspended ceiling systems have been suggested wherein the framing members are formed with various types of notches, slots, hooks and other elements which are intended to lock the framing members in position. All these systems are either uneconomical to manufacture, difficult to assemble, or do not provide a sufficiently strong connection at the joints.

It is therefore the primary object of the present invention to provide an improved locking system for such framing members in which the framing members may be formed at a minimum of cost, and the entire system may be assembled quickly and easily.

More particularly, it is the object of the present invention to provide a framing system of this kind which does not require the use of locking clips and the like and which may be locked together in position by the installer even from a position in which he cannot clearly see the joint.

Another object of the present invention is to provide a framing system of this kind in which the joint may be unlocked quickly and easily for disassembly, and the framing members may be subsequently again locked into place.

A further object of the present invention is to provide an improved lock for such framing members in which the framing members, once locked into position, are highly resistant to displacement regardless of the direction from which external forces are applied to the framing system.

As will be subsequently described in detail with respect to a preferred embodiment of the present invention, these objects are generally met by providing a single component system in which each member or beam includes small slots located at spaced points along its length and hook portions at opposite ends thereof. The rectangular grid is formed by locking the various members together at right angles to one another. Each hooked end fits within the slot of an adjacent transversely extending member, thereby locking the members against relative motion in any horizontal direction. A small tab or flap is formed immediately above each slot and is adapted, when the intersecting members are in connected position, to be bent inwardly to a position extending above the hook portions disposed in the slot so as to prevent the framing members from moving vertically with respect to one another.

Since the tab is formed of the same thin light material (e.g. aluminum) as the framing member itself, it may be easily bent with the thumb or forefinger into locking position. The tab can easily be felt by the installer after the members are mounted in position and can then be pressed inwardly with the thumb, locking the entire joint in place. If the joint is to be disassembled, the tab may be forced outwardly either with the finger, the end of a pencil or any other similar object.

I have found that this system for locking the framing members together provides, in effect, a “self-leveling” frame structure which is extremely resistant to sag even with a minimum of support from above and relatively heavy loads applied to the frame by the supported tiles or panels. This resistance to torque acts in any direction so that the frame is also highly resistant to twisting of the frame in the horizontal plane.

The hooks, slot and tab may be easily formed into the frame members when they are stamped or rolled. As a result, the cost of the framing system proposed herein is far less than that of the framing systems now in use.

Other objects and advantages of the present invention will be more readily apparent from the following detailed description of a preferred embodiment thereof. The description makes reference to the drawings in which:

FIGURE 1 is a fragmentary perspective view from below of a suspended ceiling system incorporating the framing members according to a preferred embodiment of the present invention;

FIGURE 2 is an exploded perspective view of a typical joint in the present improved locking system;

FIGURE 3 is a top plan view of the assembled joint of FIGURE 2 showing the locking tab in unlocked position in phantom lines;

FIGURE 4 is a cross-sectional view taken along the lines 4—4 in FIGURE 3; and

FIGURE 5 is a cross-sectional view taken along the lines 5—5 in FIGURE 4.

Referring to the drawings now in detail, FIGURE 1 shows a single component suspended ceiling system, generally indicated at 10, suspended from rafters 12. The system 10 comprises perpendicularly intersecting identical framing members 14 and 16 formed of aluminum, steel or any other suitable material, the numeral 14 being used to designate those framing members extending in a first or “longitudinal” direction, while 16 represents those members extending at right angles or in a “transverse” direction. Wires 18 are tied or otherwise connected at their upper ends to the rafters 12 and at their lower ends are tied to the framing members 14 and 16 in a manner which will be described below. The intersecting framing members 14 and 16 define a series of rectangular openings of uniform size in which conventional rectangular acoustical panels or ceiling tiles are supported in position. The rafters 12 are shown as supported at their ends on building walls 22.
FIGURES 2-5 show the typical intersection of the framing members 14 and 16 indicated at A in FIGURE 1. In FIGURE 2 the framing members are shown in exploded perspective view. Each frame member 14 and 16 is suitably folded and formed to define a central vertical wall or web 24 having a tubular or cylindrical upper edge 26, these parts being shown on longitudinal member 14 in FIGURES 2-5. A series of right angle bends at the leading edge 22 create horizontal flanges 28 and 30 extending outwardly from the web substantially at right angles thereto and on opposite sides thereof, thereby providing supporting surfaces upon which the acoustical panels 20 are supported.

The web 24 includes a vertical slit 32 located substantially midway between the upper and lower edges of the web. A portion of the web 24 is cut along spaced apart horizontal lines intersecting with the slit and the portion of web material between these two lines is pushed outwardly away from the web, thereby forming a tab 34 hinged at its remaining connection at 36 with the web 24. When the tab 34 is in its "open" condition (as in FIGURE 2) the end of the rectangular opening formed in the web by the tab forms the upper end of the slit 32. When the tab is in its "closed" position (coplanar with the web 24) the tab occupies the upper end of the slit 32, thereby creating an opening of the web 24 in the vertical dimension of the tab. The web 24 also includes a circular hole 38 to which the lower end of one of the wires 18 secured to the rafter 12 may be attached.

The transverse framing members 16 are identical to the longitudinal members 14. The portion of the longitudinal member 14 shown illustrates the construction of the central slit 32 while the transverse members 16 are shown at their end sections to illustrate the construction of the hooks. FIGURES 2-5 show the ends of the transverse members 16 (which will be identical to the ends of the longitudinal members 14) as being folded and formed to define a vertical web portion 40 having a tubular or cylindrical upper edge 42, and flanges 44 and 46 projecting substantially at right angles on opposite sides of the lower end of the web 20. The portions 40-46 are, of course, merely the extensions of the portions 22-36 at the center of each member. Flanges 44 and 46, flanges 28 and 30, serve to support the acoustical tiles 20 or other ceiling element in place. At each end of each framing member 4 and 16, a hook portion 48 is formed by a recessed or indented edge 50 and a vertical notch 52 at the forward end of the web 40. The vertical dimension of the flute portion 48 is substantially the same as the height of the slit 32; the hook portion 48 thus fits within the slit 32 until the notch 52 is disposed directly above the lower end of the slit 32. In this latter position, the plane of flanges 44 and 46 is slightly above the plane of flanges 28 and 30 of the longitudinal member 24. However, the flanges 44 and 46 terminate at a point rearwardly of the notch 52 such that, in the position described above, the forward edge of the flanges 44 and 46 is immediately above the outer horizontal edge of flange 28 or 30.

The entire member 16 may then be lowered slightly with the lower edge of the slit 32 fitting into the notch 52. When the upper end of the notch 52, indicated at 54, bears against the lower edge of the slit 32, indicated at 56, the planes of the flanges 44, 46 and 28, 30 coincide with the leading edge of the flanges 44, 46 abutting the outer horizontal edge of flanges 28 and 30. The upper horizontal edge 42 of framing member 16 is formed such that in this locating position its forward edge, which is curved as indicated at 57, abuts the adjacent surface of the web 24.

The slit 32 is formed so as to be wide enough to accommodate both hook portions 48. The hook portions 48, 28 and 30, 44 and 46, are inserted in position in the slit 32 of the web 24 with their hook portions 48 alongside one another. In this position, both framing members 16 and the longitudinal member 14 are prevented from moving horizontally with respect to one another due to the engagement of the notch 52 with the lower end 56 of the slit 32. The tab 34, which in its open position is disposed at an angle with respect to the plane of web 24, is accommodated within the opening formed by the recessed edge 50 in one of the members 16. The vertical dimension of the tab 34 is substantially equal to the length of the notch 52. When the tab 34 is depressed with the thumb or finger into its closed position in the plane of the web 24 the lower edge of the tab abuts the upper edges of the hook portions 48 and the upper end of the slit 32 is closed, thereby preventing either of the transverse members 16 from being moved vertically with respect to the longitudinal member 14.

The transverse member 16 also include circular holes 60 to which the lower ends of the wires 18 are normally tied. Thus the entire interlocked system of framing members is suspended from the rafters 12.

From the foregoing it can be seen that the interlocking notches 52 and slits 32 provide the locking action preventing the framing members 14 and 16 from moving with respect to one another in the horizontal direction. Relative movement of these members in the vertical direction is prevented solely by the tab 34 when bent into its closed position coplanar with the web 24. In FIGURE 3, the tab 34 is shown in phantom lines in its normally open position with the two transverse framing members 16 locked in position with respect to horizontal movement. In FIGURE 4, the framing members 14 and 16 are shown secured together both with respect to horizontal and vertical movement.

When the present single component framing system is installed, a series of the framing members are first mounted in spaced parallel fashion at the end of the wires below the rafters 12. The remaining framing members are then located to this framing members in the manner shown in FIGURE 1 until the entire grid is established. Each end of each framing member is locked in the slit at the center of a perpendicularly extending member; the slit of each member receives the hooks of two framing members intersecting the former member perpendicularly on opposite sides thereof. This is accomplished by orienting the members such that each hook portion 48 extends into the slit 32, the tab 34 being in its open position. The member is then moved downwardly so that the notch 52 fits over the portion 56 of slit 32. Both transverse members 16 are mounted in this fashion with the two hook portions 48 alongside one another. The front portions of the flanges 28 and 30 of the longitudinal member 24 extend into the slit 32. In this position, the hook portions 48 are prevented from moving vertically with respect to the support member 14. As a result, the intersecting members 14 and 16 are securely locked together against relative movement in any direction. The panels 20 are then dropped into place between the intersecting framing members.

In the single component system shown and described above, each frame member 14 and 16 will have a length equal to twice the side dimension of the ceiling tile or panel to be hung on a frame member. The members will be used where a 2 ft. x 2 ft. ceiling panel is to be supported. However, where desirable or necessary the framing members may be provided in other multiples of the panel dimension with the slits 32 being provided at spaced points (the spacing being equal to the panel dimension or some multiple thereof) along the length of the member.

By employing a single component system, manufacturing, estimating and installation costs may be reduced sub-
stantially from that required for conventional systems in which the framing members are of more than one size in each installation.

In the event these members are to be disassembled, the tab 34 may be pushed outwardly either with the finger, a pencil or the like, and the transverse members moved upwardly slightly to disengage the notches 52 from the slits 32; the members 16 are then pulled horizontally away from the longitudinal member 14.

The framing system described above has been found to be "self-leveling" as a result of its high resistance to sag. This twist or torque resistance is due to the nature of each joint. The hook portion 48 contacts the wall 24 of the longitudinal member 14 at the lower end 56 of the slit 32 and along the lower edge of the tab 34.

In addition, the projecting edge 57 of the tubular upper edge 42 bears against the tubular upper edge 26 of the member 14; since two transverse members 14 are connected at each joint and on opposite sides of the wall 24, the force exerted by each end 57 against the edge 26 will be resisted by the end 57 on the opposite side of the wall 24 which bears against the edge 26 with an equal and oppositely directed force. Thus the forces acting through end 57 towards the wall 24 of the longitudinal member 14 are effectively nullified by the resistance of the end 57 on the opposite side of the wall. If the torque applied to the member 16 is directed so as to try to move the end 57 away f: on the wall 24, this moment will be resisted by the flanges 28 and 30 which bear against the forward edge of flanges 44 and 46.

Thus it can be seen that twisting of the framing members is effectively resisted in each transverse member at four separate bearing points: (1) At the juncture of notch 52 with the lower end 56 of slit 32; (2) at the line of contact between tab 34 and the upper edge of the hook portions 48; (3) at the line of contact between end 57 and edge 26; and (4) at the juncture of the flanges 28 and 30 with flanges 44 and 46.

As a result of these spaced bearing areas, I have found that a frame constructed in accordance with the present invention is more resistant to twisting and sag than any system now available. This "self-leveling" feature permits the frame to be supported with fewer connections to the rafters and to support heavier files and ceiling panels than are normally used. Moreover, this system is also resistant to misalignment or twisting of the frame in the horizontal plane in the contact between the flanges 28 and 30 and flanges 44 and 46. Thus the present invention provides a system which, once locked together, is virtually completely safe from misalignment in any direction.

Although the above description and drawings show how the present invention can be incorporated into a single component system, it can readily be appreciated that it may easily also be employed in a conventional system wherein elongated main frame members extend the length of several panels with shorter transverse members intersecting the main members at spaced points along its length. In such a case, the members 14 and 16 described above will not be identical members but will differ completely in their length and shape. The member 14 will then be the main member with the slits 32 located at spaced points along the length of the wall 24. The members 16 will be of shorter length, e.g. the length of a single ceiling file. The hook portions will not be provided on the ends of the member 14 and the vertical slits 32 will not be provided along the length of the shorter members 16. The present locking system is obviously adaptable for many other framing systems wherein the relative size of the framing members differs from that described above. In each case the location of the slits and hooks can be easily varied to suit the particular system.

Regardless of the system employed, it can be seen that the relative locations of the hook portions 48, the notch 52, and tab 34 may be easily varied if desired. In addition, the present improved locking system may be easily adapted for use with types of structural framing systems other than ceiling systems if desired.

It will be apparent to those skilled in the art to which this invention pertains that various changes and modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

**Claim:**

1. In a ceiling construction having a plurality of spaced parallel longitudinal members, and a plurality of spaced transverse members connected to said longitudinal members to form openings in which ceiling tiles and the like are supported, said longitudinal and transverse members having substantially equal height, an improved locking system for said longitudinal and transverse members, comprising:

(a) hook portions formed at the end of each transverse member,

(b) an opening in said longitudinal member adapted to receive simultaneously the hook portions of transverse members intersecting said longitudinal member on opposite sides thereof, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its vertical axis, said transverse members and longitudinal member being then relatively movable vertically to a position wherein said hook portions engage said longitudinal member at the perimeter of said opening, in said last position said transverse and longitudinal members being locked together against relative movement in the horizontal plane,

(c) and a tab portion on said longitudinal member pivotable between an open and closed position, in said open position said tab permitting said hook portions to move vertically with respect to said opening, in said closed position said tab preventing such relative vertical movement and thereby locking said framing members together.

2. The suspended ceiling construction as set forth in claim 1 and wherein said longitudinal and transverse members are identical so as to form a uniform component system, the central portion of said component including the aforesaid features of said longitudinal member and the ends of said component including the aforesaid features of said transverse member.

3. In a ceiling construction having a plurality of spaced parallel longitudinal members, and a plurality of spaced transverse members connected to said longitudinal members to form openings in which ceiling tiles and the like are supported, said longitudinal and transverse members having substantially equal height, an improved locking system for said longitudinal and transverse members, comprising:

(a) hook portions formed at the end of each transverse member,

(b) an opening in said supporting member adapted to receive simultaneously the hook portions of transverse members intersecting said longitudinal member on opposite sides thereof, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its vertical axis, said transverse members and longitudinal member being then relatively movable vertically to a position wherein said hook portions engage said longitudinal member at the perimeter of said opening, in said last position said transverse and longitudinal members being locked together against relative movement in the horizontal plane,

(c) and a tab portion formed of a portion of said longitudinal member adjacent to said opening, said tab portion being pivotable between open and closed position, in said open position said tab leaving said opening unobstructed and thereby permitting said hook portions to move vertically with respect to said opening, in said closed position said tab obstructing the unoccupied portion of said opening and thereby
4. In a ceiling construction having a plurality of spaced parallel longitudinal members, and a plurality of spaced transverse members connected to said longitudinal members to form openings in which ceiling tiles and the like are supported, each of said longitudinal and transverse members having substantially equal height and including a vertical web portion and horizontal flanges projecting outwardly therefrom, an improved locking system for said longitudinal and transverse members, comprising:
(a) hook portions formed in the web portions at the ends of each transverse member,
(b) a recess in the web portion of each of said transverse members adjacent to said hook portion,
(c) a vertical notch formed in said hook portion on the edge thereof away from said recess,
(d) a vertical slit in said longitudinal member adapted to receive simultaneously the hook portions of transverse members intersecting said longitudinal member on opposite sides thereof, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its vertical axis, said transverse members and longitudinal member being then relatively movable in the vertical direction to a position wherein said notch engages one end of said slit, and thereby locking said longitudinal and transverse members against relative movement in the horizontal plane,
(e) and a tab portion formed in the web of said longitudinal member substantially equal to an open and closed position, in said open position said slit being unobstructed for entrance and removal of said hook portions, in said closed position said tab obstructing the portion of said slit exposed when said transverse member having said hook portion is in said locking position, said tab then preventing relative vertical movement between said framing members and thereby locking said framing members together.

5. In a ceiling construction having a plurality of spaced parallel longitudinal members, and a plurality of spaced transverse members connected to said longitudinal members to form openings in which ceiling tiles and the like are supported, said longitudinal and transverse members having substantially equal height, each of said longitudinal and transverse members including a vertical web portion and horizontal flanges projecting outwardly therefrom, an improved locking system for said longitudinal and transverse members, comprising:
(a) hook portions formed at the ends of the web portions of each transverse member, said hook portions including a vertical notch along the lower edge thereof,
(b) a vertical slit in said web of said longitudinal member having a width substantially equal to twice the thickness of said hook portion, the height of said slit being equal substantially to the vertical dimension of said hook portion, said slit thereby receiving simultaneously the hook portions of said transverse members intersecting said longitudinal member on opposite sides thereof, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its axis, said transverse members being then relatively movable in the vertical direction to a position wherein said notch engages said web portion of said longitudinal member at the lower end of said slit, in said last position the forward edges of the flanges on said transverse members abutting the edges of the flanges on said longitudinal member, said transverse and longitudinal members being then locked together against relative movement in the horizontal direction,
(c) and a tab portion in the web of said longitudinal member hinged about a vertical line in said last web portion between an open and a closed position, the vertical dimension of said tab portion being equal to the vertical dimension of said notch, in said open position said tab leaving the upper end of said slit unobstructed to receive said hook portions, in said closed position said tab closing the upper end of said slit and extending across the upper edges of said hook portions so as to prevent relative movement with respect to said longitudinal member, thereby locking said framing members together.

6. The locking system as set forth in claim 5 and wherein said tab portion is formed by cutting a portion of the web of said longitudinal member along two parallel lines and a third line intersecting said parallel lines, said third line being co-linear with the lower end of said slit, the portion defined by said three cuts being then pushed outwardly away from the plane of said web about its remaining connecting line in said web portion.

7. A suspended ceiling construction, comprising:
(a) a longitudinal member having a vertical web portion with a slit formed therein,
(b) a pair of transverse members intersecting said supporting member at right angles thereto and at opposite sides thereof, each of said transverse members including a vertical web portion, said transverse and supporting members having substantially equal height,
(c) a hook portion formed at the end of each of said web portions on said transverse members, said slit being adapted to receive simultaneously the hook portions of said transverse members, said supporting and transverse members intersecting in this manner without rotation of either of these members about its axis, said transverse members and longitudinal member being relatively movable in the vertical direction to a position wherein said hook portions engage the perimeter of said open, in said last position said transverse and longitudinal members being locked together against relative movement in a horizontal direction,
(d) and a tab portion on said longitudinal member pivotable between an open and closed position, in said open position said tab permitting said hook portions to be placed within said opening and moved to said locking position, in said closed position said tab obstructing the unoccupied portion of said opening and thereby preventing relative vertical movement between said transverse and longitudinal members.

8. A suspended ceiling construction, comprising:
(a) a longitudinal member having a vertical web portion and horizontal flanges projecting outwardly therefrom,
(b) a pair of transverse members intersecting said longitudinal member at right angles thereto and on opposite sides thereof, said longitudinal and transverse members having substantially equal height, said transverse members each including a vertical web portion and horizontal flanges extending outwardly at the lower end thereof,
(c) hook portions formed in the web portion of each of said transverse members at the end thereof,
(d) a vertical slit in the web portion of said longitudinal member adapted to receive simultaneously the hook portions of said transverse members, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its axis, said transverse members and longitudinal member being then relatively movable in the vertical direction to a position wherein said hook portions engage the web portion of said longitudinal member at one end of said slit, in said last position said transverse and longitudinal members being locked together against relative movement in the horizontal direction,
(e) and a tab portion formed in the web of said longitudinal member and pivotable between an open and
closed position, in said open position said tab permitting said hook portions to move into said slit and into said locking position, in said closed position said tab obstructing the unoccupied portion of said slit when said hook portions are in said locking position and thereby locking said transverse and longitudinal members together against movement in the vertical direction.

9. A suspended ceiling construction, comprising:
(a) a longitudinal member having a vertical web and horizontal flanges projecting outwardly therefrom at the lower end of said web,
(b) transverse members intersecting said longitudinal member at right angles thereto and on opposite sides thereof, said longitudinal and transverse members having substantially equal height, said transverse members each comprising a vertical web and horizontal flanges projecting outwardly from the lower edge of said web,
(c) a hook formed in the web of each of said transverse members at one end thereof, said hook including a vertical notch along its lower edge,
(d) the vertical slit in the web of said longitudinal member being adapted to receive simultaneously the hooks of said transverse members, said longitudinal and transverse members intersecting in this manner without rotation of either of these members about its axis, said transverse members being then relatively movable in a vertical direction to a position wherein said notches engage said web of said longitudinal member at the lower end of said slit, in said last position said transverse and longitudinal members being locked together against relative movement in a horizontal direction,
(e) and a tab portion formed in the web of said longitudinal member and pivotable about a vertical line in said last web displaced from said slit between an opened and a closed position, in said open position said tab leaving said slit unobstructed for entrance of said hooks and movement of said transverse members to said locking position, in said closed position with said transverse members in said locking position said tab occupying the portion of said slit not occupied by said hooks and thereby preventing vertical movement of said transverse members with respect to said longitudinal member.

10. The ceiling construction as set forth in claim 9 and wherein the vertical dimension of said notch substantially equals the vertical dimension of said slit with said tab in open position.

11. The ceiling construction as set forth in claim 10 and wherein the vertical dimension of said notch substantially equals the vertical dimension of said tab.

12. The ceiling construction as set forth in claim 9 and wherein in said first locking position the forward end of the flanges on said transverse members abuts the edges of the flanges on said longitudinal member.

13. The suspended ceiling construction as set forth in claim 11 and wherein in said locking position the front edge of the upper portion of the web of said transverse members abuts a face of the web of said longitudinal member.

14. The suspended ceiling construction as set forth in claim 9 and wherein said tab is formed by cutting the web of said longitudinal member along two parallel lines and along a third line intersecting said two lines at right angles thereto, said third line being co-linear with said slit at the upper portion thereof, the section formed by these lines being pushed outwardly from the plane of said last web about its remaining connection along a vertical line in the plane of said last web.

References Cited

UNITED STATES PATENTS

860,884 7/1907 Priddle -------- 287—189.36 X
1,161,316 11/1915 Jones ------- 287—189.36 X
2,903,104 9/1959 Brown ------- 287—189.36 X

FOREIGN PATENTS

325,001 12/1957 Switzerland.

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