Dec. 5, 1967 D. L. SMITH 3,356,402

FRAMING SYSTEM FOR A SUSPENDED CEILING

Filed Jan. 8, 1965 2 Sheets-Sheet 1

FIG. 1

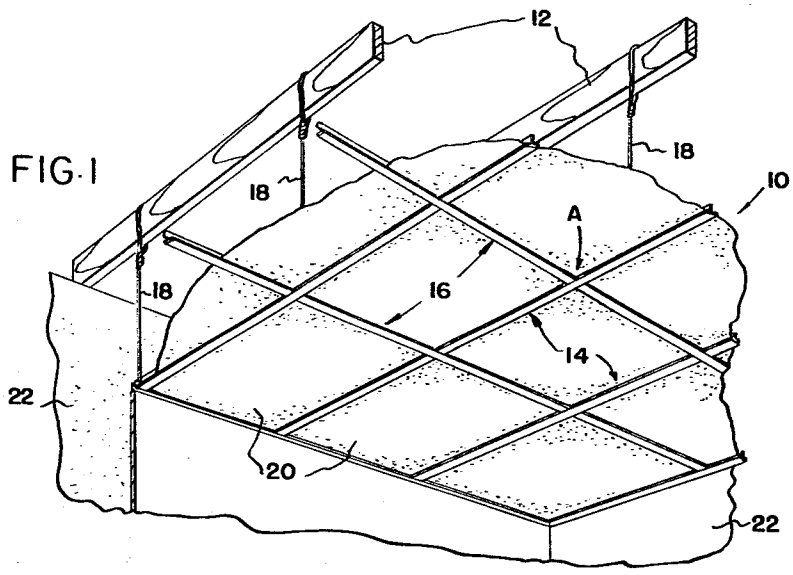
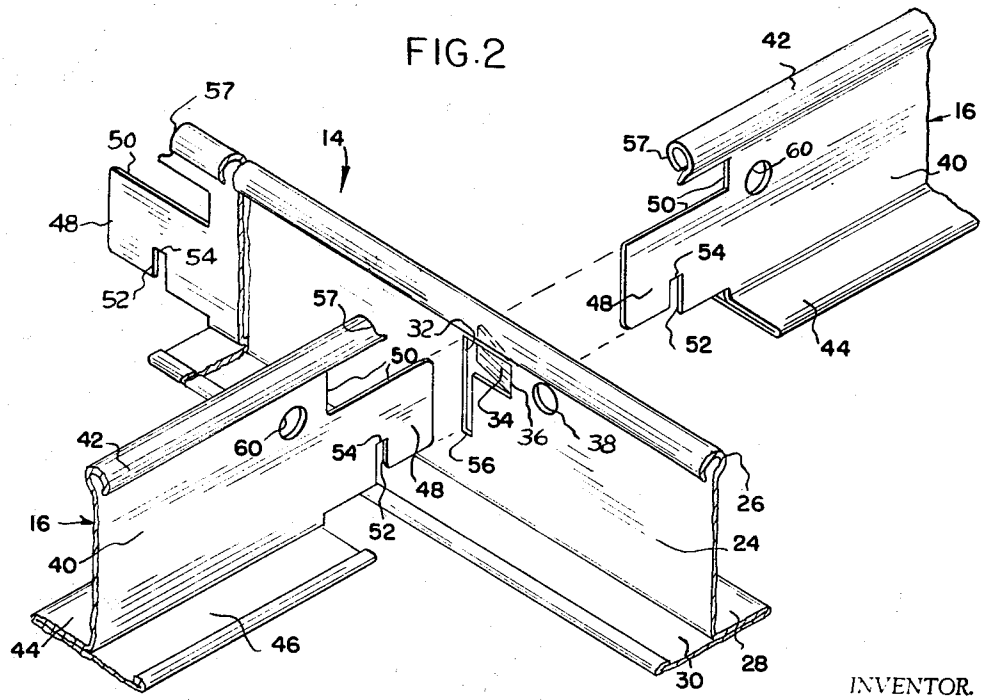


FIG. 2



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FRAMING SYSTEM FOR A SUSPENDED CEILING

Filed Jan. 8, 1965 2 Sheets-Sheet 2

FIG. 3

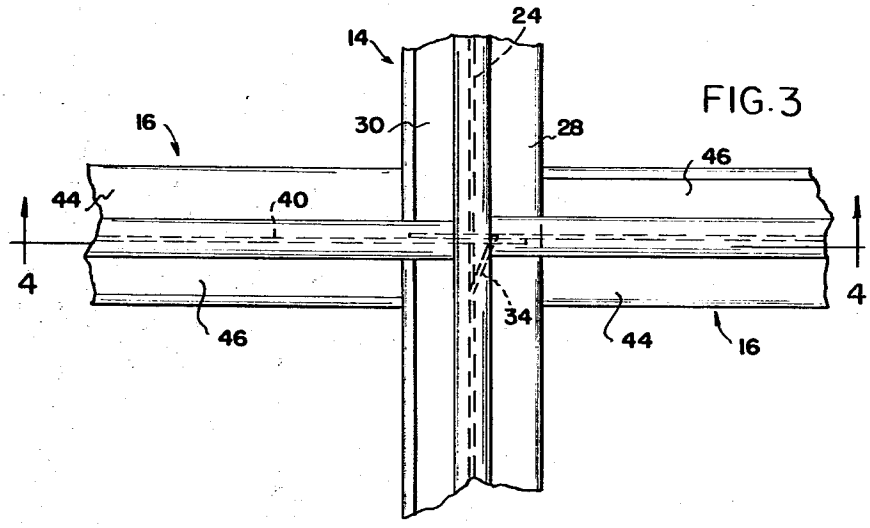


FIG. 4

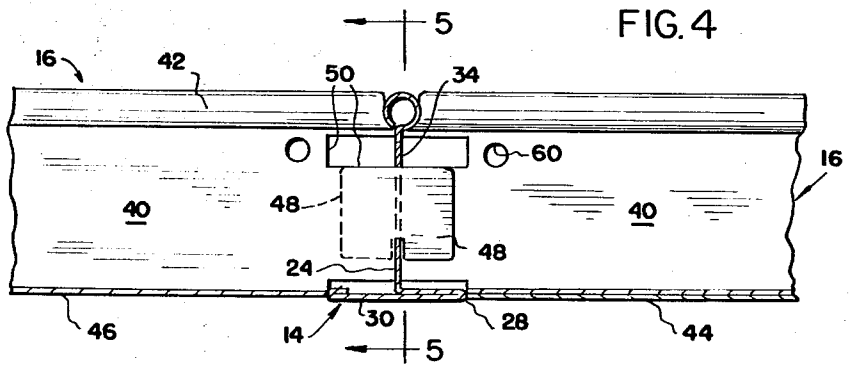
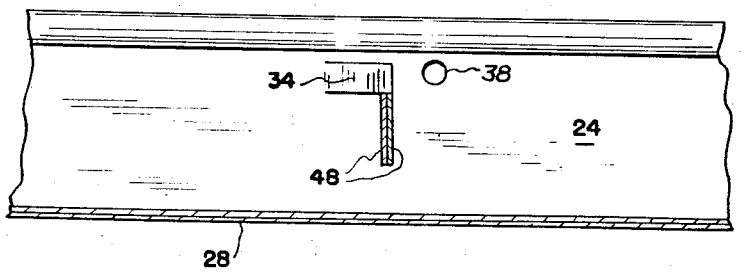


FIG. 5



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3,356,402

FRAMING SYSTEM FOR A SUSPENDED CEILING

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14 Claims. (Cl. 287—189.36)

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. It requires that the installer be in a position where he can see the holes or slots which receives the clips. Since the installer is often not in a position to view the holes, he must insert the clip into place "blindly" or by feeling the joint. The result 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 directon. 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 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 lower end of web **24** 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 reducing the length of the slit by an amount equal to 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 **40**. The portions **40–46** are, of course, merely the extensions of the portions **24–30** at the center of each member. Flanges **44** and **46**, like 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 hook 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** or **30**. The upper tubular edge **42** of framing member **16** is formed such that in this locking 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 two framing members **16** 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 securely locked 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 **18** below the rafters **12**. The remaining framing members are then locked to these 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 **44** and **46** abut the edges of the respective flanges **28** and **30**. The curved front edge **57** at the upper portion **42** of each transverse member **16** abuts the adjacent face of the upper portion **26** on the longitudinal member **14**.

The tab **34** is then depressed, causing it to swing to its closed position wherein its lower edge is disposed immediately above the upper edges of the two hook portions **48**. 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 supported. Thus a four foot framing member 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 end **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 each 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 from 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 due to the contact between 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 tile. 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 member **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.

I 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

preventing relative movement between said framing members and locking them together.

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 pivotable between 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 members are 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 downwardly 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 same from vertical 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 opening, 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 abut 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.

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