June 23, 1964 K. E. GORDON 3,138,227

FRAMEWORK FOR A SUSPENDED CEILING

Filed Aug. 18, 1961

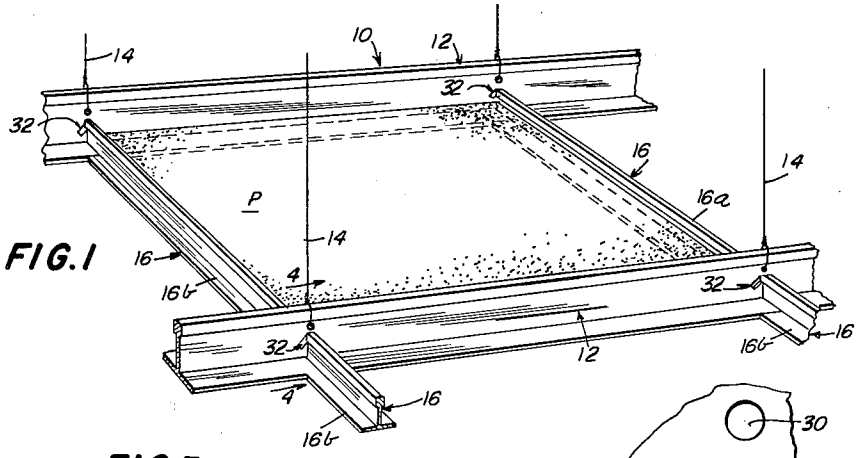


FIG. 1

FIG. 3

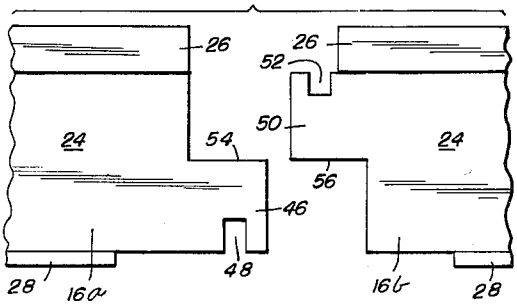
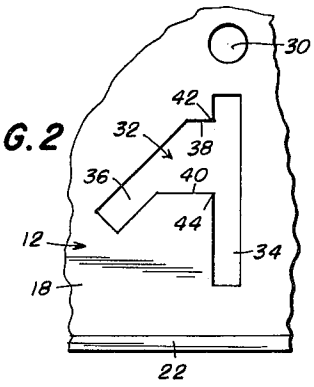


FIG. 2



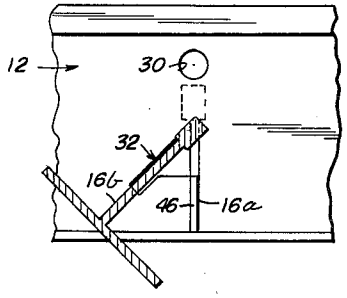


FIG. 5

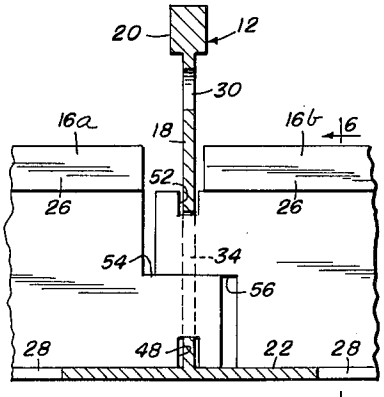


FIG. 4

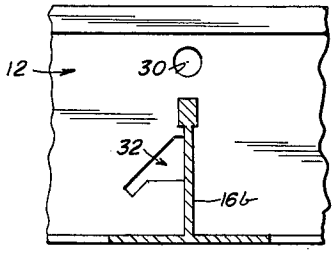


FIG. 6

INVENTOR

K. E. GORDON

BY Beale and Jones

ATTORNEYS

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FRAMEWORK FOR A SUSPENDED CEILING

Kerwin E. Gordon, Magnolia, Ark., assignor to Southern Extrusions, Incorporated, a corporation of Arkansas

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2 Claims. (Cl. 189—36)

This invention relates to improvements for the framework for a suspended ceiling shown and claimed by me and William C. Ferguson in U.S. Patent 2,946,414, issued on July 26, 1960. More particularly, this invention relates to improved locking means by which the transverse support members in a suspended ceiling are locked into the longitudinal support members.

In the patent referred to above the invention resides in a longitudinal support member having spaced openings therein, said openings receiving from opposite sides the adjacent ends of two collinear transverse support members. The openings are so designed and the ends of the transverse support members so configured that a locking effect may be established, precluding the accidental displacement of the transverse support members from their proper position. In the instant invention I have provided novel improvements in the longitudinal support member openings to more securely hold the transverse support members in their proper position.

Accordingly, it is the principal object of this invention to provide in a framework for a suspended ceiling construction an improved locking means which is easy to fabricate and which will securely hold the various supporting members in their proper position.

It is a further object of the present invention to provide in a framework for suspended ceiling construction locking means which do not involve bending of the support members of the framework.

Another object of this invention is to provide in a framework for a suspended ceiling construction locking means for the various support members which is inherent in the members themselves and which do not require special parts in addition to the support members.

This invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims, and illustrated in the accompanying drawing, wherein:

FIG. 1 is a downward perspective view showing a framework for a suspended ceiling embodying the invention;

FIG. 2 is an enlarged fragmentary side elevation of a longitudinal member embodying the invention showing the improved locking opening;

FIG. 3 is a fragmentary side elevational view of the adjacent ends of two collinear transverse support members;

FIG. 4 is a fragmentary sectional view taken along the lines 4—4 of FIG. 1;

FIG. 5 is a fragmentary sectional view taken along the transverse support member showing a step in the installation process;

FIG. 6 is a fragmentary sectional view taken along the lines 6—6 of FIG. 4.

More specifically and referring to the drawing, a framework for a suspended ceiling embodying the invention is shown in FIG. 1 and is generally designated **10**. It will be understood that an acoustical or insulating panel P appropriately cut is dropped down into the rectangular spaces between the support members and is supported therein. The framework comprises a plurality of parallel, longitudinal support members **12** which are suspended in spaced relation on wires **14** or the like hanging down from the roof of a building. Running perpendicular to the support members are a plurality of spaced transverse support members generally designated **16**. Each

individual transverse support member is in length only the distance between two adjacent longitudinal support members. However, because a plurality of transverse support members are arranged collinearly they create from below the effect of uninterrupted lines intersecting the longitudinal support members.

All support members are preferably of aluminum extrusions, although rolled steel members are satisfactory.

It should be understood that in this application the terms "longitudinal" and "transverse" are not intended to indicate direction with respect to the length or width of the building in which the framework is installed. The terms are intended only to distinguish support members running in one direction from support members running in a perpendicular direction.

From FIG. 1 it can be seen that each of the support members is an inverted T-shaped structure. The longitudinal support members **12**, for instance (see FIG. 4), each comprise a vertical web **18** having a thickened reinforcing head **20** along the upper edge thereof. Outwardly from the lower edge of the web extend ceiling-panel-supporting flanges **22**. As seen from FIG. 3, the transverse support members each comprise a vertical web **24** of somewhat less height than the vertical web of the longitudinal support member. The transverse support members have similar reinforcing heads **26** along the upper edges thereof and have from the lower edges thereof oppositely extending ceiling-panel-supporting flanges **28**.

Reference to FIG. 2 discloses that formed in the vertical web **18** of the longitudinal support member, below the thickened head thereof, is an aperture **30** by which a wire **14** hanging down from the roof of the building engages the framework to support the same. The apertures are preferably spaced on 12 inch centers. Preferably adjacent and below each aperture is formed an opening **32** for receiving in locking engagement the intersecting transverse support members **16**. The novel and improved opening **32** of this invention principally comprises a vertical slot **34** and an inclined slot **36** having its upper end horizontally offset just below and near the upper end of the vertical slot. The inclined slot **36** is disposed at about 45 degrees to the vertical and if it were to be extended upwardly its uppermost side would intersect the upper left hand corner of the vertical slot **34**. To complete the opening **32** a portion of the metal of the vertical web **18** between the slots and below a first horizontal projection line **38** extending from the uppermost corner of the inclined slot **36** is removed down to a second horizontal line **40** extending between adjacent sides of the slots. The line **40** runs through the approximate mid-point of the vertical slot **34** as shown. It will be noted that by this construction a major portion of the left hand side of the slot **34** is left intact. Only the side of this slot extending between corners **42** and **44** is removed to complete the openings **32**. This construction has the effect of more securely holding the transverse support members in place as will be referred to below.

Reference to FIG. 3 indicates that the first of two transverse support members **16***a* is formed with a first projection **46** extending out beyond the end of its vertical web **24**. The bottom edge of this first projection has an upwardly extending notch **48** therein slightly larger in width than the thickness of the vertical web of the longitudinal support member. In the area adjacent the projection the outwardly extending ceiling-panel-supporting flanges **28** are removed to accommodate the flanges **22** of the longitudinal support member. The second transverse support member **16***b* extends collinearly and from an opposite direction from the first support member **16***a* and is formed with a second projection **50**. The second

projection on the vertical web 24 of the second transverse support member is formed in a position adapting it to be disposed above the first projection of the first transverse support member when all members are in place. It will be noted that the second projection 50 is formed with a notch 52 extending down thereinto at the top edge thereof, the second notch also being of a width approximately equal to but slightly larger than the thickness of the vertical web 18 of the longitudinal support member. As with the first transverse support member the second transverse support member in the area adjacent its ends has its ceiling-panel-supporting flanges 28 removed to accommodate the flanges 22 of the longitudinal support member.

FIGURES 4 and 6 show the relation of the longitudinal support member with the two transverse support members locked therein. The lower portion of the vertical slot 34 of the longitudinal support member receives the first projection 46 with the notch 48 thereof receiving the portion of the vertical web 18 of the longitudinal support member immediately below the vertical slot. The second projection 50 rests on top of the first projection 46, and the notch 52 in the upper edge of the second projection receives the area of the vertical web immediately adjacent and above the vertical slot. It will be realized that the sum of the heights of the projections at the notches is slightly shorter than the height of the vertical slot 34. However, the height of each projection at its notch is such that when both projections are placed one on top of the other in the vertical slot 34, the bottom of the upper notch 52 will be slightly above the corner 42 in the opening 32. Thus by providing the peculiar shape of the opening 32 including the corner 42, the second transverse support member is prevented from moving laterally and having its projection 50 displaced into that part of the opening 32 between the two slots. It can be seen that by this construction after the two transverse support members are locked in place, they are not likely to be displaced from their proper position. As a further safeguard against accidental displacement of the transverse support members the projection 50 of the second transverse support member 16b may be so dimensioned that when it is in place its lower edge 56 will rest slightly below the corner 44 and the bottom of its notch 52 will rest slightly above the corner 42 of the opening 32. In this manner it will be seen that both projections are securely locked in the opening 32. The second projection 50 can be removed by only lifting it slightly and then moving it over into the inclined slot 36. It is apparent that the novel construction of this invention not only prevents the transverse members from longitudinal movement, but also prevents them from moving laterally or rotating about their longitudinal axis when they are placed in the opening 32.

Further reference to FIG. 4 shows a clearance between the various portions of the transverse support members to permit ease of installation. It should be noted that the ceiling-panel-supporting flanges 22 and 28 of all three support members are flush and have their bottom surfaces in a common horizontal plane.

The manner in which the two transverse support members 16*a* and 16*b* are installed in the longitudinal support member 12 is shown in FIG. 5. Once the position of the longitudinal support member is established by the wires 14, the first projection 46 is slipped into the vertical slot 34, and with the notch 48 on the lower edge of the first projection aligned with the vertical web 18 of the longitudinal support member, the first transverse support member is tapped or pulled down into position. Next, the second transverse support member 16*b* is angled as shown in FIG. 5, and the second projection 50 is slipped into the inclined slot 36. With the notch 52 on the upper edge of the second projection aligned with the vertical web 18, the second transverse support member is moved upwardly so that the bottom of the notch 52 just clears the corner 42 of the opening 32. The second projection

is then urged upwardly and laterally until the notch 52 receives the portion of the vertical web 18 above the vertical slot 34. The second transverse support member 16*b* is rotated into its proper position with the lower edge 56 of the second projection 50 resting on the upper edge 54 of the first projection 46. As stated above the projections are dimensioned to allow the bottom of the notch 52 to be above the corner 42 of the opening 32 when the second transverse support 16*b* is in place. This will prevent the upper part of the projection 50 from moving laterally into the opening 32. Also, as explained above, the projections may be of such size that the lower edge 56 of the projection 50 will rest slightly below the corner 44. This will prevent the lower portion of the projection 50 from moving laterally into the opening 32. Also, as explained above, the projections may be of such size that the lower edge 56 of the projection 50 will rest slightly below the corner 44. This will prevent the lower portion of the projection 50 from moving laterally into the opening 32.

With the two collinear transverse support members thus in position it is impossible to withdraw them or for them to be accidentally displaced without first moving the second projection over into the inclined slot 36. Such movement will be impossible once the ceiling panels P are in place because if correctly fitted the panels preclude the tilting of the second transverse support member 16*b*. However, by the construction shown in this invention the transverse support members will remain in their proper positions even before the panels P are placed in position.

For adaptability, opposite ends of each transverse support member are made complementary. In other words, each transverse member has on one end a projection similar to the first projection 46 and on the opposite end a projection similar to the projection 50. However, each of the projections may be dimensioned slightly different to cooperate properly with the size and exact shape of the opening 32 in the longitudinal support member.

Thus it will be seen that I have invented a practical and improved locking means for use in the construction of the framework for suspended ceilings. The improved locking means is simple to fabricate and effect, and once established it absolutely prevents the accidental displacement of the transverse support members.

While the invention has been shown in but its preferred form, it is obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit and scope of the claimed invention.

I claim:

1. In a suspended ceiling comprising a longitudinal support member and a pair of collinear transverse support members intersecting said longitudinal support member wherein each of said support members comprises a vertical web having outwardly extending ceiling-panel-supporting flanges, and wherein said longitudinal support member has an opening in the vertical web thereof, the improvement wherein said opening comprises a vertical slot and an inclined slot, and an intermediate area joining the upper end of the inclined slot with a portion of said vertical slot, said inclined slot being located on only one side of said vertical slot, the intermediate area formed by removing the material between the slots below a first horizontal projection-line extending from the uppermost corner of said inclined slot down to a second horizontal line extending between adjacent sides of said slots, the first of said transverse support members having a first projection extending from one end thereof, said first projection having a notch in the lower edge thereof, the second of said transverse support members having a second projection extending from one end thereof, said second projection having a notch in the upper edge thereof, said first projection extending into said vertical slot from one direction with the notch therein receiving the part of the vertical web of the longitudinal support mem-

ber immediately below the vertical slot, said first projection being prevented from moving laterally by engagement of its sides with the sides of said vertical slot near the lower end thereof, the top of said first projection being substantially coplanar but located on a plane below said second horizontal line, and the second projection extending into said vertical slot from the opposite direction and resting on the first projection, said notch on the second projection receiving the part of the vertical web of the longitudinal support member immediately above the vertical slot, said second projection being prevented from moving laterally by engagement of the upper and lower part of both sides of said second projection with sides of said vertical slot, the height of the vertical slot being substantially equal to the sum of the heights of the projections at the notches, whereby the ends of the transverse support members are locked in said vertical slot and can be unlocked only by maneuvering said second projection out of the upper end of said vertical slot and down into said inclined slot.

2. In a suspended ceiling as described in claim 1 in which the side of the vertical slot nearest the inclined slot has an upper and a lower vertical surface, said upper vertical surface engaging the upper side of said second projection and said lower vertical surface engaging the lower side of said second projection, the side of the vertical slot opposite the inclined slot engaging the entire length of the second projection, said engagements locking the second projection securely in position in the vertical slot to prevent lateral and rotational movement.

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993,209 France ---------- July 18, 1951