United States Patent

[11] 3,589,086

[72] Inventor **Roland Kurt Schilling**
6001 Altmark Ave., Whittier, Calif. 90601

[21] Appl. No. **848,832**
[22] Filed **Aug. 11, 1969**
[45] Patented **June 29, 1971**

[54] **REMOVABLE SUSPENDED CEILING SUPPORT**
12 Claims, 19 Drawing Figs.

[52] U.S. Cl. **52/127,** 52/484, 52/488, 52/496
[51] **Int. Cl.** **E04b 5/55**
[50] **Field of Search** 52/484, 488, 496, 495, 501, 726, 476, 144, 127, 483

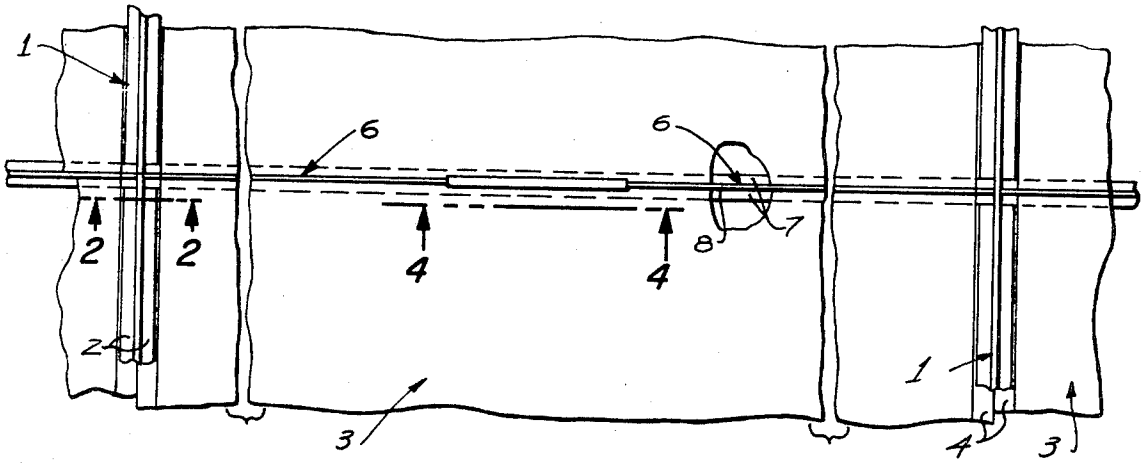
[56] **References Cited**

UNITED STATES PATENTS

2,882,559	4/1959	Stanley	52/488
2,963,132	12/1960	Rosenbaum	52/127
3,108,334	10/1963	Lindstrom	52/484
3,284,977	11/1966	Lickliter et al.	52/726 X
3,327,444	6/1967	Downing	52/496 X

Primary Examiner—Price C. Faw, Jr
Attorney—Lyon & Lyon

ABSTRACT: A removable support for suspended ceilings, the support generally being in the form of an inverted T, the lateral portions of which fit in slits formed in the confronting edges of the ceiling tile; the support being accessible to a thin blade inserted between the confronting edges of the tile and extended thereby so that the extremities of the support may rest on transversely extending fixed suspension members, or retracted to clear the fixed suspension members for removal of a selected ceiling tile.



PATENTED JUN 29 1971

3,589,086

SHEET 1 OF 2

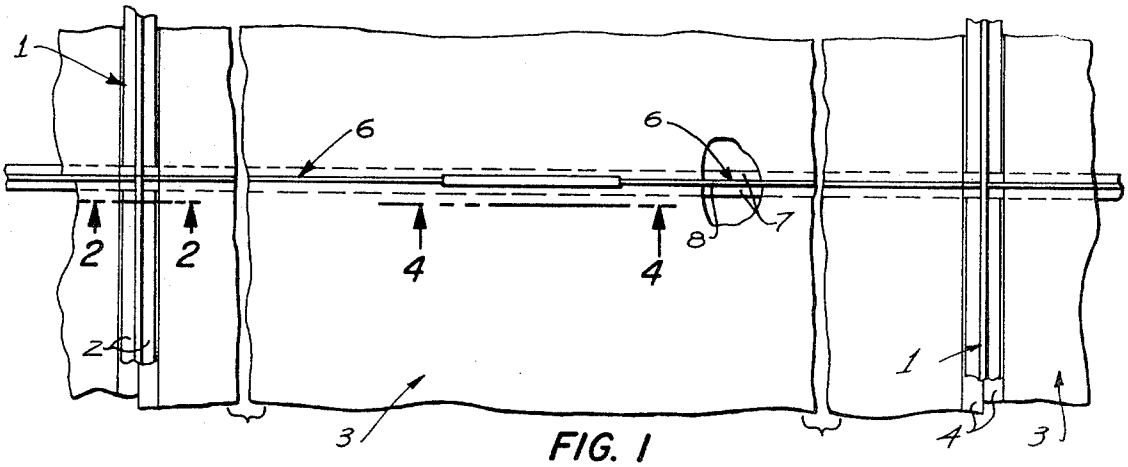


FIG. 1

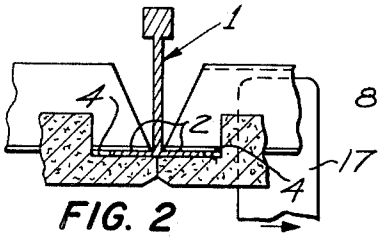


FIG. 2

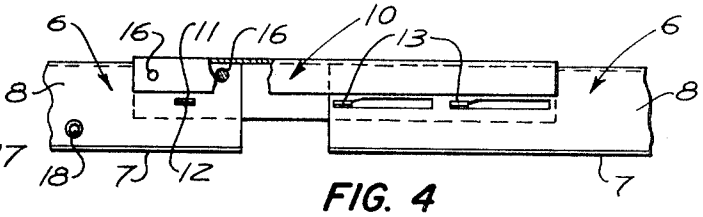


FIG. 4

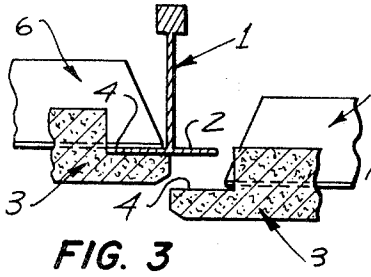


FIG. 3

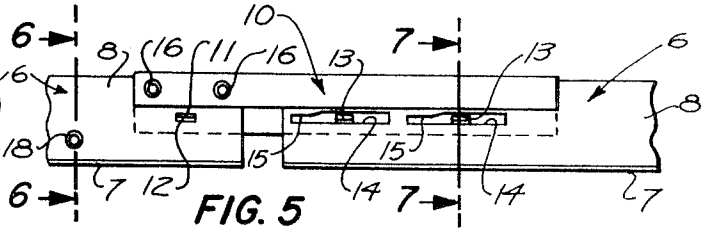


FIG. 5

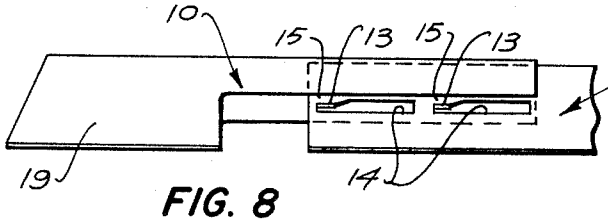


FIG. 8

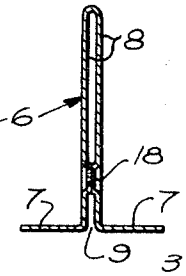


FIG. 6

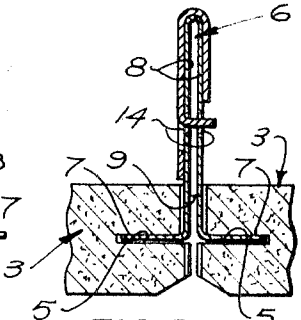


FIG. 7

INVENTOR.
ROLAND KURT SCHILLING
BY
Lyon Lyon
ATTORNEYS

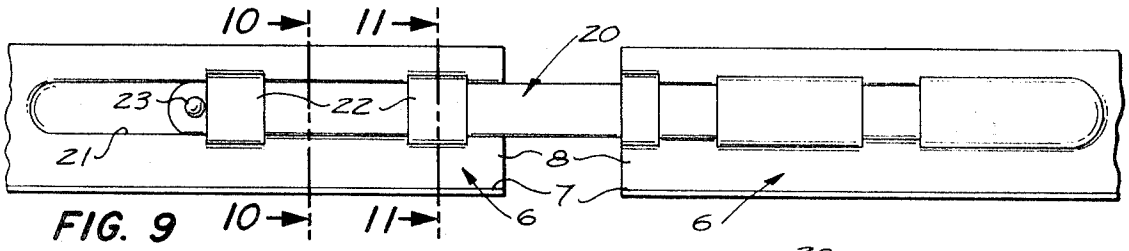


FIG. 9

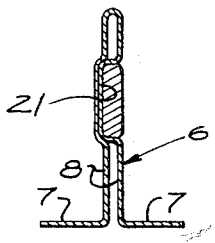


FIG. 10

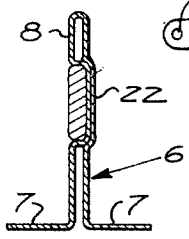


FIG. 11

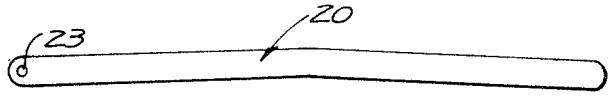


FIG. 12

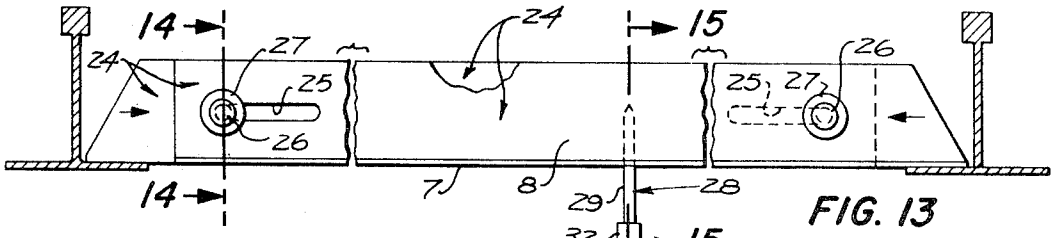


FIG. 13

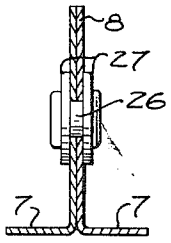


FIG. 14

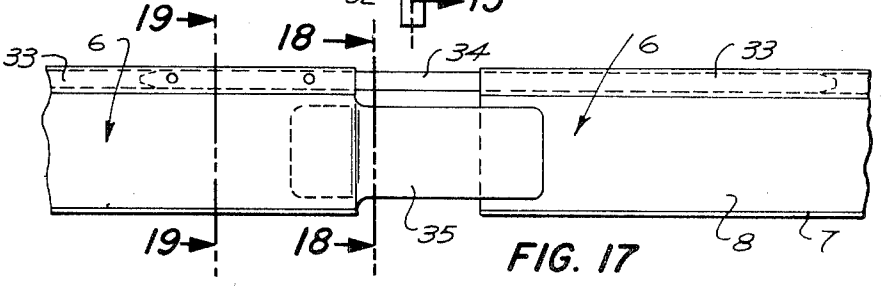


FIG. 17

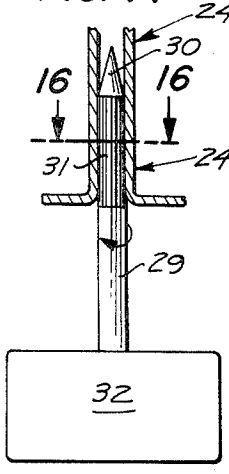


FIG. 15

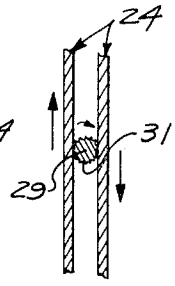


FIG. 16

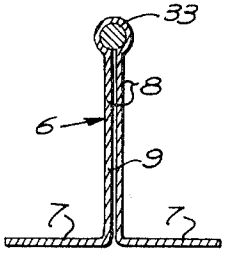


FIG. 19

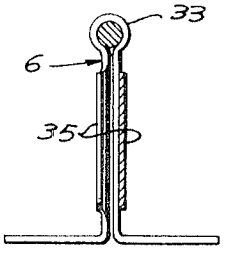


FIG. 18

INVENTOR.
ROLAND KURT SCHILLING
BY
Lyon Lyon
ATTORNEYS

REMOVABLE SUSPENDED CEILING SUPPORT

BACKGROUND OF THE INVENTION

Suspended ceilings are used extensively. These ceilings usually utilize acoustical ceiling tiles which vary greatly in dimension, and are provided with peripheral slits or grooves which receive longitudinal and transverse suspension members which frame the tile and which conceal the suspension members. Usually the tile is placed progressively, starting at one side of the room, then supporting the final margin by a coping strip. Once installed, the individual tiles cannot be removed without destroying the tile.

Suspended ceilings often cover substantial areas which are divided into rooms and offices by partitions which are changed from time-to-time. Light fixtures are set in or suspended from the ceilings. Often these must be relocated. Heretofore, attempts have been made to predict the various possible fixture locations and place special removable acoustic panels or outlet blanks at such locations. However, such removable panels or the like require exposed fasteners and, in general, detract from the aesthetic appearance of the ceiling. Should the locations available be unsatisfactory, a major ceiling repair is required which is expensive without assurance that the repair will not mar the appearance of the ceiling.

While access to the space above a suspended ceiling usually involves light fixtures, often other services are provided above the ceiling which require access and rearrangement.

SUMMARY OF THE INVENTION

The present invention is directed to a removable ceiling support which is summarized in the following objects:

First, to provide a removable support for ceiling tile which may be utilized for all of the tile comprising the ceiling so that any tile may be removed without disturbing the others.

Second, to provide a removable support, as indicated in the preceding object, which is completely concealed and which is operable to install or remove a tile by use of a thin blade capable of being inserted between tiles even if they are in mutual contact.

Third, to provide a removable ceiling tile support having a cross section in the form of an inverted T and comprising two relatively movable sections that may be extended so that their ends rest on suspension runners or may be retracted to clear the runners.

Fourth, to provide a support, as indicated in the preceding object, wherein the web of the T is formed of confronting portions forming a blade receiving slit whereby the blade received therebetween may be utilized to extend or retract the support.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary plan view of a suspended ceiling, showing one form of the removable support.

FIG. 2 is an enlarged fragmentary sectional view, taken through 2–2 of FIG. 1, showing a runner and adjacent portions of the ceiling tile, and indicating in elevation adjacent ends of the removable support as they appear when extended and supporting the ceiling tile.

FIG. 3 is a fragmentary sectional view, similar to FIG. 2, showing one of the removable supporting members retracted so that the supporting member and the ceiling tile may be removed.

FIG. 4 is an enlarged fragmentary elevational view, taken from 4–4 of FIG. 1, with the ceiling tile omitted, to illustrate the central portion of the removable support as it appears when in its extended or supporting position.

FIG. 5 is an enlarged fragmentary side view, similar to FIG. 4, showing the removable support in a partially retracted condition.

FIG. 6 is a further enlarged transverse sectional view, taken through 6–6 of FIG. 5.

FIG. 7 is a further enlarged sectional view, taken through 7–7 of FIG. 5, showing adjacent portions of the ceiling tile.

FIG. 8 is a fragmentary side view, showing one end portion of a modified form of the removable ceiling support.

FIG. 9 is an enlarged fragmentary elevational view, similar to FIG. 4, showing a further modified form of the removable ceiling support, the parts of the support being shown in their extended position.

FIG. 10 is an enlarged transverse sectional view, taken through 10–10 of FIG. 9.

FIG. 11 is another enlarged transverse sectional view, taken through 11–11 of FIG. 9.

FIG. 12 is a reduced side view of the connecting bar which joins the support members shown in FIG. 9, illustrating at an exaggerated scale, the crown provided in the bar to compensate for any tendency of the support members to sag.

FIG. 13 is a fragmentary side view, showing a further modified form of the removable ceiling support, the support being shown in its extended position with its ends resting on runners which are indicated in transverse section.

FIG. 14 is an enlarged transverse sectional view, taken through 14–14 of FIG. 13.

FIG. 15 is an enlarged fragmentary transverse sectional view, taken through 15–15 of FIG. 13, and illustrating a tool employed to manipulate the removable ceiling support.

FIG. 16 is a fragmentary sectional view, taken through 16–16 of FIG. 15.

FIG. 17 is a fragmentary side view, showing a further modified form of the removable ceiling support.

FIG. 18 is an enlarged transverse sectional view thereof, taken through 18–18 of FIG. 17.

FIG. 19 is an enlarged transverse sectional view thereof, taken through 19–19 of FIG. 17.

Reference is first directed to the construction shown in FIGS. 1 through 7. In the construction of suspended ceilings, runners 1 are suitably suspended in parallel relation. The runners are in the form of inverted T-members, including side flanges 2.

Acoustical tile 3 is employed, having reduced or notched end margins 4 so arranged as to extend under the runners 1 into abutting relation, as shown in FIG. 2. The side margins of each ceiling tile are provided with a narrow slit or channel 5. The removable ceiling support, which constitutes the present invention, is constructed so as to fit the side channels 5 and permit the adjacent ceiling tile to be placed in abutting relation, or nearly so.

The embodiment of the removable suspended ceiling support shown in FIGS. 1 through 7 includes a pair of beam members 6 which may be identical. Each beam member may be formed of sheet metal, and in its operating position, forms an inverted T; that is, each beam member forms a pair of side flanges 7 joined to a folded or dual web 8 disposed perpendicularly to the side flanges. The dual web forms a narrow slit 9. In the construction illustrated, the web is formed by folding the sheet material upon itself. However, the beam members may be formed of two L-shaped members, suitably joined at the upper margins of their respective webs. Still further, the beam members may be extrusions. It is essential, in each case, that the slit 9 be provided.

The two beam members are joined in longitudinal alignment by a connecting strip 10, which is folded over the upper margins of their respective webs 8. The connecting strip is anchored to one of the beam members by a fixed key 11, folded from the connecting strip and extending through a keeper opening 12 formed in the corresponding web 8. The connecting strip slidably receives the other beam member by means of a pair of keys 13 which are received in guide slots 14 provided in the other beam member. The connecting strip holds the two beam members in longitudinal alignment. In addition, the pair of keys 13 wedge into reduced ends 15 of the guide slots 14 so as to prevent sagging of the beam members. If desired, the connecting strip may be secured by spot welds 16 or other means supplementing or in place of the fixed key 11

and keeper opening **12**. Also, the connecting strip **10** may slidably receive both beam members, in which case the guide slots **14** are provided in both beam members.

The beam members **6** are moved between their extended and retracted positions by means of a blade **17** (FIG. **2**), which may be the blade of a conventional putty knife. Such a blade is readily inserted between adjacent ceiling tile without damage to the tile, even though the tile may initially be in mutual contact. The slit **9**, formed by the dual web, may be sufficiently narrow that the blade, when inserted, frictionally engages the walls of the slit. Preferably, however, the dual web may be provided with spot welds **18** at convenient locations, or may merely be dimpled to provide a protrusion into the slit.

Operation of the removable support is as follows:

During initial installation of the ceiling, the removable supports are maintained in their extended position and the ceiling tile are placed consecutively in a conventional manner.

When it is desired to remove a selected portion of the ceiling, it is convenient to remove two ceiling tile. This is done by inserting a blade first in one, and then the other, of the beam members **6** to move the extremities of the support clear of the runner flanges **2**. The support then may be lowered from the position shown in FIG. **2** through the position shown in FIG. **3** to a position in which the support clears the ceiling. The support may then be withdrawn from between the tile and the tile slipped from the supports at the opposite side margins. To reinstall the tile, the steps are reversed.

It is also possible to remove a single tile by retracting one end only of a pair of supports at opposite sides of the tile, then dropping that margin of the tile so that the tile can be slipped from the supports. In doing so, of course, the adjacent tile are distorted slightly, not to the extent of damaging the tile.

Reference is now directed to FIG. **8**. In this construction, a single beam member **6** is used and the connecting strip **10** is provided with an inverted T-extension **19**, which is identical in cross section to the beam member, and may be of sufficient length to receive a blade **17**.

Reference is now directed to FIGS. **9** through **12**. In this construction, the beam members **6**, as previously described, are used, and a connecting bar **20** is substituted for the folded connecting strip **10**. The adjacent ends of the beam members are provided with channels **21** pressed into the side of the web **8**, and the web is slitted so that guide bands **22** may be pressed in the opposite direction so that the connecting bar may be slidably received therein. The connecting bar may be provided with a slight crown, as indicated on an exaggerated scale in FIG. **12**, to compensate for any sagging that might otherwise occur. Retainer bosses **23** are provided at the extremities of the bar **20** so as to limit extended movement of the beam members **6**.

Reference is now directed to the construction shown in FIGS. **13** and **14**. In this construction, a pair of beam members **24** is used, which are L-shaped in cross section. Together, the beam members form a structure of inverted T-cross section, similar to the beam members **6**. At intervals the beam members **24** are perforated, one member having a slot **25**, and the other member, a mating hole which receives a rivet **26**. The rivets are provided with washers **27**. The common dimension of the slots **25** is such that the beam members may move relative to each other between an extended position resting on the runner side flanges **2** and a retracted position clearing the side flanges. The rivets **26** may hold the web portions of the beam members in contiguous relation, or if desired, a washer may be interposed.

In order to move the beam members **24** relative to each other, a tool **28** is provided, which includes a pin **29** of small diameter, having a pointed end **30** so that it may be forced between the web portions of the beam members. Adjacent its pointed end, the pin is provided with a longitudinally knurled portion **31**. The lower end of the pin is provided with a suitable handle **32**, so that the pin may be rotated.

The beam members **24** are moved relative to each other by forcing the pin **29** between the web portions, spreading them apart slightly, and thus establishing a frictional contact between the knurled portion **31** and the web portions. Then, upon rotation of the pin **29**, one beam member is moved in one direction and the other in the opposite direction, thereby relatively extending or retracting the beam members.

Reference is now directed to FIGS. **17**, **18** and **19**. In the construction here illustrated, the beam members **6** are modified to form a loop **33** at the upper extremity of the dual web **8**. The loop **33**, at the adjacent ends of the beam members **6**, receives a slide bar **34** which may be secured in one of the loops and permitted to slide in the other. In addition, each beam member **6** is provided with a tongue **35** which overlaps the web of the other member. Alternatively, one member may be provided with two tongues which engage opposite sides of the web of the other member.

The present embodiments of this invention are to be considered in all respects as illustrative and not restrictive.

I claim:

1. A removable support structure for ceiling tile having end margins adapted to underlie the side flanges of parallel runners, the ceiling tile having slits in their side margin extending between the end margins, said removable support structure comprising:

a. a strut comprising first and second support members;

b. and means slidably connecting said support members for relative longitudinal movement between a retracted position wherein the remote extremity of at least one of the support members clears the flange of its corresponding runner and an extended position wherein the remote extremities of said support members rest on their respective runner flanges;

c. said support members including flange elements dimensioned to be slidably received in the side margin slits of contiguous ceiling tile and a web perpendicular to said flange elements;

d. and engageable means in said web for engagement by a tool inserted upward between adjacent ceiling tile to effect relative extension and retraction of said support members; and

e. means defining a tool passageway between said flange elements, accessible from between the edges of said adjacent ceiling tiles, to said engageable means.

2. A support structure, as defined in claim 1, wherein:

a. each of said support members is in the form of an inverted T in cross section;

b. and said connecting means secures said support members in longitudinally aligned relation, the connecting means slidably receiving at least one of said support members.

3. A support structure, as defined in claim **2**, wherein:

a. said connecting means is a strip folded over the webs of said support members;

b. and key and slot means formed by said strip and at least one of said support members permits relative longitudinal movement thereof.

4. A support structure, as defined in claim **2**, wherein:

a. said connecting means is integral with one of said support members and is folded over the web of the other support member;

b. and key and slot means formed in the folded portion of the connecting means and said other support member permits relative longitudinal movement of the support members.

5. A support structure, as defined in claim **2**, wherein:

a. said connecting means is a bar;

b. and the web of at least one of the support members is slit and deformed to form portions extending over opposite sides of the bar to permit limited relative sliding movement of said support members while said bar secures said support members in longitudinal alignment.

6. A support structure, as defined in claim **2**, wherein:

a. the webs of the support members have tubular extremities;

b. and said connecting means includes a bar received in said tubular extremities, and means extending from the web of at least one support member and overlapping the web of the other support member.

7. A support structure, as defined in claim 1, wherein:

a. said support members are L-shaped in cross section and include webs disposed in contiguous relation thereby to define compositely, an inverted T;

b. and said connecting means includes at least a pair of headed pins extending through said webs, and slots in said webs to permit longitudinal movement of said support members in opposite directions.

8. A removable support structure for ceiling tile having end margins adapted to underlie the side flanges of parallel runners, the ceiling tile having slits in their side margins extending between the end margins, said removable support structure comprising:

a. a first and a second support member;

b. means connecting said support members for relative longitudinal movement between a retracted position wherein the extremities of the support members clear the flanges of parallel runners and an extended position wherein the extremities of said support members rest on said runner flanges;

c. said support members including flange elements dimensioned to be slidably received in the side margin slits of contiguous ceiling tile and a dual web perpendicular to the flange elements and defining a slit aligned with the crack formed between the contiguous ceiling tile;

d. and operating means for relatively extending and retracting said support members insertable between contiguous tile into said slit.

9. A removable support structure, as defined in claim 8, wherein:

a. said operating means includes a flat blade dimensioned for insertion through said ceiling tile crack into said web slit;

b. and the walls of the dual web frictionally engage said blade.

10. A removable support structure, as defined in claim 8, wherein:

a. said operating means includes a flat blade dimensioned for insertion through said ceiling tile crack into said web slit;

b. and means extends laterally into said dual web slit for engagement by said blade.

11. A removable support structure, as defined in claim 8, wherein:

a. each of said support members is L-shaped in cross section and includes one of said flange elements and one side of said dual web;

b. and said connecting means includes at least a pair of headed pins extending through said dual web, and slots in said dual web to permit said relative extension and retraction of said support members;

c. and said operating means includes a pin forcibly insertable into said dual web and having a surface for driving engagement therewith; whereby on rotation of said pin to move said support members in opposite directions.

12. A support structure, as defined in claim 1, wherein:

a. said tool receiving means is a downwardly facing longitudinal slit formed in the web.