

United States Patent [19]

Hartzell et al.

[11] 3,783,771

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[54] **SPACER FOR A FIRE-RATED AIR BAR**

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[52] U.S. Cl. **98/40 D, 52/484, 287/189.36 D**

[51] Int. Cl. **F24f 13/06**

[58] Field of Search **52/221, 484 X, DIG. 5; 287/189.36 D; 138/112, 113, 68 C; 98/40 D, 40 C**

[56] **References Cited**

UNITED STATES PATENTS

3,411,425 11/1968 Lambert 98/40 D

360,782	4/1887	Ober	138/112 X
3,002,443	10/1961	Brandes	98/40 C
3,343,250	9/1967	Berto et al.	138/113 X
3,444,801	5/1969	Lambert	98/40 D

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Attorney—Clifford B. Price

[57]

ABSTRACT

An air bar has supports made of a low temperature melting point material located between the side rails. A high temperature melting point spacer assembly is frictionally fitted between the side rails of the air bar, at periodic points along the air bar, to support the side rails and prevent their collapse in a fire.

5 Claims, 3 Drawing Figures

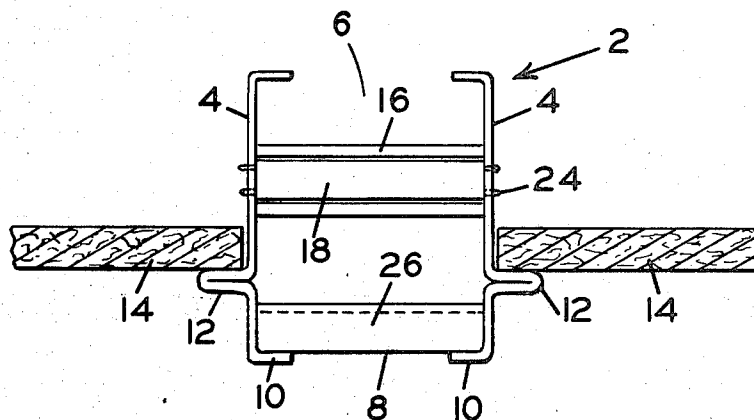


Fig. I

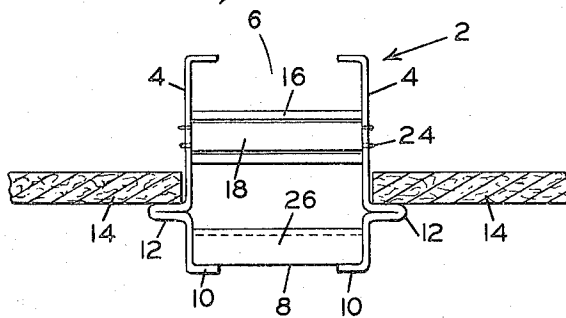


Fig. II

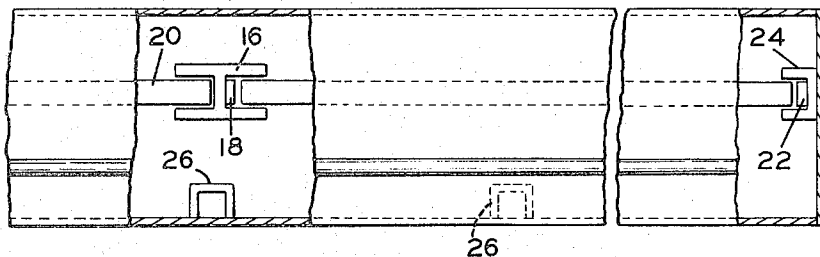
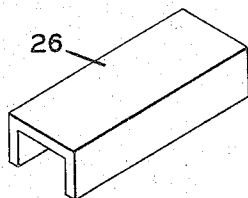


Fig. III



SPACER FOR A FIRE-RATED AIR BAR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to the field of suspended ceiling system ventilating devices and, more particularly, to a fire-resistant air bar for use in a fire-resistant suspended ceiling system.

2. Description of the Prior Art

The rooms of buildings and other structures are provided with a decorative and aesthetically pleasing suspended ceiling located below the real ceiling of the room. Such suspended ceilings usually include a framework of main runners and cross runners on which are supported ceiling tiles to separate an attic space from the room below. In this attic space, typically is located the air conditioning equipment such as air plenum chambers, ducts, etc., for supplying conditioned air to and for returning air from the room below. In order for the air to pass from the attic space to the room below, air bars are located in the framework of the suspended ceiling.

Typically, an air bar has a pair of side rails spaced apart by spacers and has air control means, such as nested weirs, located therebetween so that air will controllably flow through an air bar to pass through the suspended ceiling. The side rails of the air bar additionally support the adjacent ceiling tiles of the suspended ceiling to be an integral part of the suspended ceiling framework.

In many of the buildings, the suspended ceilings are designed to be a fire barricade. Such suspended ceilings have main runners and cross runners made of a high melting point material and have fire-resistant ceiling tiles. However, it is not easy to make the air bars of the suspended ceiling system out of high melting point material because of the complicated shapes of some of the parts thereof. The side rails and the nested weirs have relatively simple shapes and so can be formed of high melting point material. However, the spacers which separate both the side rails and mount the nested weirs, have complicated shapes; therefore, the spacers were typically extruded into their complicated shape. The high melting point material cannot be readily and inexpensively extruded in the complicated spacer shapes and so the spacers heretofore have been extruded from lower melting point material.

If an air bar, having side rails and nested weirs made of high melting point material, were assembled with extruded spacers made of a low melting point material, and were included in a fire-resistant ceiling, the effectiveness of the ceiling as a fire blockade would be reduced. In the case of a fire, the spacers would soften and possibly melt to drop the nested weirs and to allow the side rails to pivot and drop the fire-resistant ceiling tiles, leaving a hole in the suspended ceiling through which the fire could spread. What is needed then is an air bar which will maintain its spacing even through the spacers soften or melt entirely.

There is currently available on the market an air bar in which a high melting point material bar has been inserted in the low melting point material spacers to help the air bar sidewalls maintain their spacing if the low melting point material spacer support should melt or soften. However, it has been found that the low melting point material, upon melting, fluxes the high melting point material and also causes it to weaken during the

standard two hour fire-rating test. In addition, the spacers are normally spaced a relatively large distance apart. Heat will cause buckling of the side rails in the region between two spacers and this can also result in the dropping of ceiling tiles from the suspended ceiling system.

Consequently, what is needed is a rather inexpensive system of periodically spacing apart the side rails of conventional air bars with a high melting point material so that conventional air bars can pass a standard two hour fire-rating test.

SUMMARY OF THE INVENTION

The invention herein is a spacer retainer which is inserted into an air bar for the purpose of securing a fire rating for the air bar. The spacer retainer is of a rectangular shape with a width such that will allow it to pass through the bottom air slot of the air bar, and a length which is equal to the space between the side rails of the air bar. The spacer retainer is inserted lengthwise through the air slot, past the bottom flanges of the air bar, and then rotated 90°. The air bar side rails have sufficient spring to allow this rotation. A frictional fit against the side rails and the presence of the bottom flanges of the air bar slot hold the spacer firmly in place. Normally an air bar is composed of two weir assemblies which have supports at each end of the air bar and a support at the center of the air bar. Three spacer retainers are then used in each air bar; one by the center air weir support, and one in between the center air weir support and the end air weir supports at each end of the air bar.

The spacer retainer can be made of a number of materials and in different shapes. However, the major requirement for shape is one such that it may be readily inserted in place and it will space the side rails apart. Normally the appearance of the spacer retainer is not objectionable since both the slot interior and the spacers are painted black and will normally not be noticeable by an observer from the room below the suspended ceiling system.

BRIEF DESCRIPTION OF THE DRAWING

FIG. I is a cross-sectional side view of an air bar;

FIG. II is a partially open side view of an air bar assembly; and

FIG. III is a perspective view of a typical spacer retainer structure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A typical air bar structure is shown in U. S. Pat. No. 3,411,425. The air bar has side rails with flanges 11 that define the air opening. Within the air bar, weirs 440 are used to control the flow of air through the air bar and the weirs are supported by a support structure 420.

FIGS. I and II of the drawing herein are a showing of the commercially available system which is covered by the above-mentioned patent. Herein, the air bar assembly 2 is composed of two side rails 4. An air inlet opening 6 is positioned at the top of the air bar and an air outlet opening 8 is defined by the two flange structures 10. The side rails also have flange structures 12 on which are supported ceiling tiles 14. Air weir supports 16 are placed between the two side rails 4 to space the side rails and to support the air weirs. A fire-resistant

bar 18 is used in conjunction with the air weir support 16.

The air weir support structure can better be seen in the exposed area of the FIG. II drawing. The air weir support 16 is generally a channel shape structure on which the ends of the air weirs 20 rest for support. Normally structure 16 is an extruded aluminum structure. During a fire-rating test, the aluminum structure would tend to melt. This would then eliminate the support for the side rails 4. The side rails 4 could then collapse towards each other and this would remove the flanges 12 from their supporting function of the ceiling tiles 14. The ceiling tiles would then drop to the floor providing an exposed area into which the fire could spread to the region beyond the suspended ceiling. In order to compensate for the low melting point material which is used in the air weir supports 16, a reinforcing bar 18 has been provided adjacent the air weir support 16. This bar is usually a high temperature melting point material and would have tabs 24 on the end thereof, which pass through the side rails and are bent along the side rails to hold the bar 18 in position. This bar 18 would be unaffected by a fire and would therefore help to support the side rails in position during a fire test.

Normally the air weirs 20 are two or more feet in length. A support structure 24 would be provided at each end of the air bar and a high temperature material bar 22 would be provided therein also. Consequently, in the normal air bar there would be provided two air weir structures. Normally three supports would be provided; one at each end of the air bar, and one at the center of the air bar to support the two air weirs in position within the air bar. As was indicated above, during a normal fire test, the melting of the support 16 would sometimes flux the high temperature melting point material of bars 18 and 22 and cause them to actually melt during a standard two hour fire test. In addition, the distance between a support 16 and a support 24 for a single air weir is such that the side rail structures would tend to buckle in the region between these two supports. Buckling at this point would cause releasing of the ceiling tiles from position within the ceiling structure. Consequently, means must be provided to provide additional support to the air bar so that it would pass a standard two hour fire test.

FIG. III of the drawing herein provides a typical structure which may be utilized to help the air bar of FIGS. I and II pass a standard two hour fire test. A typical spacer retainer 26 is shown in FIG. III. This spacer retainer is shown in position in FIGS. I and II also. The spacer retainer is generally rectangular in shape and may be made of a steel wire form, a length of steel channel, a steel bar or any other type of high temperature melting point material. The air bar must be generally of a rectangular shape, or at least have two critical dimensions. The one dimension is that the overall length of the spacer retainer must be such that it will frictionally fit into the space between two adjacent side walls. See FIG. I for the positioning of the spacer retainer in position and the fact that its length is equal to the spacing between two side rails 4. In addition, the width of the spacer retainer must be somewhat less than its length and must be such that it can pass into the opening 8 of the air weir. The spacer retainer is positioned with its long dimension extending along the slot 8 of the air bar. It is inserted within the air bar and then rotated 90° so that the length of the air bar then extends

from one side rail to an adjacent side rail. The spacer retainer is now in position to provide support to the side rail structure of the air bar so that these two side rails cannot readily move towards each other.

In FIG. II, the spacer bar is shown being positioned by the center weir support 16 and also in the region between the center weir support 16 and the end weir support 24. Naturally, there would be a spacer retainer between the center support 16 and the other end weir support of the air bar, which is not shown on the left side of FIG. II. The spacer retainer 26 is retained in position due to its frictional contact with the side rails 4 and the fact that it rests upon the flanges 10 which define the air opening 8 of the air bar.

The spacer retainers herein will now provide for proper spacing of the side rails 4 of the air bar during a conventional two hour fire test. Should the high temperature melting point bars 18 and 22 be fluxed by the melting weir support 16, spacer retainers 26 will still support the side rails 4 in position. In addition, the side rails will be supported midway between the weir supports so that there will be no buckling of the side rails in those positions. The spacer retainer is not restricted to just the air bar shown in the drawings herein, but to any air bar structure which has an unusually long length and which is unsupported in its mid-regions. Such an air bar structure will tend to buckle during a conventional fire-rating test.

What is claimed is:

1. In combination, an air bar structure which has two side rails spaced thereapart to define an air passage, heat-meltable support means within the air bar and spaced along the length of the air bar to support said side rails, said side rails having flange means extending outwardly from the air bar to support ceiling tiles of a suspended ceiling system, and spacer retainers within the air bar and positioned between the side rails to support and space said side rails, said spacer retainers being made of a high temperature melting point material and said spacer retainers being positioned in the air bar structure closely adjacent said flange structures to support said side rail structures so that they will not collapse inwardly when the air bar structure is exposed to heat from a fire and the heat-meltable support means being melted partly by the heat from a fire and no longer supporting the side rails.

2. The combination of claim 1 wherein the spacer retainers are not positioned within the normal support structure for the air bars and said spacer retainers are positioned at least in regions where there are no supports between the side rails of the air bar.

3. In combination, an air bar structure which has two side rails spaced thereapart to define an air passage, aluminum support means within the air bar and spaced along the length of the air bar to support said side rails, said side rails having flange means extending outwardly from the air bar to support ceiling tiles of a suspended ceiling system, and steel spacer retainers within the air bar and positioned between the side walls to support and space said side rails, said spacer retainers being made of a high temperature melting point steel and said spacer retainers being positioned in the air bar structure closely adjacent said flange structures to support said side rails so that they will not collapse inwardly when the air bar structure is exposed to heat from a fire and the aluminum support means has been melted

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partly by the heat from the fire and no longer supports the side rails.

4. The combination of claim 1 wherein the spacer retainers are not positioned within the normal support structure for the air bars and said spacer retainers are positioned at least in regions where there are no supports between the side rails of the air bar.

5. The combination of claim 3 wherein the spacer retainer is generally rectangular in shape and such that it

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has a width capable of being passed within the air outlet of the air bar structure and a length which is equal to the spacing between the side rails of the air bar so that the spacer retainer may be passed within the opening of the air bar structure and then rotated 90° to be frictionally held within the air bar structure by the side rails of the air bar structure.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,783,771 Dated January 8, 1974

Inventor(s) Lyndon G. Hartzell and James C. Ollinger

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the specification, column 2, line 19, "wbich" should be --which--. In the specification, column 2, line 61, insert the sentence "Fig. 1 herein is very similar to Fig. 12 of the above-mentioned patent" before "Herein." In the specification, column 4, line 13, "than" should be --that--.

In the claims, insert dependent claim 3 into the application. The claim reads as follows:

3. The combination of claim 1 wherein the spacer retainer is generally rectangular in shape and such that it has a width capable of being passed within the air outlet of the air bar structure and a length which is equal to the spacing between the side rails of the air bar so that the spacer retainer may be passed within the opening of the air bar structure and then rotated 90 degrees to be frictionally held within the air bar structure by the side rails of the air bar structure.

In the claims of the patent, claims 3, 4 and 5 should be renumbered as claims 4, 5 and 6. Claim 4 of the patent, now renumbered to claim 5, should be made dependent on claim 4. Claim 5 of the patent, now renumbered to claim 6, should be made dependent on claim 4.

Signed and sealed this 27th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents