United States Patent

Rachlin et al.

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[45] **July 4, 1972**

[54] VENTILATING AIR DISTRIBUTING CHANNEL

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[52] **U.S. Cl.** .....**98/40 D,** 52/495

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

[58] **Field of Search** .....52/495; 98/40 D, 40 DL

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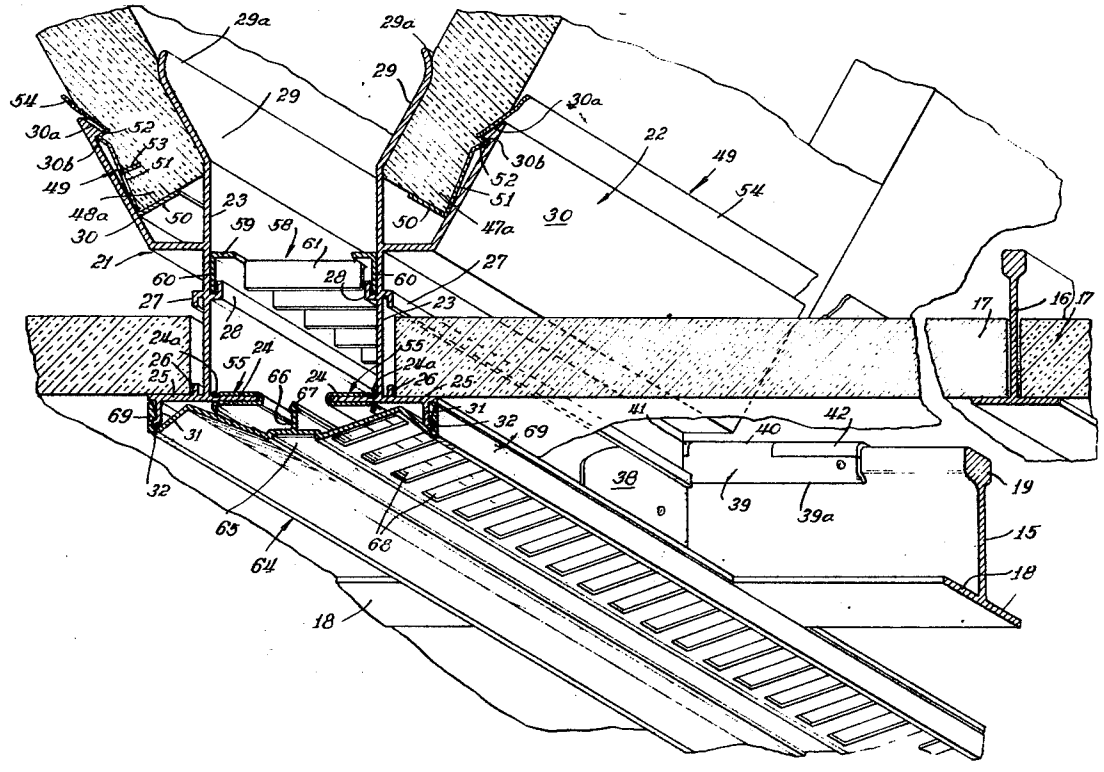
[57] **ABSTRACT**

The supporting grid (e.g., main and cross inverted tees) of a suspended ceiling also completely supports ventilation air-distributing apparatus which may include the air supply duct. This apparatus, which is completely assembled before mounting in the grid, comprises a lower air flow channel section formed of two extruded metal bars having vertical webs with hooks on the outside of the web defining ways into which the wings of a bracket project to hold the spaced bars in a channel assembly. A clip integral with the bracket hooks over the top of a grid tee and has gripper conformations to mate with a clip on the opposite side of the tee to align channels. Along the top of the web of each bar are two outwardly extending spaced arms which are used to hold the sides of a fiberglass air duct. Between the webs and below the air duct is an optional air extractor. The air from the duct discharges out through the opening between the webs. At the bottom of the webs are flanges forming supports for ceiling panels and air flow control dampers.

21 Claims, 15 Drawing Figures



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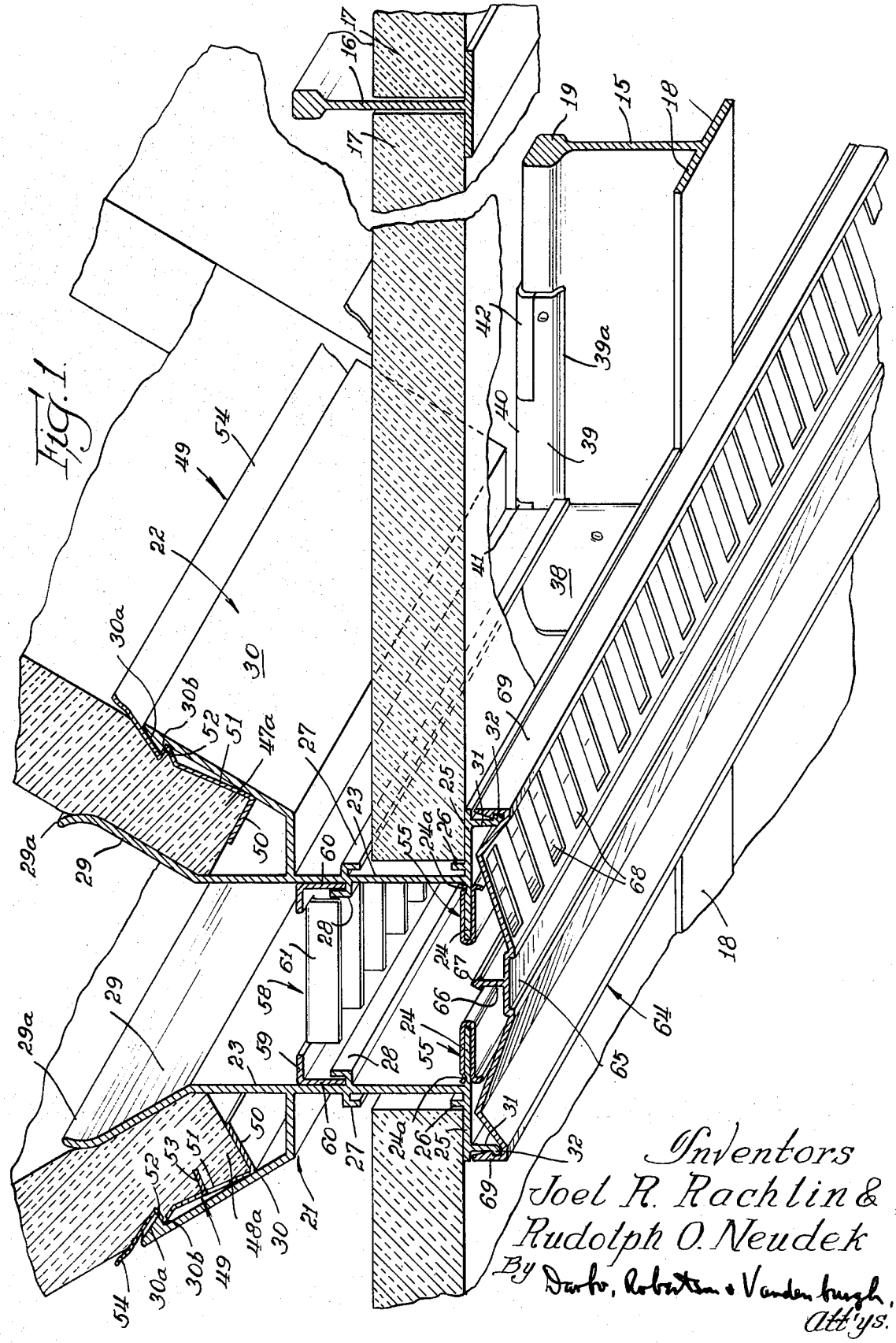

Fig. 1

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Att'ys.

Fig. 2

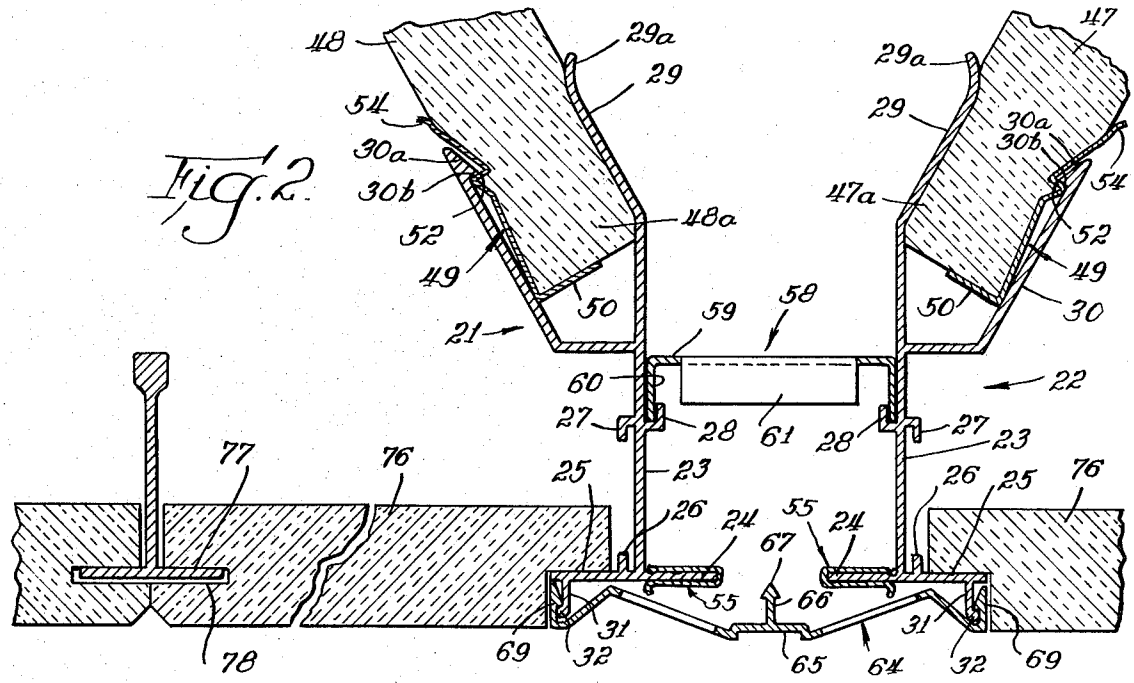


Fig. 3

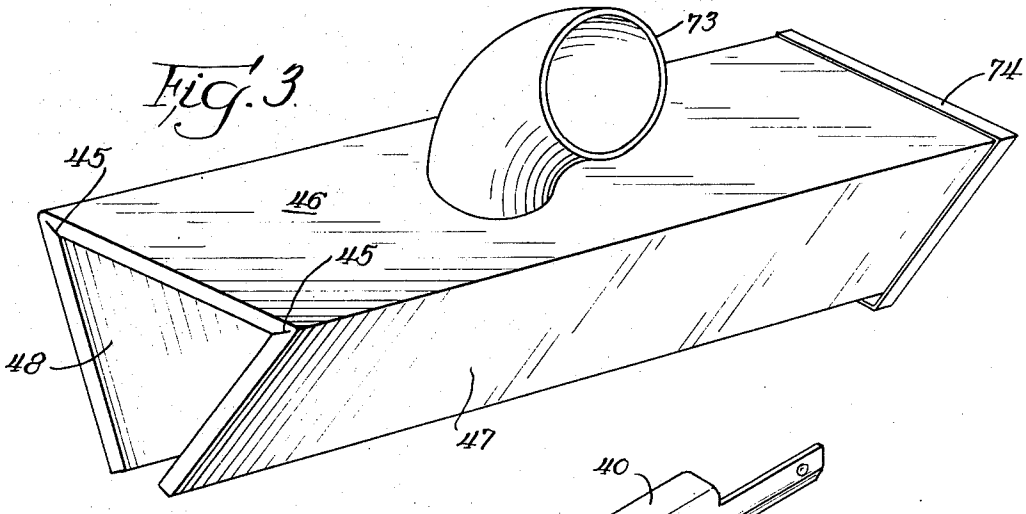
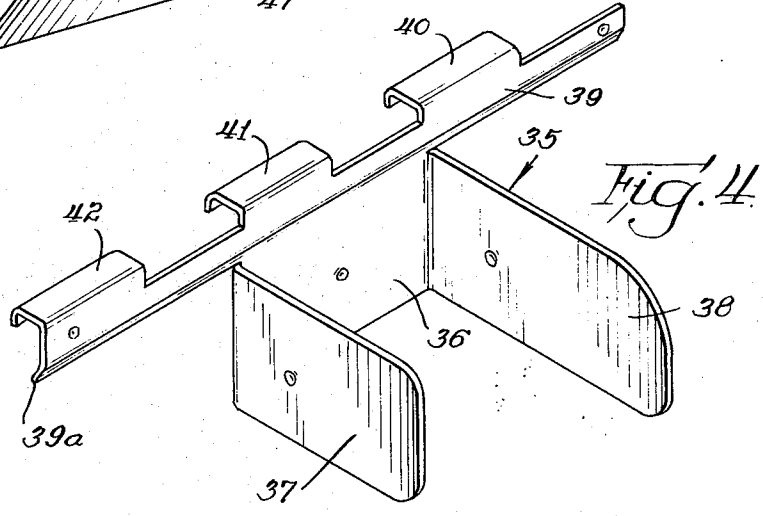


Fig. 4



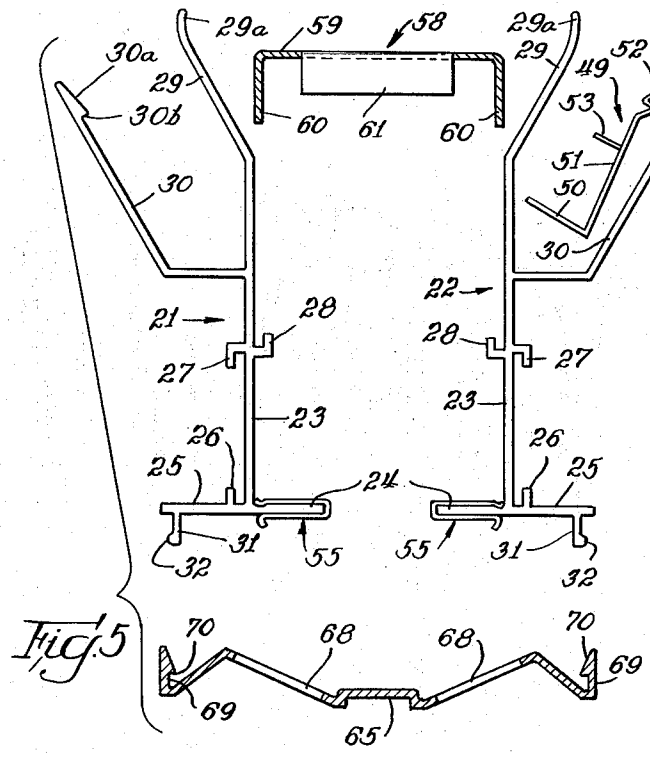


Fig. 5

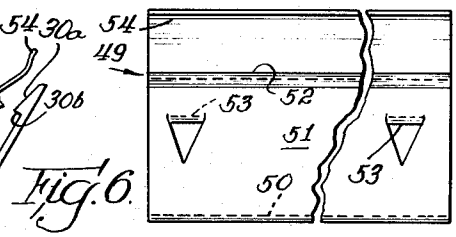


Fig. 6

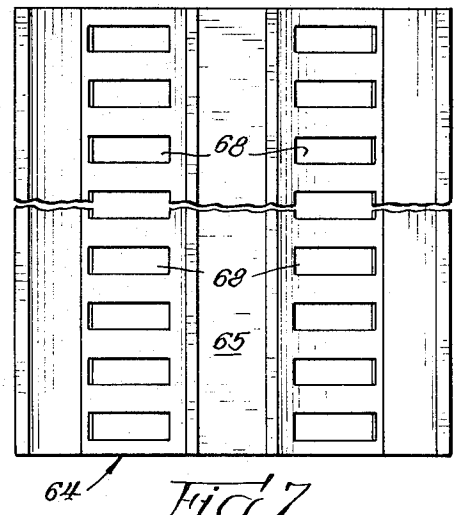


Fig. 7

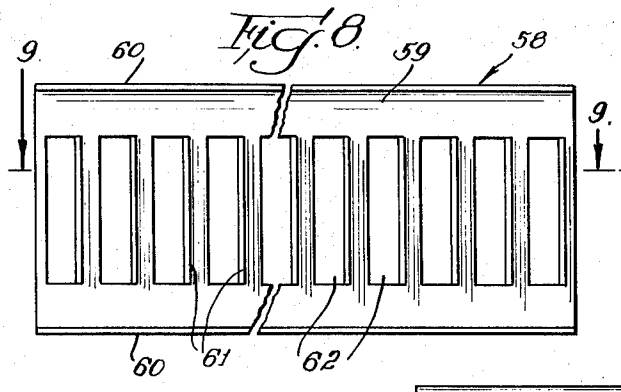


Fig. 8

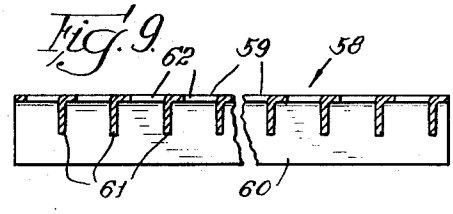


Fig. 9

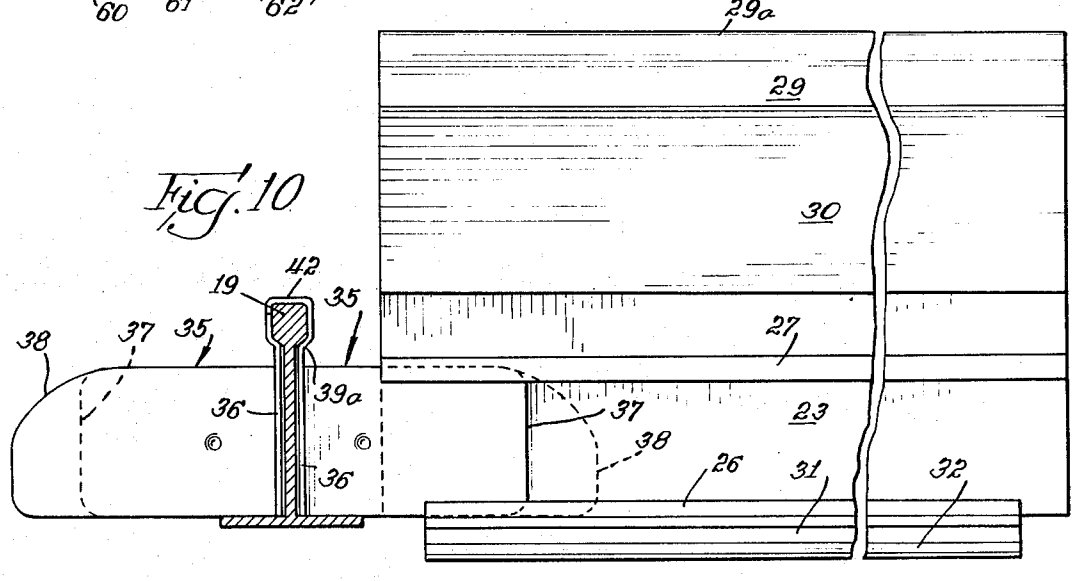


Fig. 10

Fig. 11.

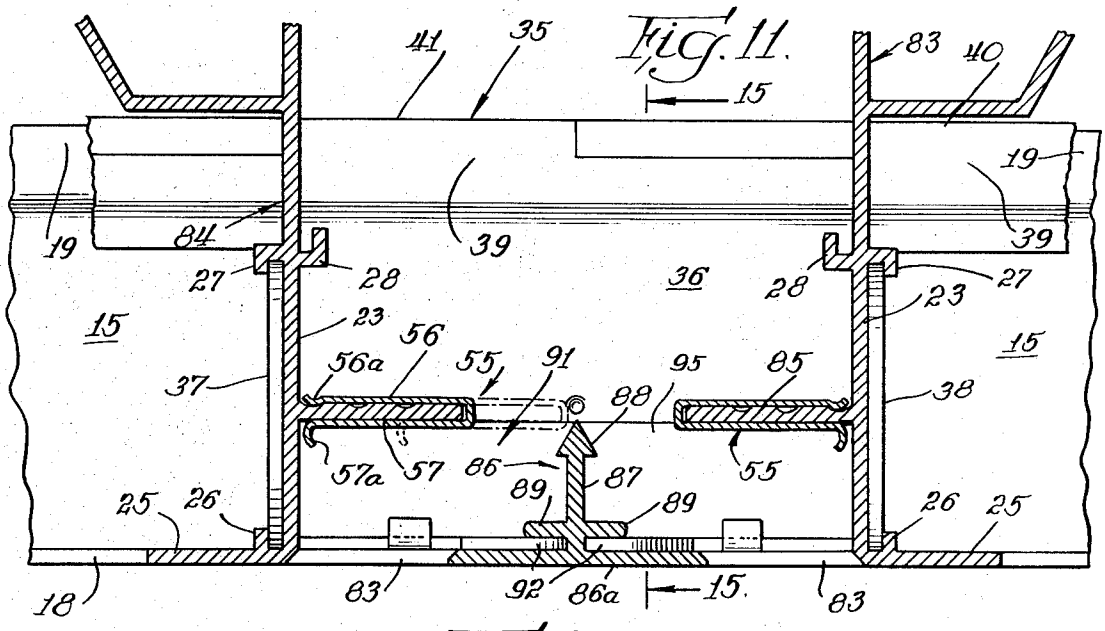


Fig. 12

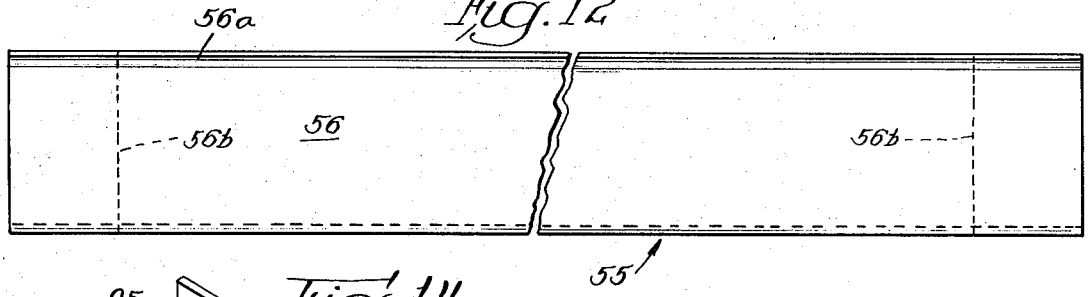
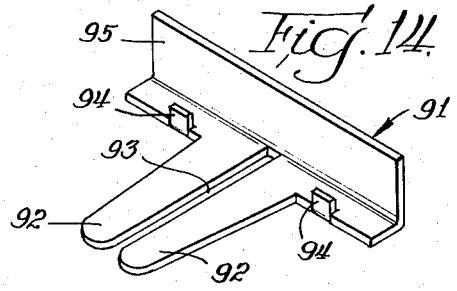


Fig. 14



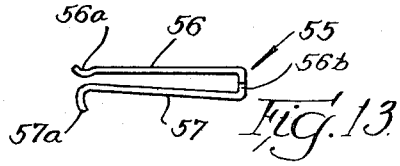
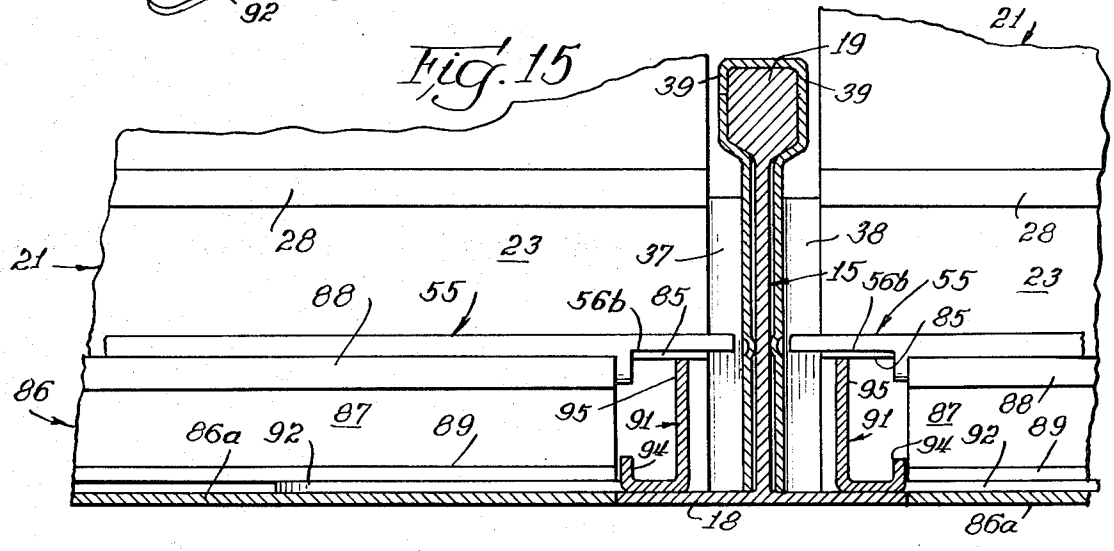


Fig. 13

Fig. 15



VENTILATING AIR DISTRIBUTING CHANNEL

BACKGROUND AND SUMMARY OF THE INVENTION

Various forms of structures have been proposed and used for providing ventilating air distribution in connection with suspended ceilings. The systems in commercial use suffer from a common disadvantage; namely, they must be assembled (to a greater or lesser extent) at the ceiling level. This is difficult and awkward to do. Inevitably, it results in very high labor costs. At the very minimum they require the installation and attachment of wires, rods, or other supports to the air duct and distribution apparatus while the latter is otherwise being held in place. Great care and skill is needed to properly install the structures.

Also, in known systems, installation requires measuring and cutting and otherwise fitting of materials and parts in expensive custom manner. The bill of materials for a given job requires considerable figuring to arrange for a balanced and adequate supply of materials and parts. The systems and installation procedures are geared to now obsolete scales of building trade labor costs.

The principal object and advantage of the present invention is to provide a simplified air-distributing apparatus which may be completely assembled at a convenient working location (on a bench or even on the floor) and then merely lifted into place and deposited on the ceiling grid structure. There is no necessity for any independent suspension for the air distribution apparatus. It uses the same suspension, i.e., the tees or channels of the ceiling grid structure, that is otherwise present for supporting the ceiling.

A further object is to provide ceiling air-distributing apparatus which is characterized by flexibility of application in that it is readily adapted to differing size, capacity, functional and appearance requirements and by modular dimensioning which makes possible efficient packaging, storage, handling and shipping, as well as installation.

A very real and important object and achievement of the invention is the saving of upwards of one-half of the field labor installation costs as compared with known contemporary systems.

Other objects and advantages will become apparent from the following description.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of portions of an installation utilizing one embodiment of the invention;

FIG. 2 is a sectional view illustrating the embodiment of FIG. 1 employed in a ceiling wherein the air-distributing apparatus is flush with the surface of the ceiling;

FIG. 3 is a perspective view of an example of a fiberglass duct section;

FIG. 4 is a perspective view of one of the brackets used for supporting the apparatus from grid tees;

FIG. 5 is an exploded view of the apparatus hardware;

FIG. 6 is a side view of one of the fiberglass duct retainers;

FIG. 7 is a bottom view of the air discharge grille;

FIG. 8 is a plan view of the air extractor;

FIG. 9 is a section as viewed along the line 9—9 of FIG. 8;

FIG. 10 is a partially disassembled view illustrating the manner in which the bracket of FIG. 4 is used;

FIG. 11 is a cross-sectional view of an alternative embodiment of the invention;

FIG. 12 is a bottom view of an air flow control damper;

FIG. 13 is an end view of one of the air dampers;

FIG. 14 is a perspective view of a support bracket employed in the embodiment of FIG. 11; and

FIG. 15 is a cross-sectional view showing the manner in which the support bracket of FIG. 14 is employed.

DESCRIPTION OF SPECIFIC EMBODIMENTS

The following disclosure is offered for public dissemination in return for the grant of a patent. Although it is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

FIG. 1 illustrates the use of an embodiment with a ceiling system comprising conventional grid of longitudinal (main) tees 15 and cross-tees 16, with ceiling tiles 17. The tees conventionally have a bottom flange 18 on each side and a bulbous head 19. Any conventional means, such as wires (not shown), for supporting main tees 15 may be employed.

In this embodiment of the invention two bar members, generally 21 and 22, are employed. These bar members are formed from extruded metal, e.g., aluminum. They are identical and one has been turned end for end with respect to the other so that one forms a "left" and the other forms a "right." Describing, specifically, the bar on the left in FIG. 1, the section from which the bar member is formed comprises a vertical web 23, having at the lower end thereof an inwardly extending flange 24 and an outwardly extending flange 25. A longitudinal rib forms what may be termed a finger 26 extending upwardly in spaced relation to web 23. A hooked rib forms an upper finger 27. These two ribs, equally spaced from web 23, define a partially enclosed way for receiving the wings of the mounting brackets, as hereinafter described. An inwardly extending rib forms a shelf 28. Extending upwardly from the top of web 23 is an angular arm 29. A second arm 30 extends outwardly from web 23 in spaced, parallel relation to arm 29.

Adjacent the distal edge of the exterior bottom flange 25 is a downwardly extending support member 31 having a rib 32 along the bottom thereof.

To support the bar members 21 and 22 in proper relation to each other and form the air-distributing channel, and to mount the channel on the tees 15, a pair of brackets, generally 35, are employed (as best seen in FIGS. 1, 4 and 10). Bracket 35 is formed from sheet metal and includes a plate 36 which eventually lies alongside the vertical portion of the tee. Extending outwardly at right angles from plate 36 are a pair of wings 37 and 38. These wings are of a size to be received and securely retained in the ways defined by fingers 26 and 27 of the bars. When fully inserted in the ways, the web 23 of the bar members abuts the main plate 36 of the bracket.

Extending upwardly from the main plate 36 is a clip portion in the form of a bar 39 with three grippers 40, 41, 42 integral therewith. The grippers 41 and 42 are spaced apart by gaps equal to their individual lengths and are disposed eccentrically with respect to the center line of the bracket (as it exists midway between wings 37 and 38). The positioning is such that when the two brackets are applied to opposite sides of a supporting grid tee (see FIGS. 10 and 15) the grippers from the two sides interdigitate so that opposite wings of the two brackets on each side of the tee are in exact alignment. The lower portion 39*a* of the bar 39 fits under bulbous head 19 of the tee when the bracket is mounted thereon. This, in combination with the gripper 42 extending around the top of the head 19 and down partially over the far side, provides a secure gripping of the tee by the bracket.

A section of fiberglass ducting is used for the air supply duct. This is conventional ducting material which may be formed to the shape most convenient for the particular installation. Two folds 45 (FIG. 3) to form a triangular duct is usually the simplest. This triangular duct has a top 46 and two sides 47 and 48. The lower portions 47*a* and 48*a* of the two sides are inserted into the two slots defined by the spaced arms 29 and 30 of the bars 21 and 22. To facilitate this, the upper portions of arms 29 are outwardly curved, as indicated at 29*a*. The upper portion of arm 30 has an inwardly extending taper 30*a* extending to a step 30*b*. A duct retainer, generally 49, is applied to the sides of the duct before the latter is put into place. This retainer comprises a length of sheet metal having a bottom flange 50, a side 51 formed with an outwardly project-

ing detent **52**, inwardly projecting prongs **53** and an upper release lever **54**. These duct retainers **49** are applied to the edges of the duct with the prongs **53** being pressed securely into the fiberglass duct material. As the duct with its retainers then is inserted between the arms **29** and **30**, the resilient fiberglass material being somewhat compressed in the process, the detent **52** ultimately snaps into place behind step **30***b* so as to securely lock the fiberglass duct to the bar members **21** and **22**, the joint being self sealing against air leakage. Inward pressure on release lever **54** will disengage detent **52** from step **30***b* and permit removal of the duct from the channel.

Shutters, generally **55**, are employed on inner flanges **24** to serve as dampers for the regulation of the air flow. These shutters are formed of continuous lengths of sheet metal bent into a "U" so as to have an upper plate **56** and a lower plate **57**. These plates frictionally grip the inner flanges **24**. The inner flanges may be formed with grooves **24***a* into which the detent end **56***a* can seat at a variety of positions. The end **57***a* is bent outwardly to form a handle to facilitate the manipulation of the damper from the room below the ceiling.

Between the bar members **21** and **22** is an air extractor, generally **58** (FIGS. **8** and **9**). It comprises a plate **59**, the longitudinal edges of which have been bent down to form flanges **60**. Along the center portion a plurality of three-sided cuts were made with the metal within the cut areas being bent down to form a series of deflectors **61** and leaving openings **62** in the metal. The function of the extractor is to turn air downwardly when supplied for linear flow through the duct.

Along the under side is a cap or grille, generally **64**, also preferably formed by metal extrusion. Along the under side, the cap has a center recess **65**, into which the upper edge of a partition may be inserted if the area being ventilated is divided into rooms. A divider **66** extends upwardly at the center line of the cap and has an arrowhead ridge **67** along the top thereof. At each side of divider **66** the cap is provided with a plurality of openings **68**. Along each side are upwardly extending support flanges **69** having hooks **70** (FIG. **5**) along the inner sides thereof. These hooks **70** are for engaging the bulbous ridges **32** of support members **31** to hold the cap in place.

It is the common practice to position the longitudinal tees **15** on four foot centers. Accordingly, the bar members **21** and **22**, the extractor **58**, the duct sections **46–48**, the duct retainers **49** and the shutters **55** would be cut into, and supplied in, 4 foot lengths (or just that amount short of 4 feet to allow for the thickness of the metal at each side of the center line of the tees). The caps may also be supplied in lengths exactly four feet long.

While all of the hardware for a single unit may be packaged together, assembled or unassembled, and so supplied to the job, it may be more economical to package and ship the several component parts separately. The units will then be assembled at the job site, but this need not be done overhead; it can be done conveniently and rapidly on the floor or on a bench. Advantageously, a sheet of fiberglass ducting is scored (for bending), a duct retainer **49** applied to each long edge and bars pressed onto the ducting. The duct is then formed by bringing the sides up until the bars confront each other and the end brackets **35** are inserted to hold the bar members together in the proper spaced relation. Insertion of the bracket wings into the ways is facilitated by the greater length and curved end of wing **38**. Shutters are already in place on their supporting flanges **24** as the bars are supplied. The assembly is then turned right side up and the extractor **58** (if used) is put into place.

The thus assembled complete, integral unit is now ready to be positioned on the ceiling structure. It is relatively light and can be handled readily by one man. He lifts it up and deposits it at the desired location spanning a pair of grid tees. While it is resting on the tees, and working on one end at a time, he presses the clips at the tops of brackets **35** down securely over the heads of the tees. The unit is now in place, and the workman can proceed with the assembly and installation of another unit. If the job plans call for two or more lengths of duct and channel to be connected in series, the next unit is similarly placed in position in the grid in longitudinal alignment with the first unit. Exact alignment is automatically provided by the interdigitating fit of grippers **40**, **41**, **42** of the two associated support brackets. Following usual practice, the joint between adjacent ends of the units are taped to prevent appreciable air leakage.

The air-distributing runs may be supplied with ventilating air by longitudinal (usually called "linear" in the trade) flow through the fiberglass duct from a source connected at one end, in which case the extractors are usually employed to turn the air downwardly, or the air may be supplied to the units from a supply duct through boot connections **73**. Ends of ducts may be closed by means of closures **74** conveniently cut from the fiberglass ducting material and taped into place.

When all of the units of a given row have been put into place, the cap **64**, cut to the proper length, is applied to the whole row of units. If the ducting extends from wall to wall of the room, then the cap **64** would be of that length. By pushing upwardly on cap **64** the supports **69** are forced into place so that the hooks **70** engage the ridges **32** of supports **31**. As is apparent in FIG. **1**, the cap **64** is below the bottom of flanges **18** of the tees so that a "finished" appearance is achieved. Should the cap **64** only extend across a part of the room, filler plugs (not shown) may be inserted into the gaps at the exposed ends, which gaps would be below the bottom of bar members **21** and **22** and above the cap **64**.

As is indicated above, caps **64** may be supplied in the same lengths as the other parts of the apparatus, in which case no cutting is necessary on the job. The continuous length of cap presents a better appearance because most, if not all, of the butt end joints may be avoided. If the air-distributing units are arranged to meet at, for example, right angles in the ceiling, the parts of the apparatus, including the caps, may be cut to form a mitre type joint.

After the system has been installed, the dampers are set for the desired air flow from each side of cap **64**. The flow on each side may be adjusted individually, since the gap between head **67** and the shutter **55** on each side is individually controllable. As a matter of fact, if desired, one side may be shut off entirely by bringing the shutter on that side over against head **67**.

The air-distributing apparatus illustrated in FIG. **2** is identical with that already described. However, FIG. **2** illustrates the manner in which this system is employed in connection with a ceiling of the type wherein the ceiling tiles **76**, instead of resting on the exposed flanges **77** of the tees, have slots **78** into which the flanges **77** extend. In this arrangement the tiles **76** that are to rest on flanges **25** of the air-distributing channels are notched out so that when the tile is in place it will be horizontal. The flanges **25** and the flanges **77** are at the same elevation whether the tiles and ceiling arrangement are of the type illustrated in FIG. **1** or the type illustrated in FIG. **2**, but in the latter the supporting grid structure is hidden from view.

FIGS. **11–15** illustrate a modified form of the invention. The configuration of the bar members **83** and **84** is the same as that of the bar members **21** and **22** with the following modifications: Internal flanges **85** are arranged at a higher level than flanges **24** and the cap-supporting members **31** are dispensed with. Instead of the apertured cap **64**, a center spreader **86** is employed comprising a plate **86***a* with an upright divider **87** having a triangular head **88**. Flanges **89** extend outwardly on each side of divider **87** in spaced parallel relation to plate **86***a*. Again, the spreader may be an extruded section cut to a length such as to extend between the flanges **18** of adjacent tees **15** in the ceiling grid structure.

Brackets **91** are employed to support the spreader in the air-distributing apparatus. Each bracket has a pair of horizontal prongs **92** which fit on opposite sides of divider **87** between flanges **89** and plate **86***a*. A slot **93** between the prongs accepts the divider and, for purposes that will be understood as this description proceeds, the slot extends all of the way to the inner surface of back **95** of the bracket. Upturned ears **94** are handle elements useful in ceiling mounting and demounting procedures.

As is best seen in FIG. 15, the brackets 91 rest on the flanges 18 of the tees 15 when the apparatus has been mounted in the ceiling structure. The top edges of the backs 95 of the brackets engage the undersides of flanges 85 in the fully assembled and mounted unit with the result that the spreader 86 is securely held against upward movement. If shutters 55 are provided full length, the end portions are notched, as at 56*b*, to provide clearance for brackets 91. The brackets rest upon their supporting tees between wings 37 and 38 of brackets 35. The backs 94 of the brackets 91 are as long as the inside distance between webs 23 of the bar members 83 and 84 so that the spreader 86 is centered between the two bar members. This results in equal air discharge slots 83 at each side of plate 86*a* through which the ventilating air can flow. As previously described, the amount of air being discharged through each slot can be controlled by the manipulation of dampers 55. This embodiment of the invention provides an especially attractive flush distributor arrangement.

While cap 64 of the form of the invention first described is supported by the channel assembly, the spreader 86, like the channel itself, rests upon the ceiling grid structure which, then, prevents downward or longitudinal movement of the mounted spreader. At the same time, the spreader supporting brackets 91 interrelate with the channel structure to prevent upward or lateral movement of the mounted spreader. Because of this three-way interrelationship, and because it is desirable to make the spreader demountable, special procedures, along with the special brackets, are employed in mounting the apparatus of FIG. 11. After the channel-duct unit has been assembled and placed in position in the ceiling grid structure, a bracket 91 is inserted as far as it will go into each end of a spreader and this sub-assembly is then arranged in position in the lower portion of the channel with the ends of plate 86*a* abutting the edges of supporting flanges 18. Using handle ears 94, the installer then pushes the brackets at each end of the spreader outwardly to positions upon flanges 18 with the backs of the brackets spanning the distance between the top surfaces of flanges 18 and the under surfaces of flanges 85. The spreaders are thus firmly secured in position. To remove a spreader from an assembled system, should that become desireable, the process is reversed.

If desired, the spreader sub-assembly may be arranged in position within the assembled channel with the brackets moved outwardly to plates 36 of brackets 35 and held in place as the unit is raised into position and mounted in the ceiling grid.

It will be understood that ventilating air supplied to the air-distributing channels will flow downwardly to the cap or spreader, as the case may be, then the stream will be divided and deflected to flow outwardly in opposite directions along under the ceiling, merging and mixing with the air in the room to provide draftless ventilation. By adjustment of the shutter dampers, the flow may be directed and the flow characteristics controlled to meet the needs of the particular location.

The apparatus itself is susceptible of many variations to adapt it to particular air requirements. The units may be installed in any lengths. If lengths less than the normal space between grid supports are to be employed, an additional grid tee or two may be used to support the unit. Esthetic and functional considerations may be readily reconciled and met. The units may be installed at any location along the lengths of the grid tees.

If narrower flow channels are desired, this is readily accomplished by appropriate alteration of the bracket dimensions. For example, the bars 83 and 84 may be fixed closer together by reducing the width of plate 36 of bracket 35 and the length of the back 95 of bracket 91.

It should also be noted that, while the form of bracket 35 is that to be used with the very commonly used grids composed of inverted tee members, the shape of this bracket may readily be adapted for the same use with grids employing other grid rail shapes, such as channels, instead of tees.

As is suggested in the foregoing description, ventilating air may be supplied to the distributing channels either linearly from one end of the duct which is a part of the unit, in which case the air extractors would ordinarily be employed to turn the longitudinal flow downwardly as the air is fed to the room below, or more or less transversely of the duct when the air is fed from a main supply duct through flexible boots. In the latter case, the extractors may be dispensed with. If the space above the suspended ceiling is used as a supply plenum, the fiberglass ducts will be omitted, the ventilating air flowing directly into the distributing channels from the plenum space.

We claim:

1. In a suspended ceiling air-distributing apparatus including a supporting grid of spaced rails and ceiling panels arranged in a plane and supported by said grid to form a suspended ceiling, the improvement wherein said apparatus comprises means spanning the distance between two adjacent rails of said grid and supported solely thereby, said means comprising two identical bars of a length approximately equal to the distance between supporting rails, said bars having conformations on a side thereof defining at least partially enclosed ways, and a single bracket at each end of said bars, each bracket having wings received in the ways of the respective bars to space and hold the two bars a given distance apart to form an air-distributing channel and an integral clip portion engaging adjacent grid rails for supporting said channel therebetween and in said grid.

2. Apparatus as set forth in claim 1, wherein the grid rails are inverted tees and the clip portion of each bracket has grippers that extend over and about the top of the engaged tee, said grippers being off center and spaced from each other an amount such that when two brackets are hooked over the tee at the same location therein but from opposite sides said grippers will interdigitate and align the centers of the two brackets with each other.

3. Apparatus as set forth in claim 2 wherein the inverted tee rails have bulbous tops and said grippers of said clip portions of said brackets fit around and grip the bulbous tops of said inverted tee rails including under portions thereof.

4. Apparatus in accordance with claim 2 and including an air duct approximately equal in length to that of said channel, said duct being fastened to said channel along the top thereof and having an opening along its bottom for air flow connection of said duct with said channel.

5. Apparatus in accordance with claim 1 and including an air duct approximately equal in length to that of said channel, said duct comprising resilient fiberglass ducting formed into an inverted roughly U-shaped and each bar is provided with spaced arms forming a groove opening outwardly from said channel and extending the length of said bar, the edge portions of said duct projecting into and compressed within the respective bars whereby to sealingly connect said duct with said channel.

6. Apparatus in accordance with claim 5 and including means for positively holding said edge portions of said duct in said grooves.

7. Apparatus in accordance with claim 5 and including a duct retainer arranged in each said groove between the fiberglass ducting and the outer arm of each set of groove-defining arms, said retainer comprising an elongated sheet material member having a generally L-shaped cross section and prongs extending inwardly from the back thereof into said ducting to hold the same in fixed position relative to said retainer.

8. Apparatus in accordance with claim 7 wherein said outer arm has an inwardly projecting shoulder extending along the length of the edge thereof and said retainer has a longitudinal detent which engages said shoulder when said edge portions of said duct and said retainers are fully inserted into said grooves.

9. Apparatus in accordance with claim 8 wherein the upper edge portion of said retainer extends beyond the edge of said outer arm whereby said retainer may be disengaged from said shoulder and withdrawn from said groove along with said duct.

10. Apparatus in accordance with claim 1 and including an air spreader arranged along the bottom of said channel and extending the length thereof, said spreader having a solid median portion and being open along each side of said median portion whereby to deflect air flowing downwardly through said channel and direct it to flow laterally along under the ceiling, said median portion having a downwardly opening groove centrally therein adapted to receive and laterally support the top of a wall structure.

11. Apparatus in accordance with claim 1 and including inner flanges extending toward each other from the bottom portions of said bars but leaving an air gap therebetween, and a shutter slideably mounted on each of said inner flanges and adapted to vary the size of said air gap.

12. Apparatus in accordance with claim 11 and including an air spreader arranged along the bottom of said channel and extending the length thereof, said spreader having a solid median portion and being open along each side of said median portion whereby to deflect air flowing downwardly through said channel and direct it to flow laterally along under the ceiling, said spreader having a divider extending upwardly therefrom along the median thereof to the level of said inner flanges whereby to form with said shutters means for controlling the flow of air through said gap to the respective sides of said divider and spreader.

13. Apparatus in accordance with claim 12 wherein the median portion of said face plate is formed to define a downwardly opening groove adapted to receive and laterally support the top portion of a wall structure.

14. Apparatus in accordance with claim 1 and including an air spreader arranged along the bottom of said channel and extending the length thereof, said spreader comprising a horizontal plate narrower than the width of said channel and positioned midway between said bars to provide air flow slots along each side of said spreader, and means for supporting said spreader from the same grid rails that support said channel.

15. Apparatus in accordance with claim 14 wherein said spreader supporting means comprises a pair of brackets respectively secured to the respective ends of said spreader and seated upon said grid rails.

16. Apparatus in accordance with claim 15 and including a pair of flanges attached to said plate along the median thereof and extending respectively outwardly in spaced relation above said plate to provide a horizontal way between each said flange and said plate, said bracket having a pair of horizontal prongs received and snugly held within respective ways in said spreader to support the same.

17. Apparatus in accordance with claim 15 wherein said spreader supporting means comprises a pair of brackets respectively secured to the respective ends of said spreader and seated upon said grid rails, said brackets having vertical back portions the upper edges of which engage the under surfaces of said inner flanges to prevent upward movement of said spreader.

18. Apparatus in accordance with claim 14 wherein said bars have inner flanges extending toward each other from the bottom portions of said bars but leaving an air gap therebetween, a shutter slideably mounted on each of said inner flanges and adapted to vary the size of said gap, said spreader having a divider extending upwardly therefrom along the median thereof to the level of said inner flanges whereby to form with said shutters means for controlling the flow of air through said gap to the respective air flow slots.

19. Apparatus in accordance with claim 18 and including a pair of flanges extending outwardly from said divider in spaced relation to said plate to form a horizontal way on each side of said divider, said bracket having a pair of horizontal prongs received and snugly held within respective ways in said spreader to support the same.

20 Air distributing apparatus installed in a suspended ceiling comprising a supporting grid of spaced rails having horizontal flanges supporting ceiling panels arranged in a plane to form the ceiling, said apparatus comprising an air-distributing channel having openings along the top and bottom thereof for the flow of air downwardly therethrough and horizontal flanges extending outwardly along the bottom of said channel at the level of and abutting said rail flanges for supporting said ceiling panels, a bracket attached to each end of said channel and engaging a grid rail to support said channel therefrom, said brackets having grippers extending over the tops of said rails spaced and arranged to interdigitate with the grippers of a mating bracket on the opposite side of the same rail to exactly align said mating brackets, said channel having internal flanges extending inwardly toward each other along the bottom thereof but leaving an air flow gap therebetween, adjustable shutters arranged on said internal flanges to control the width of said gap and thus the flow of air therethrough, an apertured cap extending subjacent said channel throughout the length thereof and along under said grid rails and supported from said channel, said cap having a solid median portion and a vertical divider rising therefrom to the level of said gap, said channel having a pair of spaced arms rising upwardly and outwardly along each side of said channel to provide grooves for receiving the edge portions of an air flow duct, a duct supported by and extending the length of said channel and opening downwardly thereinto, and means for demountably and sealingly holding edge portions of said duct in said grooves.

21. Air distributing apparatus installed in a suspended ceiling comprising a supporting grid of spaced rails having horizontal flanges supporting ceiling panels arranged in a plane to form the ceiling, said apparatus comprising an air-distributing channel having openings along the top and bottom thereof for the flow of air downwardly therethrough and horizontal flanges extending outwardly along the bottom of said channel at the level of and abutting said rail flanges for supporting said ceiling panels, a bracket attached to each end of said channel and engaging a grid rail to support said channel therefrom, said brackets having grippers extending over the tops of said rails spaced and arranged to interdigitate with the grippers of a mating bracket on the opposite side of the same rail to exactly align said mating brackets, an air spreader arranged along the bottom of said channel and extending the length thereof, said spreader comprising a horizontal plate narrower than the width of said channel and positioned at the level of said channel and grid rail flanges midway between the sides of said channel to provide air flow slots along each side of said spreader, said channel having internal flanges extending inwardly toward each other from the lower part of said channel but leaving an air flow gap therebetween, adjustable shutters arranged on said internal flanges to control the width of said air gap and thus the flow of air therethrough, said spreader having a vertical divider rising along the median thereof to the level of said internal flanges, a bracket attached to each end of said spreader and seated upon the same grid rails that support said channel, said brackets having a back which fits snugly between said inner flanges and said horizontal flanges of said grid rails to prevent vertical movement of said spreader and which fits snugly between the sides of said channel to prevent lateral movement of said spreader, said channel having a pair of spaced arms rising upwardly and outwardly along each side of said channel to provide grooves for receiving the edge portions of an air flow duct, a duct supported by and extending the length of said channel and opening downwardly thereinto, and means for demountably and sealingly holding edge portions of said duct in said grooves.

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