

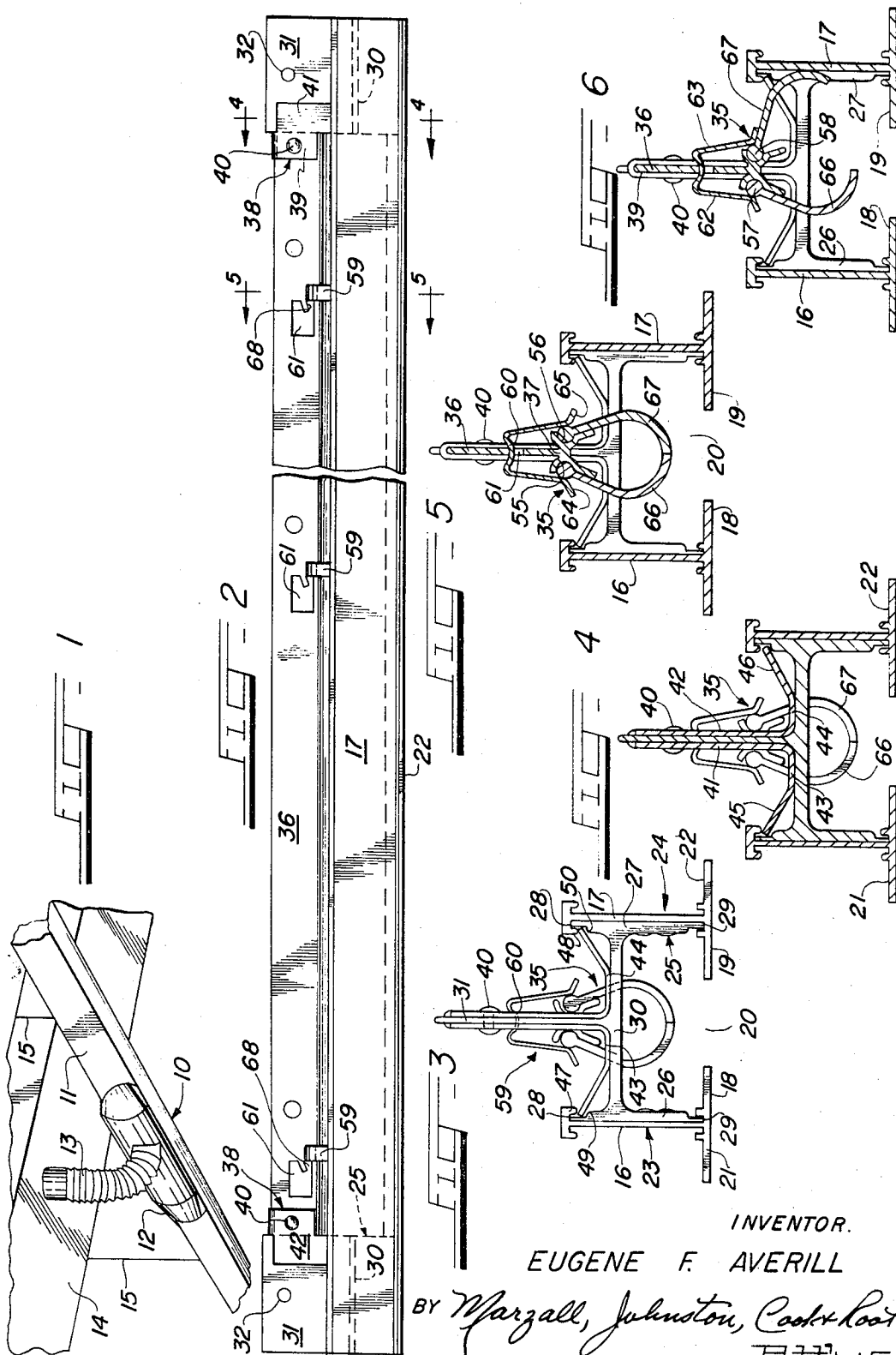
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SLOT DIFFUSER WITH CLIP-IN PATTERN CONTROLLER

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SLOT DIFFUSER WITH CLIP-IN PATTERN CONTROLLER

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ABSTRACT OF THE DISCLOSURE

Slot diffusers with clips mounting air pattern control vanes on spacer members such as H-hangers and spring arms holding pivotable vanes in grooves of vane mounting member.

This invention, in general, relates to improvements in slot diffuser structures embodying an air pattern control means in the elongated, air flow channel of the slot diffuser with clip means mounting said pattern control means on said diffuser. The invention further embodies slot diffusers of the aforementioned type in which the air pattern control means constitutes vane support means having at least one longitudinal groove therein and spring clip means acting against an elongated vane or vanes pivotally seated in said groove.

In the preferred form, as illustrated in the drawing, the invention constitutes air pattern control means embodying pivotable, elongated vanes of the type described in U.S. Patents Nos. 3,185,068 and 3,185,069, issued May 25, 1965, to H. E. Straub and E. F. Averill. The pivotable vanes in these patents have rounded, longitudinal edges which snap into elongated grooves in the vane support member and are pivotally supported therein. The invention herein provides a spring clip pressing the rounded, longitudinal edge of the vane in a respective, substantially semi-cylindrical, longitudinal groove in the support member. In certain types of slot diffuser systems, it is advantageous to provide vane support members and/or vanes mounted thereon which can be attached or detached in the slot diffusers on the job site. This invention provides slot diffuser structures having such a feature, whereby elongated walls of slot diffusers can be provided with active and inactive sections. For active sections, air pattern control means can be installed, removed, or shifted, as air distribution needs dictate by virtue of the ready attachment or detachment of the vane support members and/or the vane supported thereon. Inactive sections, i.e., sections in which air does not flow, may contain the vane support members without or with vanes, or may be without either. The latter is the most economical. Vanes may be useful in inactive sections because, in the illustrated embodiment and the like, the vanes may be used as close-off dampers. Blank-off members such as plates or the like may be used to blank off the inactive sections.

Briefly, the invention provides elongated air distribution members having elongated, spaced, opposing side walls defining therebetween an elongated, air flow channel. These slot diffusers preferably embody at least one, elongated, inwardly directed lip, and usually two opposing, inwardly directed, spaced lips, at the lower edge or edges of the respective side walls. The respective lip or lips defines a longitudinal edge of an elongated, air discharge slot in the bottom of the diffuser. The diffuser further has air pattern control means with elongated, movable, air-flow directing members extending longitudinally in the channel. The air pattern control means is employed for directing air flow against a lip or lips in certain types of presently known slot diffusers. In other types of known slot diffusers, the air pattern controller

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is employed to deflect the air away from the lip or lips. The lip or lips coact with the air pattern controller to provide selective air discharge patterns which may be substantially horizontal (parallel with the ceiling) or vertical, or the like. For further details, reference is made to such U.S. Patents as 3,185,068, 3,185,069, 3,183,821, 3,242,847, 3,126,811, 3,220,332 and the like.

The slot diffusers of the instant invention embody spacer means disposed at spaced intervals along the slot diffuser and holding the side walls of the slot diffuser in spaced, opposing relationship. A preferred form thereof is an H-hanger having the vertical legs thereof in holding engagement with said side walls. The cross-leg of the respective H-hangers has a vertical member, preferably a vertical bar, extending upwardly therefrom. These spacer means are utilized for supporting the air pattern control means in the slot diffuser by the use of clip means releasably mounting the air pattern control means on the spacer means.

For this purpose, the air pattern control means extends between adjacent spacer means with respective ends of the air pattern control means contiguous to a spacer means. The clip means is mounted on respective ends of the air pattern control means with clip arms releasably holding respective spacer means, whereby the air pattern control means is supported in the diffuser channel by and between the spacer means.

With spacer means such as H-hangers having the aforesaid vertical member or bar projecting upwardly therefrom, the clip means includes clip arms extending from respective ends of the air pattern control means along opposite sides of the vertical member or bar. With clip means such as H-hangers, the lower portions of the clip arms preferably rest on the cross-leg of the H-hanger. The clip arms, furthermore, advantageously may have laterally extending, outer ends which extend beneath inwardly projecting, longitudinal lips on the upper portion of the side walls of the diffusers. These outer ends of the arms are springable and are adapted to snap beneath said lips to secure the air pattern control means against unseating from the spacer means by an upward push on the air pattern control means. This arrangement is particularly desired when the elongated, movable, preferably pivotable, air-directing vanes of the air pattern control means are the type which can be snapped into the vane support portions of the slot diffuser.

The structure of the latter type is advantageous when the vane support means has at least one, and usually two, groove type pivot supports for respective elongated vanes with spring clip means mounted on the vane support means and spring arms pressing the respective elongated vane or vanes into the pivot support of the vane support member.

In a preferred form, this feature of the invention is achieved by the provision of at least one longitudinally extending, substantially cylindrical groove with at least one elongated vane pivotally supported therein. This vane has a rounded, longitudinal edge substantially matingly seated in the respective semi-cylindrical groove. The spring clip means has at least one spring arm extending across and pressing the rounded, longitudinal edge into the groove. In the preferred form of the invention, which is illustrated in the drawing, the vane support means has a pair of longitudinally extending, substantially semi-cylindrical grooves in side-by-side relationship along the lower portion of the vane support means. The grooves face in generally opposite directions. The spring clip has two spring arms, one on each side of the vane support member, each of which spring arms has its springable, free portion bearing against the rounded longitudinal edge of the respective vanes and releasably holding the rounded

longitudinal edge in the respective semi-cylindrical groove.

A preferred embodiment of the invention is illustrated in the drawing, wherein:

FIG. 1 is a fragmentary, perspective view, a portion of the duct work and a slot diffuser of an air distribution system;

FIG. 2 is a broken-side elevation of a preferred form of the slot diffuser of the present invention;

FIG. 3 is an end elevation thereof;

FIG. 4 is a section view taken on section plane 4—4 of FIG. 2;

FIG. 5 is a section view taken on section plane 5—5 of FIG. 2; and

FIG. 6 is a section view taken on section plane 5—5 of FIG. 2 with one of the pivotable vanes pivoted into contact with a side wall of the slot diffuser.

Referring to the drawings, an elongated slot diffuser 10 is connected by a longitudinally split duct 11 having a plenum chamber 12 to a main supply duct 14 by the intermediary flexible conduit 13. The attachment of the flexible conduit 13 to the respective ducts and the mounting of the split duct 11 on the diffuser 10 are generally well known in the art. In the case of a suspended ceiling, the diffuser 10 is hung from the main ceiling of building framework by suspension rods or wires 15.

The slot diffuser of the invention comprises horizontally spaced, oppositely disposed, elongated side walls 16 and 17, each of which may have an elongated, inner flange or lip 18 and 19 at the lower edge thereof. Lips 18 and 19 extend longitudinally of the slot diffuser in substantially opposing relationship and the opposing, inner edges thereof define the elongated, longitudinally extending slot 20 of the slot diffuser. Air supplied to the upper portion of the slot diffuser flows through the air flow channel defined by the side walls 16 and 17 and out the slot 20. If desired, the slot diffuser may also have elongated, longitudinally extending, outwardly directed flanges 20 and 21, which are ordinarily provided either for the purpose of masking the opening cut in a ceiling in which the diffuser 10 is mounted, or for the purpose of providing supporting flanges for ceiling panels, fixtures, light panels, or other structures of a suspended ceiling.

The diffusers of the invention preferably comprise extrusions 23 and 24 of a cross-section as shown in FIGS. 3-6 with H-hangers providing the spacing and connecting members for the two extrusions. The H-hanger 25 has vertical legs 26 and 27, the upper and lower edges of which are respectively received in longitudinally extending, upper grooves 28 and the longitudinally extending lower grooves 29. These H-hangers 25 are provided at the desired spacing intervals and may be used as bridges across abutting, aligned sections of said extrusions.

The cross-leg 30 of the H-hanger 25 has an upwardly extending, vertical bar 31. The latter has a hole 32 which receives the rod or wire 15 when the slot diffusers constitute members of a suspended ceiling.

The air flow channel between the side walls 15 and 16 has an air pattern controller 35 provided therein. This air pattern controller is adjustable to provide a vertical, 180° discharge pattern, i.e., horizontal or intermediate air discharge pattern upon the air flowing through the channel and out the elongated slot 20. In the embodiment illustrated, the air pattern controller also may function as a close-off damper. The air pattern controller may be of any suitable type. In this respect reference is made to such prior art as U.S. Patents Nos. 3,126,811, 3,220,332, 3,183,821, etc. The particular air pattern controller is the preferred form, and its general structure and mode of use is described in U.S. Patents Nos. 3,185,068, 3,185,069, and 3,242,847.

The illustrated air pattern controller comprises a central, longitudinally extending, vertically disposed bar 36 of the vane holder 37. End slips 38 having an inverted U-base 39 are attached at opposite ends of the bar 36 by rivets 40. The end clips 38 each have vertical arms 41

and 42 projecting laterally from the legs of the inverted U-base 39 and extending downwardly on opposite sides of the vertical bar 31 of the H-hanger 25. The vertical arms 41 and 42 extend downwardly to approximately the cross leg 30 of the H-hanger and mount the bar 36 in axial alignment with the vertical bar 31 of the H-hangers 25. They provide horizontal stability between the bars 31 and 36.

The arms 41 and 42 have lower portions comprising horizontal legs 43 and 44, which rest upon the upper side of the cross-leg 30 of the H-hangers 25, and thereby lend vertical support to the air pattern controller 35 on the respective H-hangers. Preferably, the arms 41 and 42 also have diagonally upwardly sloping end portions 45 and 46, the respective outer edges of which fit under longitudinally extending lips 47 and 48 on the upper, inner sides of the side walls 16 and 17. The end portions 45 and 46 are springable to permit the outer edges to pass between lips 47 and 48 in a downward direction. Their function is to releasably engage lips 47 and 48 to preclude upward displacement of the air pattern controller 35 after installation of the air pattern controller on the H-hangers. The inner faces of the legs 26 and 27 of the H-hangers may have longitudinal shoulders 49 and 50 immediately below the upper lips 47 and 48 to provide groove seats for the outer edges of the end portions 45 and 46 of the arms 41 and 42.

The lower portion of the vane holder 47 has longitudinally extending, substantially semi-cylindrical grooves 55 and 56. These grooves preferably face substantially oppositely outwardly on opposite sides of the vane holder 47.

The rounded, upper edges 57 and 58 of the elongated vanes 66 and 56 matingly seat in the semi-cylindrical grooves 55 and 56, whereby the grooves provide a pivot seat for the rounded edges 57 and 58. This seating relationship is maintained by the use of spring clips 59 disposed at predetermined spacings along the bar 36. The spring clips are mounted in the bar 36 in cut-outs 61, and have downwardly depending spring arms 62 and 63 having outwardly turned ends 64 and 65. The spring clips 59 comprise a bight portion 60 removably received in the lower, horizontal leg 68 of the cut-out 61, and the aforesaid spring arms 62 and 63 depending downwardly from the bight portion.

It will be seen from FIGS. 3-6 that the vanes 66 and 67 are pivotally supported on the vane support member and are manually adjustable by finger movement, or movement with a tool between the fully open position as shown in FIGS. 3-5 and a fully closed position as shown for the vane 67 in FIG. 6, wherein the vane is in contact with the inner face of side wall 17. The spring clips 59 provide sufficient frictional force in the engagement of rounded edges 57 and 58 with the substantially semi-cylindrical grooves 55 and 56 to hold the vanes in the adjusted position against the pressure of the air flowing thereagainst.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the forms herein disclosed being preferred embodiments for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. An elongated diffuser comprising elongated, spaced, opposing side walls defining therebetween an elongated, air flow channel, spacer means disposed at spaced intervals along said slot diffuser and holding said side walls in spaced, opposing relationship, air pattern control means extending between adjacent spacer means with respective ends of said air pattern control means contiguous to a spacer means, said air pattern control means in-

cluding a movable, elongated, air pattern control vane movably supported on an elongated support member extending between said spacer means, and clip means mounted on respective ends of said support member and releasably engaging respective spacer means for releasably mounting said air pattern control means in said channel.

2. An elongated diffuser comprising elongated, spaced, opposing side walls defining therebetween an elongated, air flow channel, spacer means disposed at spaced intervals along said slot diffuser and holding said side walls in spaced, opposing relationship, air pattern control means extending between adjacent spacer means with respective ends of said air pattern control means contiguous to a spacer means, clip means mounted on respective ends of said air pattern control means and releasably engaging respective spacer means for releasably mounting said air pattern control means in said channel, a bar projecting upwardly from said spacer means, and said clip means having respective bases attached to opposite ends of air pattern control means with clip arms extending from said respective ends of said air pattern control along opposite sides of said bars.

3. A slot diffuser as claimed in claim 2, wherein spacer means comprises H-hangers having the vertical legs thereof in holding engagement with said side walls, said bar extending upwardly from the cross-leg of said respective H-hangers, and lower portions of said clip arms resting on said cross-leg.

4. A slot diffuser as claimed in claim 3, inwardly protecting, longitudinal lips on the upper portion of said side walls, and laterally extending, portions on said arms extending beneath said lips.

5. An elongated, air distribution member comprising oppositely disposed, spaced, elongated walls defining an elongated air flow channel, an elongated vane support member extending longitudinally about midway between said walls, wall connecting means extending between said side walls at spaced, longitudinal, intervals and holding said walls in opposing, spaced relationship, a vertical bar on said wall connecting means about midway between said side walls, the ends of said vane support member being contiguous to respective wall connecting members, clip means attaching said vane support member to said wall connecting means, said clip means comprising a base portion attached to a respective end of said vane support member, with laterally extending spring arms extending from said base portion into engagement with groove means adjacent the upper edges of said side walls for receiving said spring arms, said vane support member having longitudinal, substantially semi-circular grooves on opposite sides thereof, elongated vanes extending longitudinally in said channel on opposite sides of said vane support member, the upper, longitudinal edge of each vane being rounded and rotatably seated in respective grooves, and means releasably pressing said edges of said vanes in respective grooves whereby said vanes are removably and pivotably supported on said vane support member.

6. An air distribution member as claimed in claim 5, wherein said wall connecting means comprise H-hangers with the vertical legs secured to said side walls and a horizontal cross-leg, said vertical bar extending upwardly from said cross-leg, and said clip means comprises a base portion attached to respective ends of said vane support member with spring arms respectively extending down opposite sides of said vertical bar, laterally across the upper side of said cross-leg, and laterally upwardly outwardly to free, outer ends seated in groove means adjacent the upper edges of said side walls.

7. An elongated, air distribution member comprising oppositely disposed, spaced, elongated walls defining an elongated air flow channel, an elongated vane support member extending longitudinally about midway between said walls, at least one elongated vane movably supported on said vane support member, H-hangers connecting said walls at spaced intervals and holding said walls in opposing, spaced relationship, said H-hangers having vertical legs secured to said side walls and a horizontal cross-leg, a vertical bar extending upwardly from said cross-leg, and clips having a base portion attached to respective ends of said vane support member with spring arms extending laterally into engagement with groove means adjacent the upper edges of said side walls for receiving said spring arms.

8. An elongated diffuser comprising elongated, spaced, opposing side walls defining therebetween an elongated, air flow channel, spacer means disposed at spaced intervals along said slot diffuser and holding said side walls in spaced, opposing relationship, air pattern control means extending between adjacent spacer means with respective ends of said air pattern control means contiguous to a spacer means, clip means mounted on respective ends of said air pattern control means and releasably engaging respective spacer means for releasably mounting said air pattern control means in said channel, said air pattern control means comprising vane support means disposed in said channel about midway between said side walls and having at least one longitudinally extending, substantially semi-cylindrical groove, at least one elongated vane having a rounded, longitudinal edge substantially matingly seated in a respective semi-cylindrical groove, and spring clip means mounted on said vane support means with at least one spring arm extending across and pressing said rounded, longitudinal edge into said groove.

References Cited

UNITED STATES PATENTS

3,276,349	10/1966	Person	98—40
3,295,432	1/1967	Palmquist	98—40
3,327,608	6/1967	Newell et al.	98—40

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