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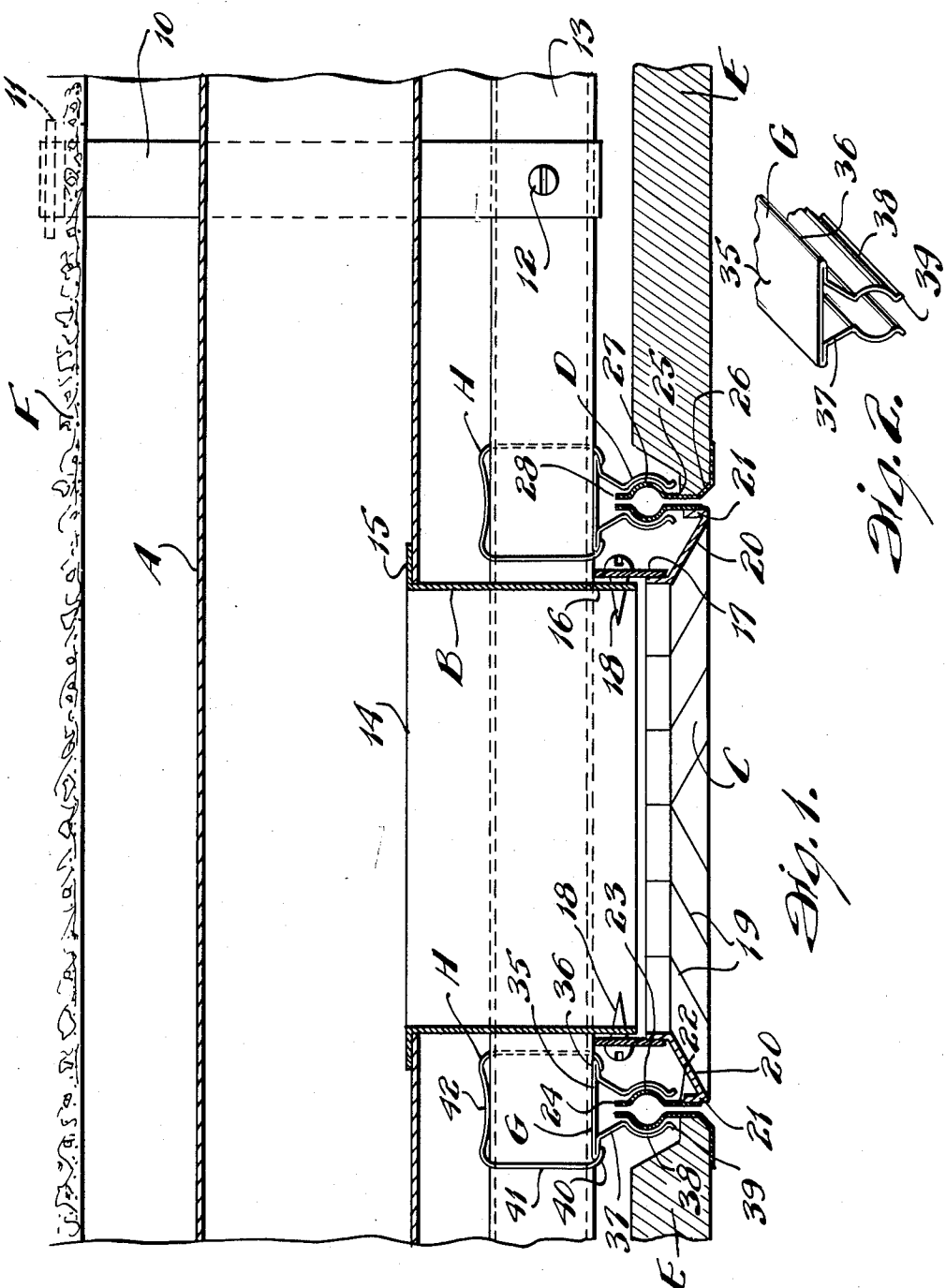
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2,734,446

CEILING INSTALLATION

Filed July 25, 1949

3 Sheets-Sheet 1



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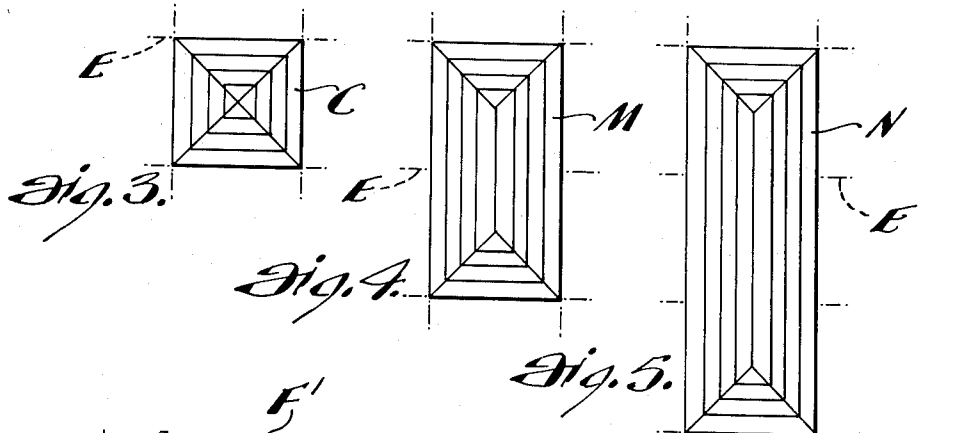
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Fig. 8.

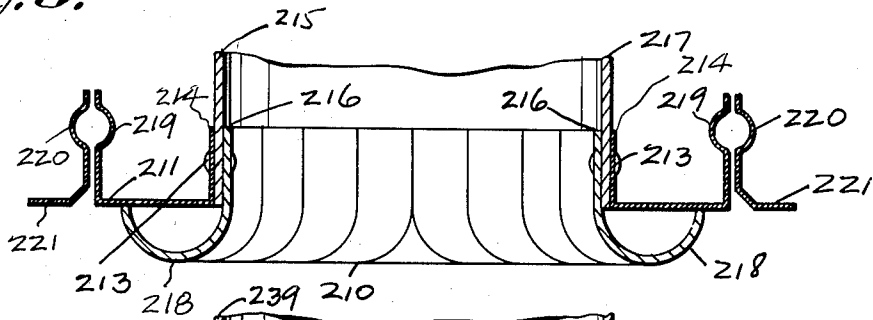


Fig. 9.

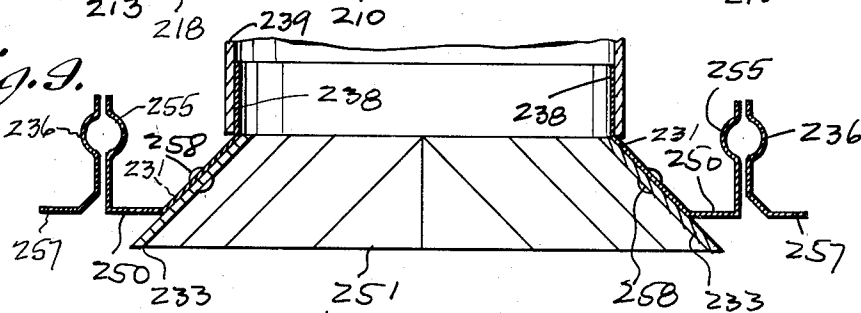


Fig. 10.

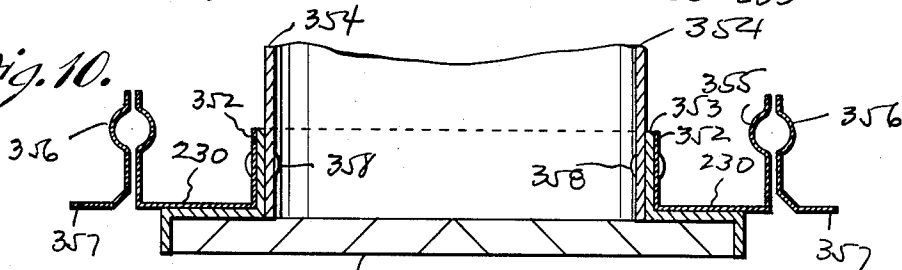


Fig. 11.

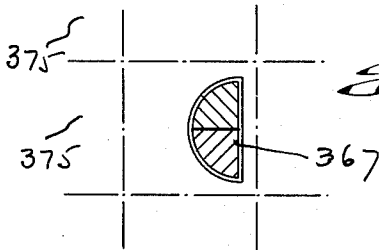
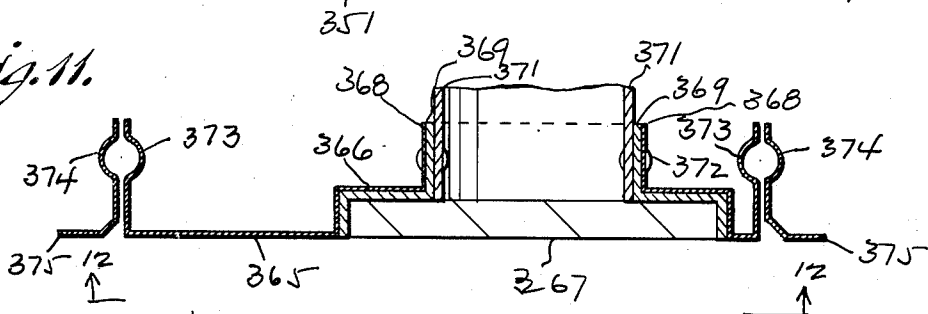


Fig. 12.

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2,734,446

CEILING INSTALLATION

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Application July 25, 1949, Serial No. 106,533

2 Claims. (Cl. 98—40)

The present invention relates to installation of air conditioning, ventilating or hot air outlets in ceilings and walls and it particularly relates to installations which may be utilized in combination with acoustical tile ceilings or walls.

Although the present invention has a broad application to air outlet installations for ventilating, conditioning and heating, it will be particularly described in this application to aligned mounting and suspension of diffusers for ventilating and air conditioning equipment.

It is among the objects of the present invention to provide an easy installation procedure for ready mounting and aligning of ventilating and air conditioning outlets in tile or acoustical ceilings which may be readily installed by workmen without difficulty or marring the ceiling and which will give an attractive appearance and blend with the general ceiling design without detracting from the acoustical effect.

Another object is to provide a ventilating diffuser installation which is readily adaptable to being installed in connection with tile or acoustical ceilings with automatic alignment and without change of design and without special sizes of tiles and which will readily lend itself to the architecture or engineering design and enable a maximum of economy or efficiency in installation.

A further object is to provide a rugged and durable ventilating and air conditioning installation which will enable rapid and speedy installation and assure that such installation will be substantially permanent and may readily be inspected, dismantled and repaired.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, it has been found most satisfactory, according to one embodiment of the present invention, to mount or suspend the air outlets or diffusers in the ceiling or wall together with the adjacent tiles or acoustical elements.

Desirably the ventilating, conditioning or heating air outlets are of such shape and size or are mounted in a pan of such shape and size as to replace one, two or more tiles or acoustical elements in the wall or ceiling of the interior or room.

In installation, the ceiling or wall construction is first prepared by mounting the air ducts or conduits and providing interior support or beam arrangements to receive the supporting spring holder members or attaching clips or connections by which the air outlets and adjacent tiles may be mounted in proper alignment and set directly in position. The clips or spring holder elements will grasp the inwardly projecting edge portions of the adjacent tiles and diffuser elements to hold the same in position.

Where the air diffusers or outlets are placed in position

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first, their central portions may be attached by screws, spot welding, rivets or in other manners to transverse auxiliary conduits leading from the main air ducts or conduits. Then the surrounding tiles or acoustical plaques may be inserted into position to encircle said outlets or diffuser with assurance of perfect alignment of the tiles and diffusers in the ceiling.

Even when the tiles are placed in position first, it is not necessary to remove the tiles to place the diffusers or outlets into position since they may be snapped into position in the spaces left for the outlets without disturbance of the adjacent tiles and with perfect alignment.

A particular feature of the present invention resides in the provision of a ventilator, diffuser or an outlet having suspension, engagement or mounting means at its perimeter or at the periphery of its mounting pan to a ceiling wall construction in lieu of or in addition a central mounting attachment to a transverse auxiliary duct leading to the main air conduits or ducts inside of the wall or ceiling.

The diffuser need not always be flush but may also be inserted so as to project beyond or be recessed within the ceiling or wall line or plane if desired by the same arrangement.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Fig. 1 is a fragmentary, diagrammatic, vertical cross sectional view showing the installation of a flush type diffuser together with acoustical tiles in a ceiling construction.

Fig. 2 is a fragmentary perspective view indicating the clip which may be utilized for holding the flush type installation as well as the adjacent edges of the pans or acoustical tiles together in perfect alignment in the ceiling or wall construction.

Figs. 3, 4 and 5 are bottom plan views indicating how the flush type diffuser may be made in modular sizes or that it may readily fit into ceiling or wall constructions in lieu of one, two, three or more tile elements.

Fig. 6 is a vertical transverse sectional view of an alternative construction similar to Fig. 1.

Fig. 7 is a vertical transverse sectional view of still another type construction similar to Fig. 1.

Figs. 8, 9, 10 and 11 are diagrammatic vertical sectional views showing other types of mounting in which diffusers of circular, ovular or semi-circular shape or which are smaller in dimension than the modular sizes are attached or placed in or associated with mounting pans which are of modular sizes and fit into the space or openings left between the tiles for the air outlets or diffusers.

Fig. 12 is a diagrammatic bottom view upon a reduced scale of the installation of Fig. 11.

Referring to Fig. 1, there is shown a main air duct A, a transverse auxiliary duct B, a rectangular or square diffuser C, a clip arrangement D, acoustic or other types of tiling E, and a main concrete ceiling or wall base structure F.

The concrete structure F, which may form part of the building construction, is provided with the support hangers or rods 10, which apparently are attached to the building by the construction indicated at 11. These bars or hangers 10 may be connected by screws, rivets or welding at 12 to the tile and diffuser or outlet support beams 13. These beams may be of U, T or H cross section.

Above the members 13 are provided the main ducts A of the air ventilating, conditioning or heating system, which have openings at 14 and are provided with flange connections 15 to the short, tubular or square, transverse connections B leading to the interior of the room or space, as the case may be.

To the lower end 16 of the conduits B are attached the side attachment plates 17 of the diffusers C by the screws 18.

Attached to the plate 17 is shown a tubular flush type diffuser C having the vanes 19 and providing correct air distribution to the area which it serves. The diffuser C may be made in a variety of patterns or a variety of vane arrangements to provide an air stream in one, two, three or even four directions, and if desired any other type of diffuser may be used in lieu of the specific type shown at C.

It may be recessed into the wall or ceiling or project therefrom and if circular, semi-circular or smaller than the normal tile opening it may be mounted into a mounting pan or adapter plate to fit into the space normally occupied by one or more tiles.

The side plates 20 of the diffuser C may have upwardly turned edges 21 which may be extended or carry the male clip members 22. As shown, the clip members 22 are welded, riveted or otherwise attached to the upturned edges 21 of the air outlets or diffusers and they are provided with the enlarged portions 23 and the end extensions 24.

At the same time the tiles E, which may be acoustical tiles, are provided with the male clip holders 26 which are turned upwardly at 25 and have the semi-cylindrical enlargement 27 terminating in the straight edges 28.

The male clip members 22 and 27 of the adjacent tiles E and diffuser C are received by a female clip member G. The clip member G is provided with a base 35 with the outwardly extending edges 36 and the oblique, downwardly extending portions 37 forming the clip member 38 having the entrance lips or mouth 39.

The outwardly extending portions 36 engage the holders H. The holders H have the lower, intumed portions 40 to engage clips G, the side portions 41 and the base portions 42.

Both the diffuser C and the tiles E may be readily assembled into the wall or ceiling.

The diffuser C may be first placed in position and mounted by the screws 18. Then the surrounding tiles E may be placed in position with assurance of automatic alignment.

Although the arrangement may widely vary, the hanger straps 10, for example, may be on 4 foot centers in both directions while the member 13 may consist of 1½" channel on 4" in one direction. The tiles E are usually of modular sizes, namely 12" x 12" or 12" x 24". The channel clips H may be of spring steel, while the T-holder members G may also be of spring steel.

As shown best in Figs. 3, 4 and 5, the diffuser C may be of the dimensions or length and width of one, two or three tiles, may be readily fitted in the ceiling or wall to occupy the space of one tile E, as indicated at C in Fig. 3, two tiles E as indicated at M in Fig. 4 or three tiles E as indicated at N in Fig. 5.

In the arrangement shown in Fig. 6, the cross beams 50 are suspended by the rods 51 from the ceiling 52. The rods 51 extend past the main air ducts 53. The holders 54 may be of the same construction as holders H in Fig. 1.

The spring steel clips 56 may be of the same construction as clips G of Fig. 1. The clips 56 are held in position by the holders 54. The clips 56 have downwardly projecting walls 55 and curved lip portions 57. The lips 57 act to clip the upwardly extending end enlargements or teeth 58 or 59. The teeth 58 and 59 extend upwardly from the peripheries 60 and 61 of the diffuser 62 and the tiles 63, respectively.

This clip arrangement, employing the latch or tooth elements 58 and 59, also enables a ready assembly of the diffuser together with the acoustical tiles in the ceiling, assures alignment, and gives a flush, durable, attractive appearance which blends into the general design of the room.

In the arrangement shown in Fig. 7 the bars 75 are provided with the loops 76 tied together at 77, which perform the function of the members H in Fig. 1.

From the peripheries 78 and 79 of the diffuser 80 and the tiles 81, respectively, there extends upwardly the H-shaped beam 82 which forms the readily attachable connection between the loops 76 and the peripheries of the diffuser 80 and the tiles 81.

In Figs. 6 and 7 parts which function the same as in Fig. 1 are designated by the same numerals and are, however, provided with a prime or a superior 2.

By reason of the above constructions, a much less expensive installation of air diffusers may be attained, permitting the maximum convenience of design to both architecture and engineering fitting into any tile or acoustical ceiling. The diffuser will be mounted in the ceiling together with the acoustical tiles and there will be an automatic alignment without need for later adjustment.

The diffuser whether square or rectangular in outline as shown, or circular or semi-circular and mounted in a square or rectangular adapter pan having peripheral male clip elements, such as 23, 59 or 78 will be automatically aligned with the tiles in the wall or ceiling and will blend quite harmoniously with the interior decoration to become part of the ceiling pattern. Where continuous trough lighting is used, the diffuser, as shown, may be substituted for lights, as well as tiles, at various points along the run of the trough without interfering with the decorative effect of the illumination.

The diffusers may be readily snapped into position and thereafter held firmly in place, and where a T-beam construction is not used, the diffusers may be readily fastened to the duct by means of sheet metal screws before adjacent tile openings are closed up.

Thus there is eliminated altogether the costly on-the-job tile cutting and there is no need of providing special tile construction.

In Figs. 8 to 12 are shown pans or adapter plates for carrying different types of air outlets or air inlets or various types of air registers or diffusers which do not fit or which are smaller than standard tile sizes or modular sizes.

In these embodiments the diffuser or air outlet 210 is circular in Fig. 8 and mounted in an adapter plate or pan 211 by rivet, screw or other attachments 213 through the upturned flange 214 of the adapter plate 211. The rivet or screw 213 extends through the end 215 of the conduit 217 and the wall 216 of the diffuser 210. The diffuser 210 extends below and covers the central part of the adapter plate as indicated at 218. The plate 211 has clip elements 219 matching the clip elements 220 of adjacent tile clip holders 221.

In Fig. 9, the plate or pan 250 has a frusto-conical recessed portion 231 which is riveted, screwed or otherwise attached at 258 to the conical wall 233 of the air outlet or diffuser 251. The connection 258 may be a bayonet type or slotted connection so that the diffuser 251 is readily attachable or detachable.

The peripheral portion of the plate 250 may be provided with clips 255 corresponding with clips 236 extending upwardly or inwardly from the tile clip holders 257. The pan or plate 250 has the upward and inward extension 238 which may directly be attached to the transverse conduit 239 of the interior air conduit system.

In Fig. 10, the pan 230 carries the depending or hanging diffuser 351 of circular or ovalar shape. The extension 352 is attached to the extension 353 of the diffuser 351 and to the conduit 354 by the rivet, screw or detachable pin and slot connection 358. The periphery of the

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pan 230 is provided with clips 355 to match the clips 356 of the adjacent tile clip holders 357.

In Figs. 11 and 12, the pan 365 is recessed at 366 to receive the semi-circular or semi-elliptical diffuser element 367. The extension 368 of the pan 365, the extension 369 of the diffuser 370 and the conduit 371 are attached together by screws or rivets or pin and slot connections 372. The sides of the pan 365 are provided with clips 373 corresponding to clips 374 on the adjacent tile clip holders 375.

Figs. 8 to 12 thus show convenient pan or plate adapters 211, 250, 230 and 365 to enable diffusers 210, 251, 351 and 367 of sizes different than that of the tiles with which the diffusers are to be mounted.

While there has been herein described a preferred form of the invention, it should be understood that the same may be altered in details and in relative arrangement of parts within the scope of the appended claims.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. In an acoustical tile ceiling construction having an upper structural interior ceiling and a lower suspended ceiling spaced substantially therebelow, said suspended ceiling being composed of a plurality of acoustical tiles arranged in flush relationship, a beam structure extending parallelly to and between said upper and lower ceilings and closely adjacent to said lower ceiling and suspension means for suspending the beam structure from the upper ceiling and the lower ceiling from the beam structure; an air conditioning distribution system having a main conduit extending parallelly to and between said upper

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ceiling and said beam structure, a transverse branch conduit extending from said main conduit into said lower ceiling and a flush diffuser outlet mounted in said lower ceiling, said outlet comprising a frame mounted flush with the lower ceiling and flush with the faces of the acoustical tiles, said frame having upwardly extending peripheral side flanges at the periphery thereof parallel to the axis of the transverse conduit and transverse to the axis of the main conduit and said flanges having semi-circular suspension means at their upper end, said frame being also provided with an interior flange connected to the lower end of said branch conduit.

2. The construction of claim 1, said suspension means forming male snap means and the beam structure being interiorly provided with means engaging said snap means.

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