

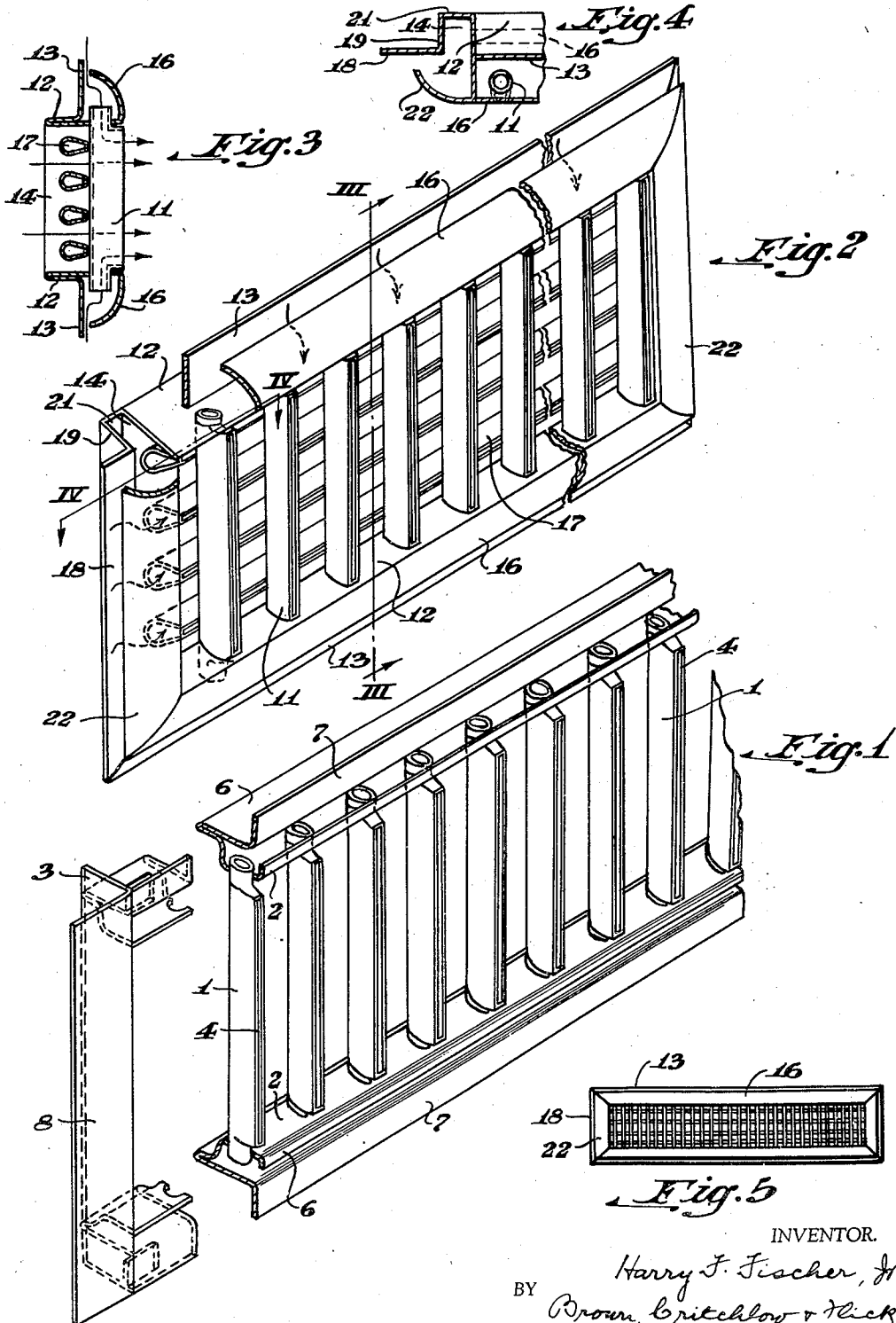
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DIFFUSION GRILLE

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DIFFUSION GRILLE

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1 Claim. (Cl. 98—38)

This invention relates to the mixing of incoming heating or cooling air with the air already in a room, and more particularly to a diffusion grille for the outlet of an air conduit.

It is difficult to uniformly heat or cool a room with a stream of air delivered thereto through a wall or ceiling outlet unless the incoming primary air is mixed or diffused with the secondary room air in the proper manner. For example, in the cooling of a room there are likely to be cold drafty places when the incoming cool air does not mix well with the room air. To avoid such conditions various devices have been proposed for the purpose of producing the desired diffusion. However, as far as I am aware, none of these has been entirely satisfactory for side wall use for the reason that directional control is lacking and known apparatus is not adapted to controlled length of diffused air throw.

It is among the objects of this invention to provide a device for the diffusion of primary and secondary air in a room which is simple and inexpensive in construction, which is highly efficient in operation, which causes diffusion to start at the wall, which requires but little space, and which is especially suitable for side wall installations.

In accordance with this invention a plurality of laterally spaced conduit-like vanes form part of a grille adapted to be disposed transversely of a stream of primary air, such as at the wall outlet of an air conduit from a furnace or cooling apparatus. At least some of these vanes are provided on their room or lee sides with aspirating openings, preferably slots, and also have inlet openings at their ends for the entrance of secondary or room air. The flow of the primary air between the vanes draws the secondary air into the ends of the vanes and out of their aspirating openings. This causes the primary and secondary air to diffuse or mix together as it leaves the grille. The vanes are preferably adjustable so that the air may be directed laterally as desired.

The invention is illustrated in the accompanying drawing in which Fig. 1 is a fragmentary perspective view of my diffusion grille separated into two parts for the purpose of clearer illustration; Fig. 2 is a perspective view, partly broken away, of a modification of my invention; Fig. 3 is a vertical section taken on the line III—III of Fig. 2; Fig. 4 is a fragmentary horizontal section taken on the line IV—IV of Fig. 2; and Fig. 5 is a front view of the grille.

Referring to Fig. 1 of the drawing, a plurality

of vertical vanes 1 are disposed in a row in spaced parallel relation with their ends projecting through openings in a pair of horizontal supporting bars 2. The ends of the two bars are connected rigidly together by parallel end plates 3. Each vane is of tubular form and has cylindrical end portions that fit snugly in the bars, but not so tightly as to prevent the vanes from being turned when desired. Between its ends the tube is elongated transversely to form a narrow projecting portion in which there is a vertical slot 4 that may be either continuous or separated into sections.

The grille thus formed is adapted to be mounted in the wall of a room, whether ceiling or side wall in the outlet opening of an air supply duct. As the primary air from the duct enters the room between the vanes of this grille it creates a low pressure area adjacent vane slots 4 and thereby draws secondary air from the room into the open ends of the vanes and out of the slot. As this secondary air issues from the slots it diffuses with the primary air, whereby the two flow across the room together. The direction of air flow away from the grille can be regulated by turning the vanes in their supporting bars.

To facilitate mounting of the grille in the wall and also to improve its appearance, it is surrounded by a frame. Accordingly, the rear portions of bars 2 are bent upwardly away from the tube ends and provided with forwardly extending flat integral portions 6 the outer portions of which are bent outwardly at right angles to form upper and lower flanges 7. This leaves a space between the ends of the vanes and the frame so that the secondary air can enter the vanes. End plates 3 are provided with outwardly projecting flanges 8 in the plane of flanges 7, thereby completing the frame.

In the modified embodiment of this invention shown in the remaining figures a plurality of tubular vanes 11, similar to those previously described herein, are disposed in a row with their cylindrical ends mounted in a pair of horizontal supporting bars 12. As shown in Fig. 3, these bars extend a considerable distance behind the vanes and are doubled back upon themselves for about half their width and then provided with upright flanges 13 which form part of a frame for the grille behind the vertical vanes. The ends of the bars are rigidly connected by vertical end plates 14. The ends of the vanes are hidden from view by flanges 16 curving rearwardly from the front edges of bars 12. The rear edges of these flanges are spaced from upright flanges 13 to form

passages between the room and the vane ends for the secondary air.

The principal difference between the embodiment and the first described form of the invention is that this one is also provided with horizontal vanes. That is, a plurality of vertically spaced horizontal tubular vanes 17 are provided with cylindrical ends that are snugly, but rotatably, mounted in end plates 14 behind the vertical vanes. To prevent the flat end flanges 18, which are in front of the horizontal vanes, from cutting off communication between the room and the ends of those vanes when the grille is installed in a wall, the inner ends of the flanges are spaced from end plates 14 by flange plates 19 parallel thereto. The two plates at each end of the grille are connected together at their rear edges by an integral spacing plate 21. These plates and the space between them are hidden from view by a flange 22 curved rearwardly from the front edge of each end plate 14. As shown in Fig. 4, the rear edge of each curved flange 22 is spaced from the adjacent flat flange 18 to provide a passage through which secondary air may pass from the room to the ends of the horizontal vanes. The horizontal and vertical flat and curved flanges are connected to form a frame of pleasing appearance, as shown in Fig. 5.

A diffusion grille constructed in accordance with this invention causes the secondary air to mix with the primary air at the wall, wherefore diffusion takes place as soon as the primary air enters the room. This type of grille effects satisfactory diffusion without changing the general direction of flow of the primary air, and consequently is suitable for side wall outlets. The direction of flow can be readily changed or adjusted by merely turning the vanes. Likewise, the amount of diffusion can be controlled for different installations by varying the size and number of vanes, their cross-sectional shape, and the size of their aspirating openings. Although tubular vanes have been shown, it will be understood that any conduit-like vane may be used under the right circumstances, such as a channel-like vane.

Although my invention has been specifically

shown and described as being particularly adapted for wall use and as including substantially straight elongated conduit-like vanes, it should be understood that I particularly contemplate employing the principles of my invention for ceiling, floor or other grilles or outlets and that the conduit-like vanes can take any desired shape, such as circular, semi-circular, elliptical, square, or other geometrical shapes as long as their function herein described remains basically the same. Further, it should be understood that I may employ my improved grille with auxiliary deflecting or directing vanes or plates of the standard type made of flat sheet metal which can be secured on the front or back of the grille and positioned or adjusted by known means. When such auxiliary vanes are used the vanes in my improved grille may be made non-rotatable.

According to the provisions of the patent statutes, I have explained the principle and mode of operation of my invention, and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claim, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

30 A diffusion grille adapted to be disposed transversely of a stream of primary air, comprising a pair of substantially parallel spaced elongate members each provided with a row of longitudinally spaced openings, a plurality of substantially parallel tubular vanes disposed between said members with their ends mounted in said openings, each of said vanes being provided in its lee side with an aspirating slot and having open ends, a flat flange projecting at substantially right angles away from the rear edge of each of said elongate members, and a rearwardly curved flange projecting from the front edge of each elongate member, the rear edge of said curved flange being spaced from the adjacent flat flange to provide a passage for secondary air to the open ends of the vanes.

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