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2,814,243

BASEBOARD AIR DISTRIBUTING DUCT

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2 Sheets-Sheet 1

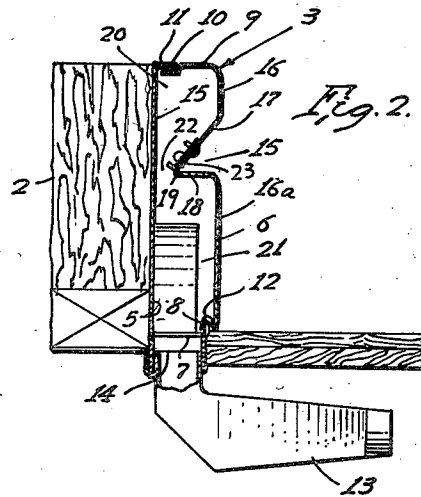
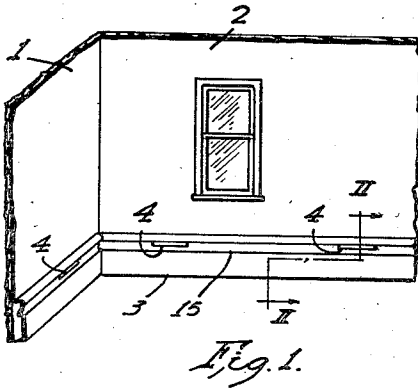
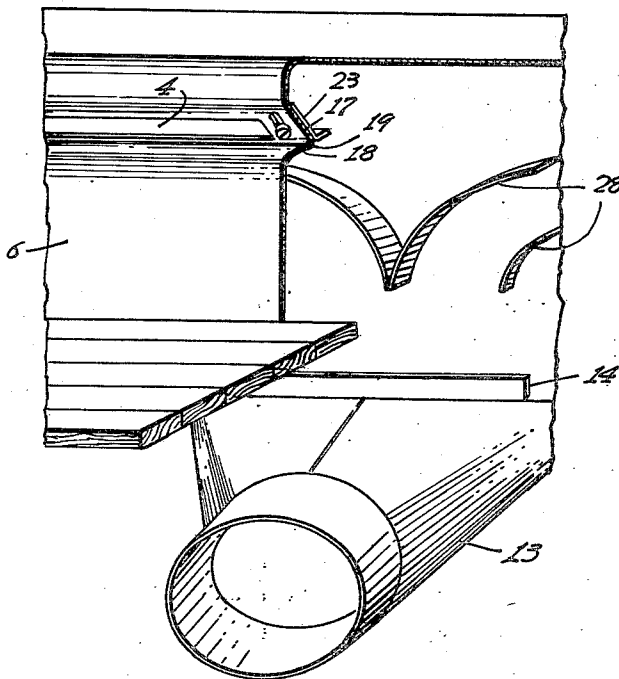


Fig. 3.



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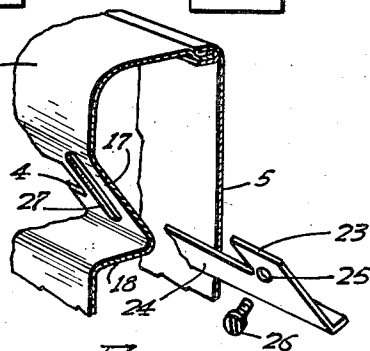
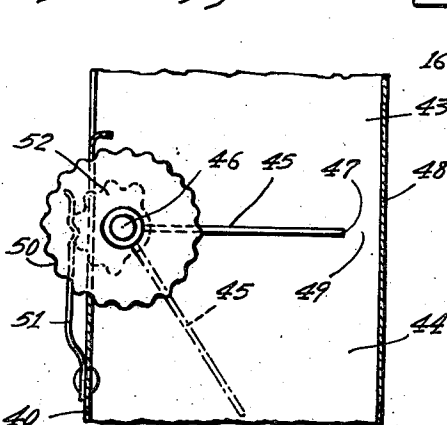
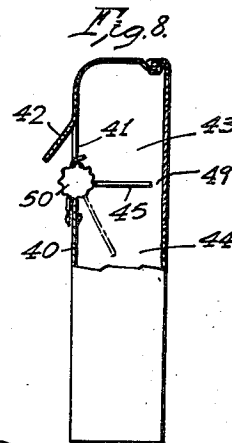
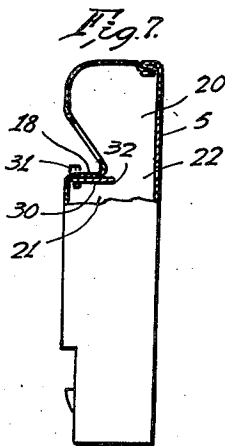
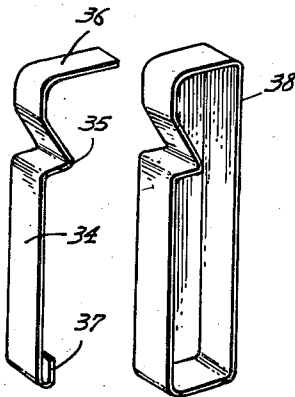
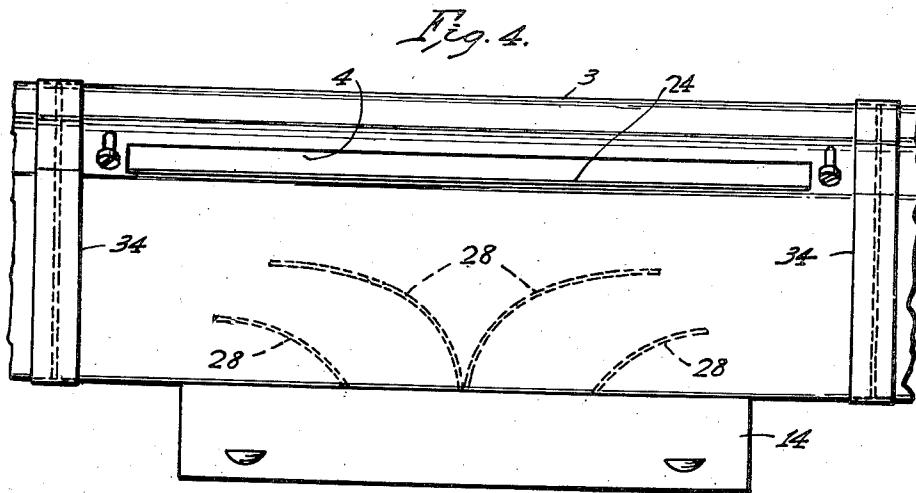
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BASEBOARD AIR DISTRIBUTING DUCT

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2 Sheets-Sheet 2



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BASEBOARD AIR DISTRIBUTING DUCT

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3 Claims. (Cl. 98-40)

This invention relates, as indicated, to a baseboard air distributing duct of the type commonly designated perimeter heaters for installation about the base perimeter of a room to be heated in place of the conventional baseboard. While air distributing ducts of this type are commonly designated perimeter heaters, it will be understood that such ducts are adaptable to air conditioning operations generally, such as cooling and cleaning, in addition to the heating operation implied by the term.

This invention has, as one of its principal objects, the provision of an improved baseboard air distributing duct of the character referred to affording improved distribution of the air circulating therethrough and elimination of the undesirable feature of concentration of air flow through the distribution openings adjacent the supply duct.

Another object of the invention is to provide in an air baseboard distributing duct of the character referred to an improved venting arrangement for distributing conditioned air into a room in which the air distributing vents are concealed from view and in which the conditioned air is introduced into the room in a downward direction along the floor of the room.

Another object of the invention is to provide a baseboard air distributing duct comprised of front and rear metal panels having a tongue and groove connection by which the front panel may be readily assembled and disassembled with respect to the rear panel and without the necessity of removing the rear panel.

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

In the drawings, there is shown a preferred embodiment of the invention together with a modified form. In this showing:

Fig. 1 is a fragmentary perspective view looking at an interior corner of a room illustrating the manner in which the baseboard air distributing duct of this invention is installed;

Fig. 2 is an enlarged sectional view taken substantially along the line II-II of Fig. 1;

Fig. 3 is a fragmentary perspective view showing the manner in which the delivery duct of the air conditioning apparatus is connected with the baseboard air distributing duct of this invention;

Fig. 4 is a front elevational view of a section of an air distributing duct constructed in accordance with the principles of this invention;

Fig. 5 is a perspective view of a connector element for connecting sections of an air distributing duct together;

Fig. 6 is a perspective view of a cap member for closing the ends of a distributing duct as shown in Fig. 4;

Fig. 7 is an end elevational view having a portion thereof broken away to show a damper for varying the communicating opening between the upper and lower portions of the duct;

Fig. 8 is a similar view to Fig. 7 illustrating a modified form of the invention;

Fig. 9 is an enlarged view of a portion of the showing of Fig. 8 illustrating the structure of the adjusting means for varying the position of the partition member; and

Fig. 10 is an enlarged fragmentary perspective view illustrating the construction of the damper for varying the effective size of the air distributing openings.

In Fig. 1 of the drawings, numerals 1 and 2 indicate the walls of a room having an air distributing duct 3 installed along the base thereof in place of the conventional baseboard. The air distributing duct 3 is fabricated of sheet metal and provides an air distributing enclosure extending along the base of the walls 1 and 2 in a manner to be described and is provided with elongated air distributing openings 4 at spaced intervals along its length.

As best shown in Fig. 2, the duct 3 comprises a sheet metal back wall 5 and a sheet metal front wall 6 spaced from the back wall 5. The back wall 5 has a flange 7 projecting horizontally outwardly from the bottom edge thereof which forms the base wall of the duct 3. The outer edge of the base wall 7 has an upwardly projecting lip 8 providing a tongue for a purpose to be described. The upper edge of the front wall 6 has an inwardly projecting flange 9 which forms the top wall of the duct and the outer edge of which provides a tongue 10 for a purpose to be described. The upper edge of the back wall 5 is crimped and doubled backwardly as at 11 to provide a groove in which the tongue 10 is received. The lower edge of the base wall 6 is crimped and doubled backwardly as at 12 to provide a downwardly opening groove in which the tongue 8 is received. The parts 8 and 12 and the parts 10 and 11 respectively provide tongue and groove connections by which the front wall 6 and top wall 9 are connected with the back wall 5 and base wall 7. To assemble the duct 3, it is only necessary to lower the front wall 6 so that the tongue 8 is received in the groove provided by the part 12, and the assembly is completed by moving the front panel 6 forwardly to force the tongue 10 into the groove provided by the part 11. Disassembly of the front wall 6 with respect to the back wall 5 may be readily effected by a reverse of the assembly operation.

The walls 5, 6, 7 and 9 define an air distributing enclosure of essentially rectangular shape by which air is distributed along the length of the duct 3. Air is delivered to this enclosure by an air supply duct 13 which is connected with air conditioning apparatus (not shown) and has an opening at 14 into the base of the enclosure through the bottom wall 7.

The front wall 6 is recessed as at 15, the recess being essentially of V-shape in vertical section, separating the front wall into spaced vertical portions 16 and 16a. The upper edge of the lower portion 16a has a flange 18 projecting inwardly in a horizontal plane, and the lower edge of the vertical portion 16 has a depending flange 17 which projects angularly downwardly and inwardly toward the back wall 5. The flanges 17 and 18 have an integral connection at 19 which extends along a horizontal line spaced from the back wall 5. The flanges 17 and 18 in effect provide a partition which divides the enclosure within the duct 3 into upper and lower horizontally extending air distributing chambers 20 and 21. The chamber 20 is a distributing chamber which is relatively smaller than the chamber 21 which constitutes an air supply chamber. The chambers 20 and 21 are connected with each other through a restricted opening or space 22 lying between the line of connection 19 and the back wall 5, the size of the opening 22 being dependent upon the position of the connection or line 19.

As best shown in Figs. 3 and 4, the air distributing

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openings 4 are of rectangular shape and are formed in the depending and angularly inclined flange 17. A damper 23 is provided for adjusting the size of the opening 4. As best shown in Fig. 10, the damper 23 is in the form of a flat bar 24, the upper edge of which forms the lower edge of the damper opening 4 and which has openings 25 at each end thereof for the reception of headed screws 26. The screws 26 extend through elongated slots 27 at each end of the openings 4 and provide adjustment for the bar 24 with respect to the air distributing openings 4. By adjusting the position of the screws 26 in the slots 27, the position of the bar 24 will be changed to vary the size of the openings 4.

Immediately above the opening 14 connecting the lower chamber 21 with the air supply duct 13, deflecting vanes 28 are provided for deflecting the incoming air into the end portions of the duct 3 at either side of the opening 14. The incoming air is thus distributed equally to the end portions of the supply duct 21. The partitioning action provided by the flange 18 insures the flow of conditioned air along the length of the supply duct 21. The air in the supply duct 21 enters the distribution chamber 20 through the restricted opening 22. By reason of the restricted size of the opening 22 between the chambers 21 and 20, air from the supply duct 21 is distributed uniformly along the entire length of the distributing duct 20, and the quantity of air being forced out of each opening 4 will be uniform regardless of its location with respect to the supply duct 13. In this manner, the conditioned air being supplied to a room will be distributed uniformly over its floor area.

In the absence of a partition such as the flange 18 separating the air distributing enclosure into upper and lower chambers 20 and 21 and the restricting opening 22 provided by such partition, the air fed to the duct by the supply duct 13 would be exhausted through the opening 4 closest to the supply duct 13 and relatively smaller quantities of air would be carried to the openings 4 remotely located with respect to the supply duct 13. While the size of the opening 22 between the chambers 20 and 21 is of a fixed size in the showings of Figs. 2 and 3 and is defined by the point of connection of the flanges 17 and 18, a damper 30 may be secured to the underside of the flange 18 as shown in Fig. 7. The damper 30 is secured to the flange 18 by a screw 31 projecting through a slot (not shown) extending transversely of the flange 30 similar to the slot 27 shown in Fig. 10. In this manner, the position of the damper 30 with respect to the flange 18 may be adjusted to vary the position of its inner edge 32 with respect to the back wall 5 and thereby vary the effective size of the opening 22.

The air emerging from the openings 4, by reason of the slope of the flange 17 in which they are located, flows in an outward and downward direction with respect to the floor of the room in which the distributing duct is located. Since there are several openings 4, it will be apparent that the air is distributed uniformly over the floor area of the room. While the air tends to move from the openings 4 in a direction normal to the slope of the flange 17, the horizontal flange 18 acts as a deflector, particularly with respect to the air emerging from the inner edges of the openings 4 which causes the air to move outwardly at a flatter angle than it would in the absence of the flange 18. The major portion of the air emitting from openings 4 of flange 17 flows downwardly past flange 18. The portion of air which may impinge on flange 18 creates some turbulence at the inner face of the downwardly flowing air and tends to decrease the velocity thereof.

In Fig. 5 there is shown a connector 34 for connecting the front wall sections 6 of the duct 3 together. The connector 34 has a shape corresponding to the shape of the front wall 6 and is provided with a V-shaped projecting part 35 which is received in the recess 15 as shown in Fig. 4. The upper end of the connector 34 has a horizontally inwardly projecting part 36 which laps the edges of the

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top wall 9 at the ends of the sections forming the duct 3. Its bottom edge has an upwardly projecting lip or tongue 37 which is received in the groove formed by the parts 12 at the base of the front walls 6. The connectors 34 are installed by hooking the lip or tongue 37 into the groove 12 into the sections to be connected and then forcing the connector inwardly so that its top part 36 will have a resilient clamping engagement with the ends of the top walls 9 of the sections to be connected together.

A closure cap member 38 is shown in Fig. 6. The cap member 38 has a contour corresponding to the contour of the duct 3 so that it may be inserted over an open end of the duct 3 to provide a closure therefore.

A modification of the invention is shown in Figs. 8 and 9. In this showing, the front wall 40 is flat throughout its vertical height, the partition flanges 17 and 18 of the preferred embodiment shown in Fig. 2 being omitted. An opening 41 is formed in the upper portion of the front wall 40 through which air may be exhausted from the interior of the duct and is provided with an outwardly projecting flange or lip 42 concealing the opening 41 from view. In this modification, the openings 41 have a length similar to the openings 4 of the preferred embodiment of the invention, and the partitioning arrangement separating the interior of the duct into upper and lower compartments 43 and 44 is provided by a damper 45. The damper 45 is a flat strip of sheet metal which extends the entire length of the duct and has one longitudinally extending edge connected to a pivot rod 46 by which its angular position within the duct may be changed. The inner longitudinally extending edge 47 of the damper 45 cooperates with the back wall 48 to define a restricted opening 49 similar to the opening 22 providing communication between the upper and lower chambers 43 and 44. The position of the damper 45 as shown in solid lines in Figs. 8 and 9 provides the minimum size for the opening 49, and the size of this opening will be proportionately increased as the damper is pivoted downwardly to the position shown in dotted lines. To adjust the position of the damper 45, a knurled wheel 50 is secured to the pivot rod 46 and projects through an opening formed in the front wall 40. A spring detent 51 has resilient engagement with a knurled wheel 52 also secured to the pivot shaft 46 for holding the damper 45 in any of its positions of adjustment.

From the foregoing, it will be apparent that a partition means constructed as shown in either Fig. 7 or 8 is effective to separate the space interiorly of the duct into upper and lower distributing chambers having communication with each other through a restricted opening. The provision of a restricted opening, such as the opening 22 in Fig. 7 or the opening 49 in Fig. 8, is effective to insure uniform distribution of air along the entire length of the upper chamber. The provision of deflector vanes 28 at the point of connection of the duct with the supply duct 13 assures equal distribution of air to the portions of the baseboard duct at either side of the supply duct 13. The air supplied by the duct 13 to the lower chamber of the baseboard duct flows along its entire length and is distributed through the restricted opening upwardly into the upper or distributing chamber. In this manner, the partition means separating the duct into upper and lower chambers is effective to prevent concentration of the flow of air through the openings to the upper chamber adjacent the supply duct 13. The action of the partition means between the upper and lower chambers in restricting the flow of air to the upper chamber thus assures the uniform supply of air to all of the exhaust openings 4 thereby preventing a drafty condition as a result of the air being circulated.

Although the above describes the baseboard distributing duct of this invention as having a plurality of spaced elongated openings 4, it will be understood that the spacing between such openings may be diminished to an extent that the openings 4 in effect cooperate to provide a single

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opening extending the entire length of the duct, and that there is contemplated within the principles of this invention a distributing duct having a single opening extending over substantially its entire length through which air may be discharged. The invention also contemplates a duct structure having in place of elongated openings 4 a plurality of closely spaced openings of smaller size and of different shape such as circular openings at intervals along the length of the duct.

Attention is also directed to the fact that the duct of this invention provides improvements from the standpoint of heat radiated by its exposed metal surfaces. The improved radiation results from the action of the partition 18 or 45 which, while primarily for the purpose of insuring uniform distribution of air through the length of the supply chamber 21, has a confining action on the air in such chamber. The air in the chamber 21 thus heats the metal, particularly the metal of the front 16a to a higher temperature than the metal defining the chamber 15 in which the air is at a lower pressure. The metal of the wall 16a thus is effective as a radiator in the distribution of heat to the room in which it is located.

While there is illustrated and described a preferred embodiment of the invention, it will be understood that this is merely by way of illustration, and that various changes and modifications may be made therein within the contemplation of the invention and under the scope of the following claims.

We claim:

1. A baseboard air distributing duct of the character described comprising a horizontally elongated housing having spaced front and back walls connected by top, bottom and end walls, a right angle flange on said front wall extending horizontally inwardly therefrom intermediate the top and bottom walls to adjacent the back wall dividing the housing into connected top and bottom chambers, said front wall forming part of the top chamber having a downwardly and inwardly directed flange overlying the said horizontal flange and connected with the inner end of the latter, openings in said top chamber flange for discharge of air and positioned so that a portion of the air

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emitting therefrom impinges upon said horizontal flange and the remainder of said air flows downwardly, past said horizontal flange, said air impinging upon the said horizontal flange being deflected upwardly and outwardly, therefrom into the air flowing past the horizontal flange creating a turbulence therein causing diffusion of the air stream emitting from the duct, an air inlet opening in said bottom chamber and arcuate baffles disposed in the path of said entering inlet air diverting same from direct vertical passage through the opening between said front wall flanges and the back wall and diverting a portion of the air to each end portion of the bottom chamber.

2. The duct as defined in claim 1 wherein the air inlet is in the bottom wall of the bottom chamber and the arcuate baffles are disposed beneath the opening between the top and bottom chambers in spaced relation to the bottom chamber front wall providing substantially uniform air pressure throughout the length of said bottom chamber.

3. The duct as defined in claim 1 wherein the said horizontal flange of the front wall has a damper mounted thereon for movement towards and away from the duct back wall in controlling the effective size of the opening between the top and bottom chambers along the longitudinal length of the duct.

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