**ABSTRACT**

An air cabinet for distributing and controlling the flow of the air to a room. Cabinet has an elongated housing with a chamber for receiving air and flanges having inwardly turned shoulders on opposite sides of an elongated outlet passage open to the chamber. Adjustable nut and bolt assemblies secured to the flanges hold the housing in assembled relation and frictionally hold a grill between the flanges. A damper unit is mounted on the shoulders independent of the grill for regulating the flow of air through the outlet passage.

10 Claims, 3 Drawing Figures
AIR CABINET ASSEMBLY

BACKGROUND OF INVENTION

The air distributing cabinets are used to disseminate and control the supply of air discharged into rooms in many types of commercial and industrial structures. These cabinets have elongated housings that are generally installed at the floor along the walls of the room and are of sizes to accommodate the temperature and air flow requirements of the room. The housings have grills over the discharge openings. These grills are part of the housing structure and are not designed to be removed once the cabinets are installed. Damper structures associated with the grills are used to control the flow of air through the discharge openings. These cabinets are a unit which is preassembled for a particular location. Once the air cabinet is installed the grill and damper assembly can not be removed for cleaning and general maintenance. Air cabinets of this type are disclosed in U.S. Pat. No. 3,272,109 and U.S. Pat. No. 3,515,052.

SUMMARY OF INVENTION

The present invention relates to an apparatus for regulating the flow of fluid, as air into a room. The apparatus has a housing with a chamber adapted to be in communication with a source of fluid under pressure. The housing has a pair of spaced flanges which project into the chamber and form an elongated outlet opening between the chamber and the room. The flanges are connected with an adjustable means operable to laterally position the flanges relative to each other and thereby control the width of the outlet opening. Positioned between the flanges is a removable grill having at least one outlet opening and portions which frictionally engage the flanges. The adjustable means is operable to hold the grill in either a tight or loose frictional fit between the flanges whereby the grill may be readily removed from the housing or tightly clamped in the housing. A damper unit is mounted on the flanges independent of the grill. The damper unit has a damper plate mounted on adjustable support structure which is operable to selectively move the damper plate to open and closed positions.

An object of the invention is to provide an air cabinet with a removable grill which is independent of the damper unit to permit the cleaning and maintaining of both the grill and the inside of the air cabinet without changing the damper position or dismantling the housing. A further object of the invention is to provide an air cabinet with a damper unit that is mounted on the cabinet housing independently of the grill. Yet another object of the invention is to provide an air cabinet with an adjustable structure which functions to hold both the grill and damper unit in assembled relation with the housing.

IN THE DRAWING

FIG. 1 is a transverse sectional view of the air cabinet assembly of the invention;
FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1; and
FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2.

Referring to FIGS. 1 and 2 of the drawing, there is shown the air cabinet assembly of the invention, indicated generally at 10, located linearly along a corner of a structure to control the flow and distribution of air into a room. The cabinet assembly 10 is usable to control other fluids and mixtures of fluids and particles. The cabinet assembly has an elongated linear housing, indicated generally at 11, enclosing a chamber 12. Chamber 12 is connected to a source of air under pressure whereby air, indicated by arrow 15, is continuously supplied to the chamber through inlet opening 20. For example, chamber 12 may be connected via inlet opening 20 to a duct system of a hot air heating system (not shown). Removably mounted on the top upper portion of the housing is a grill 13 positioned over the outlet opening of the housing. The flow of air through the housing is controlled with a damper unit, indicated generally at 14, located in the chamber 12. The damper unit 14 is supported on the housing independently of the grill 13 and is adjustable to control the flow and distribution of air from the housing into the room. A coil bank, indicated generally at 16, is mounted on the housing below the damper unit 14. The coil bank 16 is adapted to circulate either heated fluids or a coolant to control the temperature of the air moving through the chamber 12. Conventional control valves and thermostats (not shown) are used in conjunction with the coil bank to regulate the flow of fluid through the coil bank.

The housing 11 has a generally L-shaped back plate 17 positioned in the corner of the structure. A plurality of screws 18 or similar fastening members are used to attach the back plate 17 to an upright wall 19 and a floor 21. The back plate 17 has an upper linear lip 22 offset outwardly from the wall 19. The outer edge of the base of the back plate 17 has an upright linear lower lip 23 extended substantially parallel to the lip 22. Extended upwardly from the lip 23 is an upright front plate 24 having an inside clip 26 which fits over the lip 23 to clamp the front plate to the lip 23. Plate 24 has a plurality of longitudinally spaced clips 26 which clamp on the lip 23. The top of the plate 24 has an inwardly projected linear horizontal portion 27 joined to a downwardly directed vertical flange 28. The lower edge of the flange 28 has an inwardly directed linear shoulder 29.

Spaced inwardly from the flange 28 is an inverted U-shaped housing member 31 having a first downwardly directed flange 32 located between the lip 22 and the wall 19 to mount the member 31 on the back plate 17. Projected outwardly from the top of flange 32 is a horizontal linear portion 33 joined to a downwardly directed upright generally vertical second flange 34. Flange 34 is generally parallel to the flange 28. The lower edge of flange 34 has an inwardly directed shoulder 36 which lies in the same general horizontal plane as the shoulder 29.

A plurality of adjustable means, as nut and bolt assemblies, indicated generally at 37 and 38, extend transversely between the flanges 28 and 34 to attach the member 31 to the front plate 24. The nut and bolt assemblies are linearly spaced along the cabinet assembly. Each nut and bolt assembly comprises a transverse bolt 39 projected through suitable transversely aligned holes in the flanges 28 and 34. Nuts 41 on the
opposite sides of each flange are threaded onto the bolt and adjusted to fix the transverse distance between the flanges 28 and 34. This transverse distance provides a linear outlet or discharge passage 42 from the chamber 12 to the room. The length of the bolts 39 determine the width of the outlet passage. The front plate 24 and member 31 can be used with different size back plates by merely changing the length of the bolts 39.

A grill 13 is located within the linear space between the flanges 28 and 34. As shown in FIG. 3, the grill comprises a plurality of longitudinal upright spaced bars 44 attached to upright cross members 46. The top edges of the bars lie in generally the same horizontal plane as the top surfaces of the portions 27 and 33. The cross members 46 have upright opposite ends 47 and 48 engageable with the flanges 28 and 34. The adjustment of the nut and bolt assemblies 37 and 38 determine if the grill is located with a tight friction fit between the flanges 28 and 34 or with a loose fit so that the grill can be readily removed from the housing. The adjustment of the nuts 41 on the bolt 39 move the flanges 28 and 34 relative to the ends of the cross members 46 and thereby vary the fit of the grill in the housing 11.

The cabinet assembly 10, as described above, is functional to distribute air to a room. The air is forced into the chamber through an opening (not shown) and linearly flows therein. The air moves from the chamber 12 through the grill 13, as indicated by arrows 43 in FIG. 1, into the room.

The volume of air flowing from the cabinet assembly is controlled with the addition of a damper unit, indicated generally at 14. The damper unit 14 comprises a linear damper plate 49 located in chamber 12 below the shoulders 29 and 36. The damper plate 49 has downwardly and inwardly turned side flanges or lips 51 and 52 which function to deflect the air moving in the housing in an upwardly and outwardly direction. Secured to the top of plate 49 below the shoulders 29 and 36 are gaskets or cushion strips 53 and 54 that engage the bottom sides of the shoulders 29 and 36 when the damper plate 49 is closed.

A plurality of adjustable support means, indicated generally at 56, support the damper plate 49 on the shoulders 29 and 36. The adjustable means 56 are linearly spaced along the cabinet assembly and are identical in structure and function. The following description is limited to a single adjustable means, as shown in FIGS. 1 and 2 of the drawings. The adjustable means 56 comprises a transverse or cross plate 57 extended between the flanges 28 and 34 and resting on top of the shoulders 29 and 36. The plate 57 has a central hole for accommodating a downwardly directed bolt 58. The head of the bolt 58 is on top of the plate 57. The bolt 58 extends through a suitable hole in the central portion of the damper plate 49 and into a nut 59 secured to the bottom of plate 49. A biasing means or coil spring 61 extends between the cross plate 57 and the damper plate 49 to bias the damper plate 49 in a downward direction to reduce vibration and noise of the plate 49.

As shown in broken lines in FIG. 1, the damper plate 49 can be adjusted relative to the shoulders 29 and 36 to restrict the opening to the outlet passage 42. The adjustment is made by turning the bolt 58 with a suitable tool, as a screw driver, to move the damper plate 49 relative to the bolt. The bolt 58 can be turned so that the cushions 53 and 54 engage the shoulders 29 and 36 and thereby completely close the entrance to the outlet passage 42.

The damper assembly 14 is completely independent of the grill 13 as it is supported on separate transverse plates 57. These plates 57 can be linearly moved on the shoulders 29 and 36 to linearly position the damper assembly in the housing. The nut and bolt assemblies 37 and 38 clamp the plates 57 between the flanges 28 and 34.

A coil bank 16 is located in the chamber 12 below the damper unit 14. The coil bank 16 comprises a pair of horizontal tubes 62 for carrying either heated fluid or coolant and lead to a regulating valve connected to suitable thermostatic controls (not shown). These controls are responsive to the temperature in the room to regulate the flow of fluid in the tube 62. A plurality of side-by-side upright rectangular fins 63 are attached to the tubes 62 to increase the heat transfer of the coil banks. Both the tubes and fins 63 are attached to the tubes 62 to increase the heat transfer of the coil banks. Both the tubes and fins are supported on brackets 64 attached to the back plate 17. An air flow barrier 66 is positioned between the fins 63 and the upright portion of front plate 24 to insure that the air moves through the coil bank 16. The cabinet assembly can be used without the coil bank 16.

In use, the cabinet assembly 10 is assembled at an installation along the corner of a room. The grill 13 is located between the flanges 28 and 34 of the housing independently of the damper unit 14. The nut and bolt assemblies 37 and 38 can be adjusted so that the grill can be removed to thereby aid in the cleaning and removing of objects from within the housing. In some installations, as schools, it may be desirable to assemble the grill on the housing so that it cannot be readily removed.

The damper unit 14 is supported on independent transverse plates 57 and adjustable bolts 58. The linear position as well as the vertically adjusted position of the damper plate 49 is not altered when the grill is removed as the supporting structure for the damper unit is independent of the grill 13.

While there has been shown and described preferred embodiments of the invention, it is understood that various changes in size and shape and materials of the cabinet assembly may be made by those skilled in the art without departing from the spirit of the invention. The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for regulating the flow of a fluid comprising: a housing having a chamber adapted to receive fluid, said housing having a pair of spaced flanges projected into the chamber and an elongated outlet opening between the flanges, each flange having a generally linear inner edge, adjustable means connected to the flanges to laterally position the flanges relative to each other, grill means having at least one opening removably positioned in the elongated outlet between the flanges, and a damper unit mounted on the flanges independent of the grill means for regulating the flow of fluid through the outlet opening, said
5 damper unit including a damper plate located in the chamber adjacent said linear inner edges of said flanges, means connected to the plate and flanges operable to selectively position the plate relative to the inner edges of the flanges in a closed position and various open positions, said plate having inwardly converging linear lip means along the sides thereof to deflect air in outwardly directions, and sealing means between said plate and inner edges of said flanges cooperating with the damper plate and inner edges of the flanges to block the flow of air through the outlet opening when the damper plate is in the closed position.

2. The apparatus of claim 1 wherein: the grill means have cross members with ends frictionally engageable with the flanges.

3. The apparatus of claim 2 wherein: the adjustable means are operable to vary the friction fit between the cross members and the flanges.

4. The apparatus of claim 1 wherein: each flange has a shoulder along the inner edge thereof, the shoulders being projected toward each other.

5. The apparatus of claim 4 wherein: said damper plate is located in the chamber adjacent said shoulders, said means connecting the plate to the flanges including cross plates having end portions positioned on shoulders, and adjustable supports interconnecting the cross plates and damper plate relative to the shoulders thereby regulating the flow of fluid from the chamber into the outlet passage.

6. The apparatus of claim 5 wherein: the cross plates have ends engageable with the flanges, said adjustable means operable to hold the flanges in clamping engagement with the cross plates to fix the position of the cross plates relative to the flanges.

7. The apparatus of claim 5 including: biasing means between the cross plates and damper plate to urge the damper plate away from the cross plates.

8. The apparatus of claim 5 wherein: the damper plate is a substantially flat elongated plate having inwardly converging side lips and the sealing means are elongated sealing gaskets mounted on the plate, said gaskets facing the shoulders whereby the damper unit can be moved to a closed position to block the flow of fluid from the chamber.

9. The apparatus of claim 1 wherein: the adjustable means are nut and bolt assemblies operable to hold the flanges in frictional engagement with portions of the grill means and portions of the damper unit.

10. The apparatus of claim 1 wherein: the housing comprises a first member having one of said flanges and a second member having the other of said flanges, said adjustable means connecting the first member to the second member.

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