Sept. 26, 1967 C. E. DOMINGUEZ 3,343,476

AIR DIFFUSER

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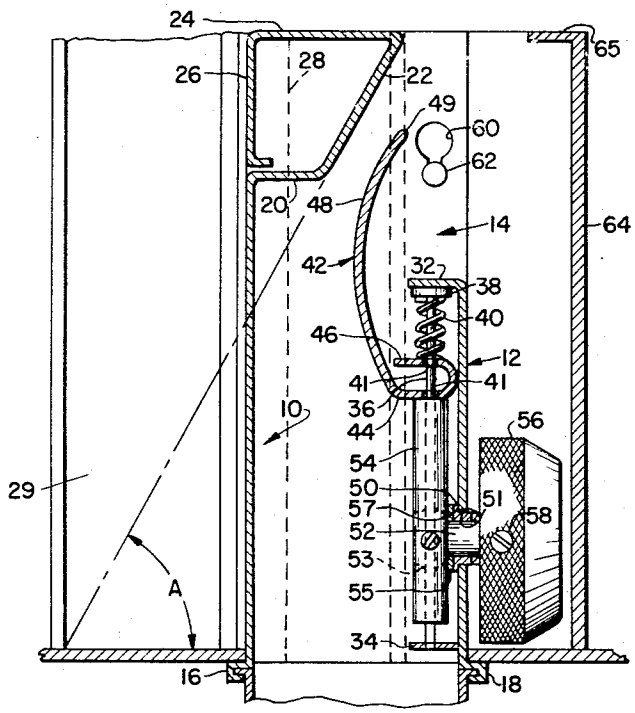


FIG. 1

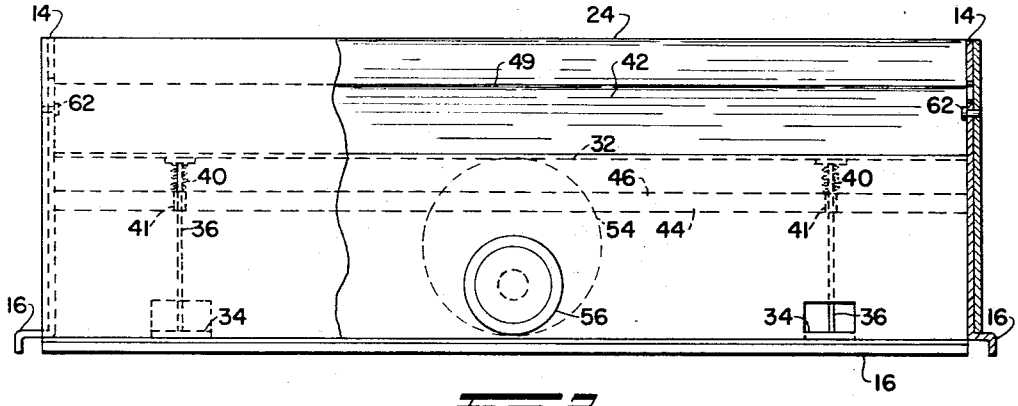


FIG. 2

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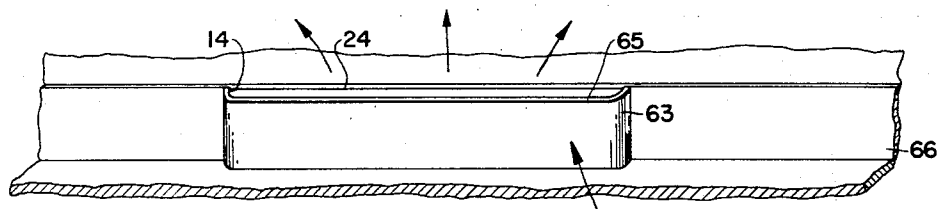


FIG. 3

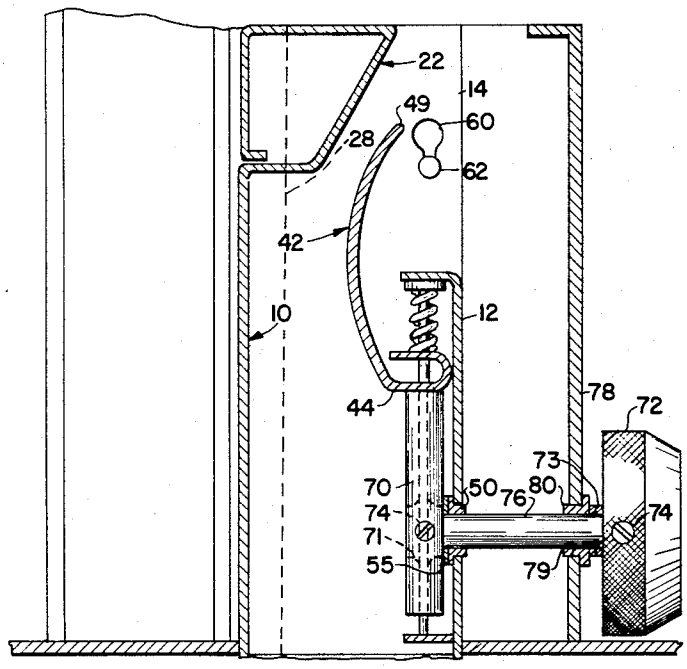


FIG. 4

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AIR DIFFUSER

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7 Claims. (Cl. 98—40)

This invention is directed to air diffusion devices and more specifically to baseboard air diffusion control systems.

Prior devices of this nature are normally capable of delivering only relatively small quantities of conditioned air at a time into the room which is being cooled or heated from the central cooling or heating system. Consequently, the devices common to the prior art normally require a plurality of outlets to control the temperature of a single room. This contributes to the high expense involved in extensive duct work and installation. Furthermore, many of the devices common to the prior art require elbows and risers to locate the air diffuser at a position elevated along a wall of the room. The use of such elbows and risers increases the air duct resistance and consequently, decreases the efficiency of the diffuser.

Accordingly, it is a principal object of this invention to provide an air diffusion apparatus of simplified construction capable of delivering large quantities of conditioned air into a room for temperature control from a minimum number of outlets.

Another object of this invention is to provide a simplified baseboard air diffuser which eliminates heat loss or heat gain due to air-wall feed connections and reduces air duct resistance by elimination of elbows and risers.

A further object of this invention is to provide an air diffuser having a stationary planar surface air deflection vane and a single movable air directing vane which has an opposing surface portion which is at all times substantially parallel with the stationary vane planar surface.

Yet another object of this invention is to provide an air diffusion control means which is flexible in that it can be made of any length without regard to wall construction for suppling large quantities of conditioned air into a room for temperature control.

Still another object of this invention is to provide an air diffuser which is simple to install and easy to blend into the baseboard construction to provide inconspicuous air distribution outlets.

Yet another object of this invention is to provide an air distribution system which is located in the baseboard of a room close to the floor air and designed for air input into the room at an angle which will induce the flow of floor air into the primary air stream from the diffuser assuring circulation of conditioned air thoroughly throughout the room.

Still another object of this invention is to provide a control means for a baseboard air diffuser which comprises an arcuate slidable vane mounted on vertical rods and abutting a substantially circular cam mechanism eccentrically connected to a rotatable control knob for varying the width of the outlet passageway from the diffuser into the room thereby accurately controlling the amount of conditioned air which is emitted into the room from the diffuser.

These and other objects of the present invention will become more apparent from the following description and appended claims when read in conjunction with the accompanying drawings wherein:

FIGURE 1 is an enlarged vertical sectional view of the air diffuser of this invention;

FIGURE 2 is a partially sectioned front elevation of the air diffuser of FIGURE 1;

FIGURE 3 is a front view of the air diffuser of this

invention illustrating its appearance when installed in the baseboard of a room; and

FIGURE 4 is a view similar to FIGURE 1 of an alternative embodiment of the air diffuser of this invention.

Referring to the drawings wherein like reference numerals are used throughout to indicate the same parts, the air diffuser of this invention comprises a generally rectangular walled structure or housing consisting of a vertically extending plate-like rear wall **10**, a plate-like but somewhat shorter front wall **12** and end walls **14** (see FIGURE 2). The housing may be formed from a substantially rigid material, such as sheet metal or thermally resistant plastic in any manner well known in the art. The lower ends of the diffuser walls may be bent outwardly and downwardly to provide attachment flanges **16** (see FIGURE 2) for crimping about mating outturned flanges **18** formed conventionally on air distribution duct work as shown in FIGURE 1 or other suitable means may be provided for securing the air diffuser to the duct work.

Rear wall **10** is provided at its upper end with a horizontally forwardly directed portion **20** merging into a planar inclined air flow directing wall surface **22** which extends upwardly and forwardly from horizontal portion **20** to define an acute angle A with the horizontal floor line. Preferably angle A is of the order of 60° to dispose surface **22** to direct the discharged air upwardly and outwardly thereby inducing floor air into the primary stream but the diffuser is operable for any acute angle of inclination of surface **22**.

This structural arrangement of the diffuser effects flow of a thin blanket of conditioned air into the room. The conditioned air blanket hugs the wall on which the diffuser is mounted (see FIGURE 3) forming a barrier of conditioned air between the room wall and interior. If the diffuser is mounted on an outside wall under a window or group of windows, the thin air blanket provides a barrier layer of conditioned air which substantially reduces undesirable radiation from the ouside. It has been found that the diffuser may even be placed behind window drapes and the like with no apparent obstacle to the flow of conditioned air and the formation of the thin air blanket radiation barrier.

Air flow directing surface **22** at its upper edge is return bent rearwardly to form a horizontal planar wall **24** terminating in a vertically downwardly extending wall **26** defining with wall portion **20** and wall surface **22** a laterally continuous passage between end walls **14** open along the lower edge of wall **26**. The diffuser housing is inset in a cut out portion of a baseboard panel **28** and the adjacent flooring with the rear wall **10** abutting the vertical side wall **29** of the room.

Front closure plate **12** is provided at its upper end with a rearwardly directed laterally continuous upper horizontal flange **32** and a pair of laterally spaced rearwardly directed tongues or shelf formations **34** comprising cut-out portions of wall **12** (FIGURE 2). A pair of guide rods **36** provided at their upper ends with enlarged heads **38** are disposed between flanges **32** and the respective tongues **34** to form slide guides for shiftable air flow volume control vane **42**. As best seen in FIGURE 1, guide rods **36** are encircled at their upper ends by respective biasing compression coil springs **40** and pass through vertically spaced guide passages **41** (FIGURES 1 and 2) in vertically movable air flow volume control vane **42** substantially coextensive in length with stationary vane **10** and having an upper edge **49**, convex surface **48** merging into an integral lower forwardly extending flange **44** carrying a return-bent overlying flange **46**. Vane **42** is made of light weight metal or plastic for a reason to be hereinafter pointed out.

Downwardly biasing compression springs **40** are axially disposed about guide rods **36** and vertically movable air flow volume control vane **42** is slidably mounted through passages **41** of integral lower flange **44** and flange **46** on vertical guide rods **36** in subjacent abutting relation to biasing springs **40**. The convex surface **48** of movable vane **42** is disposed opposite air flow directing surface **22** of stationary air deflection vane rear wall **10** to define a primary upwardly and forwardly directed air outlet passage **44**. The radius of curvature of arcuate movable vane **42** is selected to provide at all adjusted heights of vane **42** a portion of convex surface **48** in opposing substantially parallel throat defining relation to air flow directing surface **22**. The enlarged heads **38** of guide rods **36** may be welded, riveted or otherwise appropriately fastened to rearwardly directed flange **32** after assembly of springs **40** and vane **42** thereon and insertion of the lower rod ends into alignment passages in tongues **34** to fix vane **42** in an upright position.

Front closure plate **12** midway of tongues **34** is provided with a through opening **51** carrying a press fit flanged bearing sleeve **50** journaling a stub shaft **52**. The inner end of shaft **52** fixedly mounts an eccentric cam **54** the hub **53** of which abuts a friction ring **55** disposed to cooperate with the flanged end of bearing sleeve **50** and the periphery of which supportingly engages the undersurface of flange **44** of movable vane **42** midway between guide rods **36**. The outer end of shaft **52** fixedly mounts a control knob **56**, the hub **57** of which abuts the opposite end of bearing sleeve **50**. Preferably knob **56** is adjustably mounted on the forwardly extending end of shaft **52** by means of a set screw **58** so knob **56** can be adjusted axially along shaft **52** to clampingly engage sleeve **50** and friction ring **55** between the hubs **53** and **57**. Shaft **52** is prevented from rotation under influence of the springs **40** and weight of vane **42** by abutment of bearing member **50** and hub **53** with friction ring **55**.

Vane **42** is raised and lowered by manual rotation of knob **56**, shaft **52** and cam **54** fixed to shaft **52**, the varying radial distance of eccentric cam **54** being effective through engagement with flange **44** of vane **42** and springs **40** to move convex surface **48** toward and away from face **22** of rear wall **10**. Cam **54** is preferably dimensioned and arranged to assure that the opposing portion of arcuate vane **42** is moved into abutting relation with planar air flow directing surface **22** at least once during a 360° rotation of manual control knob **56**.

Due to the opposing actions of downwardly biasing compression springs **40** and the line engagement of flange **44** with cam **54**, the upper edge **49** of convex surface **48** of movable arcuate vane **42** is at all times evenly spaced from air flow deflection surface **22** to provide even flow of air from the diffuser into the room. Compression springs **40** and cam mechanism **54** additionally supplement guide rods **36** in maintaining movable arcuate vane **42** in an upright position such that the locus of the movement of edge **49** is substantially a vertical plane.

End walls **14** of the diffuser housing are preferably provided with keyhole slots **60** for receiving cooperating flat-headed rivets or like fasteners **62** attached to the inner surface of the end walls **63** of a decorative diffuser cover or shield **64** for enhancing the aesthetic quality of the diffuser when in place in a baseboard **66** as shown in FIGURE 3. Decorative shield **64** is three-sided with its ends spaced to receive the end walls **14** therebetween and dimensioned to abut the baseboard alongside the opening for the diffuser and hide the cut edges. Shield **64** may be provided with an inwardly extending laterally continuous flange **65** along its upper edge for enhancing its appearance. Shield **64** may be constructed from any rigid formable material such as thin sheet metal or plastic having sufficient resilience to permit outward flexing of its ends to pass the fasteners **62** into position opposite keyhole slots **60**.

To adjust the air flow from the diffuser shown in FIGURE 1, it is necessary to remove decorative shield **64** to provide access to the manual control knob. FIGURE 4 illustrates an alternative embodiment of the air diffuser of this invention having a cam **70** with a hub **71** and a manual control knob **72** with a hub **73** both provided with threaded through-apertures receiving set screws **74** for detachably mounting the cam mechanism and the control knob on an elongated cam shaft **76** which extends forwardly of the decorative shield to receive knob **72**. Decorative shield **78** is provided with a through opening **79** receiving a press-fit flanged sleeve bearing **80** for journalling shaft **76** in spaced relation to bearing **50** thereby allowing manual control knob **72** to be mounted on the outside of the shield for easy access. All other parts of the FIGURE 4 embodiment are the same as those discussed with respect to FIGURE 1. In this embodiment the aesthetic quality of the diffuser may be further enhanced by the choice of a decorative control knob which blends into the room interior decorating scheme.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive with the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. An air diffuser comprising a stationary vane means having a planar surface extending upwardly and outwardly at an acute angle from the horizontal; vertical guide members disposed adjacent said stationary vane opposite said planar surface; a movable vane slidably mounted on said vertical guide members for vertical movement toward and away from said planar surface of said stationary vane between fully closed abutting relation and fully open spaced relation to provide an elongated air outlet of varying width; means disposed about said guide members in abutting relation with said movable vane for biasing said movable vane toward its fully open spaced relation; rotatable camming means fixed in opposed abutting relation with said movable vane for moving said movable vane against the force of said biasing means; and manual means connected to said camming means for selectively rotating said camming means to adjust the position of said movable vane and the width of said air outlet.

2. The diffuser defined in claim **1** wherein said biasing means comprises compression springs axially disposed about said vertical guide members.

3. The diffuser defined in claim **2** wherein said camming means comprises a substantially circular disc fixedly eccentrically mounted on a shaft and said manual means is a control knob fixedly connected to said shaft.

4. The diffuser of claim **3** wherein said disc and said knob each have hubs at least one of which is adjustably fixed to said shaft, said shaft is mounted in a stationary sleeve bearing, one end of which abuts a friction ring and said hubs are disposed in opposed clamping relation to said sleeve bearing and friction ring to retain said camming means in adjusted position against the biasing force of said compression springs.

5. An air diffuser as defined in claim **4** including means on said end walls for mounting a decorative shield for attractively concealing said air diffuser.

6. An air diffuser unit as defined in claim **5** wherein said shaft extends through and is journalled in said shield to permit mounting of said control knob outside of said shield to enable manipulation of said manual control means without removal of said air diffuser shield.

7. An air diffuser comprising: a unitary housing having a front wall, end walls, and a rear wall defining one wall and the opposite ends of an air outlet passage; means at the upper portion of said rear wall defining an upwardly and forwardly directed stationary air deflection vane; movable arcuate vane coextensive in length with said sta-

tionary vane mounted on said front wall for vertical movement toward and away from said stationary vane to vary the width of said air outlet passage; and manual control means mounted on said front wall for adjustably positioning said arcuate vane thereby selectively adjusting the width of said air outlet passage, said manual control means comprising a rotatable cam mechanism comprising an eccentric cam in supporting abutting relation with a surface of said movable vane, a cam shaft having one end fixed to said eccentric cam, and a manually operable control knob fixedly mounted on the opposite end of said cam shaft for rotating said cam shaft and cam to selectively vary the rotational position of said cam mechanism.

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