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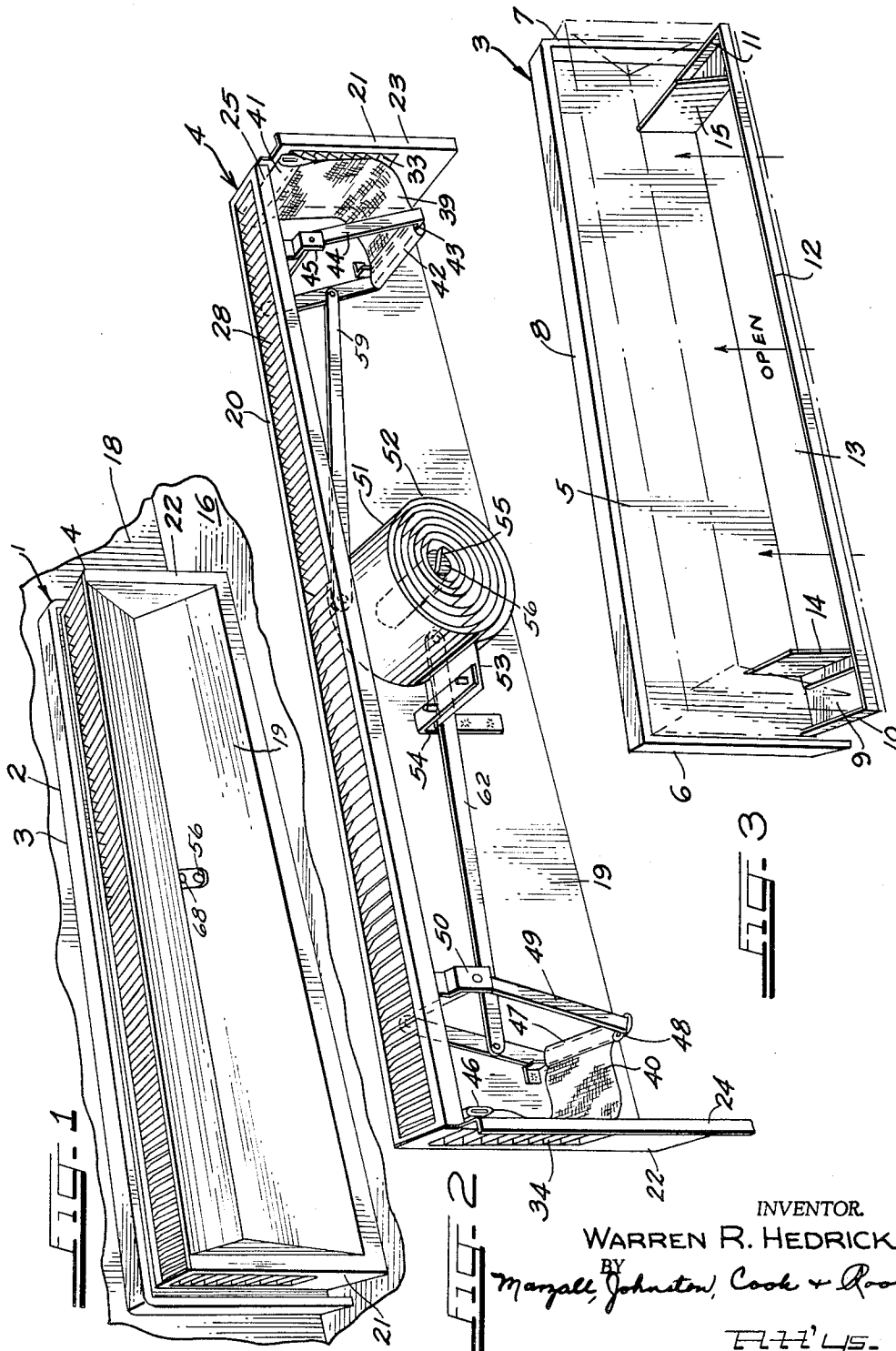
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AIR DIFFUSERS

Filed Feb. 13, 1963

3 Sheets-Sheet 1



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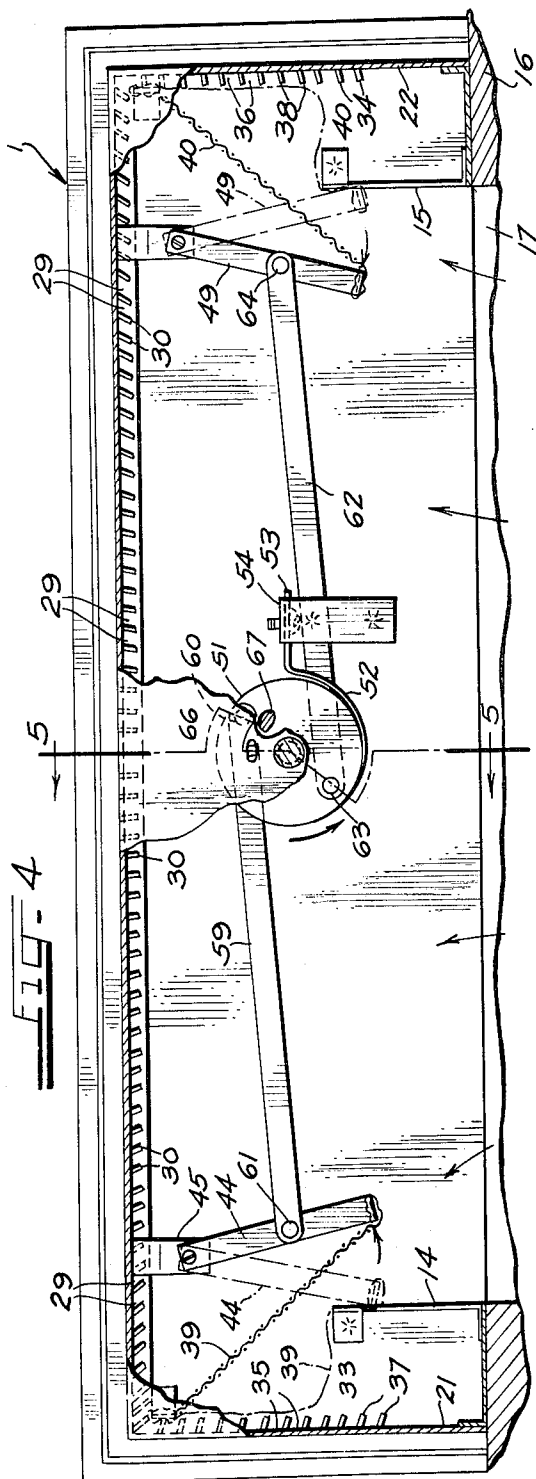
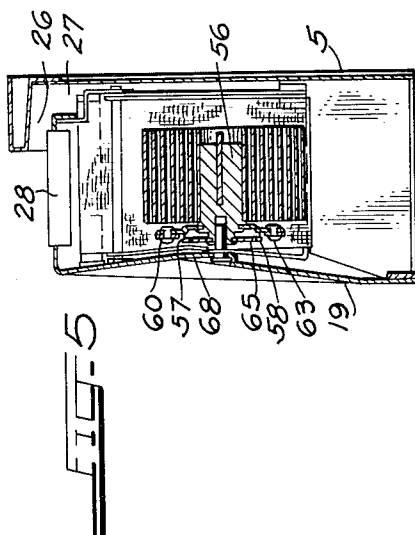
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3 Sheets-Sheet 2



INVENTOR.

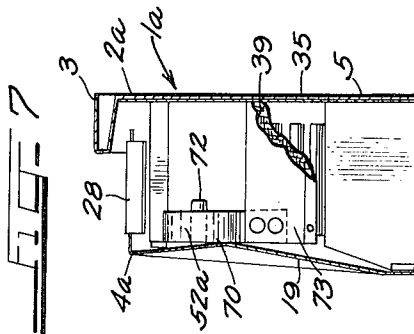
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3 Sheets-Sheet 3



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3,195,441

AIR DIFFUSERS

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9 Claims. (Cl. 98—40)

This invention relates to air diffusers, and, more particularly, to air diffusers of the type particularly well adapted for use in air-conditioning systems for rooms in dwellings and office buildings, and the like.

It is a primary object of the present invention to afford a novel air diffuser.

As is well known to those skilled in the art, warm air in a room tends to rise and stay at the top of the room, whereas cool or cold air tends to settle and stay at the bottom of the room. For this reason, among others, including the endeavor to eliminate objectionable drafts, it is commonly desirable that the warm air from warm air heating systems be directed downwardly or, at least, be directed substantially horizontally outwardly at a relatively low level. On the other hand, in cooling systems, it is commonly desirable that the cool or cold air therefrom be directed upwardly toward the top of the room. As a result, it has heretofore been common practice to use a different type of air diffuser for heating systems than for cooling systems.

This practice has been undesirable because air diffusers heretofore known in the art, which might afford quite highly effective air diffusers for heating systems, commonly afforded very poor air diffusers for cooling systems, and vice versa, so that they did not afford efficient equipment for installations which were used both for heating and cooling purposes. It is a primary object of the present invention to afford a novel air diffuser which is highly efficient and effective both as a warm air diffuser and as a cool air diffuser.

Another object of the present invention is to afford a novel air diffuser of the aforementioned type which is automatically adjustable in a novel and expeditious manner for the discharge of warm air and cool air.

Another object is to afford a novel air diffuser of the aforementioned type wherein the angle at which at least a portion of the air is discharged therefrom into a room is automatically raised and lowered in accordance with the lowering and raising, respectively, of the temperature of the air being so discharged.

Yet another object is to afford a novel air diffuser of the aforementioned type which is automatically progressively adjustable to discharge a greater quantity of air at a low level as the temperature of the air being discharged therefrom rises, and is also automatically progressively adjustable to discharge a greater quantity of air upwardly as the temperature of the air being discharged therefrom drops.

A further object is to afford a novel air diffuser of the aforementioned type which is relatively small and compact in size for the air capacity thereof.

Another object is to afford a novel air diffuser of the aforementioned type which is practical and efficient in operation, and which may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent prin-

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ciples may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a front perspective view of an air diffuser embodying the principles of the present invention;

FIG. 2 is a rear perspective view of a portion of the air diffuser shown in FIG. 1;

FIG. 3 is a front perspective view of another portion of the air diffuser shown in FIG. 1;

FIG. 4 is a front elevational view of the air diffuser shown in FIG. 1, with certain parts broken away to show underlying parts;

FIG. 5 is a transverse sectional view taken substantially along the lines 5—5 in FIG. 4;

FIG. 6 is a view similar to FIG. 4, but showing a modified form of the invention; and

FIG. 7 is a transverse sectional view taken substantially on the line 7—7 in FIG. 6.

An air diffuser 1, embodying the principles of the present invention, is shown in FIGS. 1—5, inclusive, of the drawings to illustrate the preferred embodiment of the present invention.

The air diffuser 1 includes an elongated, substantially rectangular-shaped housing 2 including a rear portion 3 and a front portion 4 removably mounted relative to each other. The air diffuser 1 is of the type normally mounted on the floor of a room adjacent the baseboard or the lower portion of a wall of the room.

The rear portion 3 of the housing 2 includes a substantially vertically disposed rear wall 5 extending longitudinally of the housing 2, and two substantially vertically disposed end walls 6 and 7 projecting forwardly from respective ends of the rear wall 5 in substantially perpendicular relation thereto. The rear portion 3 of the housing 2 also includes a horizontally extending top wall 8 and a horizontally extending bottom wall 9 projecting forwardly from the upper and lower longitudinal edges of the rear wall 5, respectively, in substantially parallel relation to each other, and in substantially perpendicular relation to the rear wall 5. The bottom wall 9 terminates at its opposite ends in inwardly spaced relation to the end walls 6 and 7, respectively, FIG. 3, and includes two flanges extending along and projecting substantially vertically upwardly from respective opposite ends thereof in inwardly spaced relation to the end walls 6 and 7. The bottom wall 9 also has a front flange 12 extending along the front edge thereof and projecting upwardly therefrom in substantially parallel spaced relation to the rear wall 5. As may be seen in FIG. 3, the end walls 6 and 7 and the top wall 8 project an equal distance forwardly from the rear wall 5, and the bottom wall 9 projects a substantially greater distance forwardly from the rear wall 5.

The bottom wall 9 is substantially rectangular in shape, and includes a rectangular-shaped opening in the central portion thereof, the opening 13 extending through the major portion of the length of the bottom wall 9 and being centered longitudinally between the flanges 10 and 11. The opening 13 also extends from the rear wall 5 to the flange 12. Two substantially flat baffle plates 14 and 15 project upwardly from the bottom wall 9 immediately adjacent respective ends of the opening 13, between the opening 13 and the flanges 10 and 11, respectively. The baffle plates 14 and 15 terminate at their upper ends below the longitudinal center line of the rear portion 3 of the housing 2, FIGS. 3 and 4, and substantially below the top wall 8 thereof.

The rear portion 3 of the housing 2 is adapted to be mounted on the floor of a room, such as, for example, the floor 16, FIGS. 1 and 4, with the opening 13 disposed in

overlying aligned relation to an air inlet duct such as the duct 17 in the floor 16. Preferably, when the rear portion 3 of the housing 2 is disposed in such operative position on the floor 16, it is disposed closely adjacent to a side wall of the room in which it is mounted, such as, for example, the side wall 18 shown in FIG. 1, with the rear wall 5 disposed in parallel juxtaposition to the side wall 18. The opening 13 and the upper end of the duct 17 are preferably of identically the same size, and the housing 2 is preferably disposed in such operative position over the duct 17 that the opening 13 and the duct 17 are in exact alignment with each other. With this construction the opening 13 affords an effective inlet opening through which warm or cool air may be fed into the housing 2 from a suitable source of supply such as the duct 17.

The front portion 4 of the housing 2 includes an elongated, substantially rectangular-shaped front wall 19, which is somewhat concave inwardly along the longitudinal center line thereof, FIGS. 1 and 5. The front portion 4 also includes a top wall 20 which extends along the upper edge of the front wall 19 and projects rearwardly therefrom in a substantially horizontal direction. In addition, the front portion 4 includes two substantially vertically extending end walls 21 and 22 projecting rearwardly from respective ends of the front wall 19 in substantially parallel relation to each other. The end walls 21 and 22 project rearwardly from the front wall 19 a greater distance than the top wall 20, so that when the front portion 4 of the housing 2 is disposed in operative position in the rear portion 3 the rear edges 23 and 24 of the end walls 21 and 22, respectively, are disposed in abutting engagement with the front face of the rear wall 5 of the rear portion 3, with the rear edge 25 of the top wall 20 spaced forwardly from the rear wall 5, FIG. 5. When in this position, the end walls 21 and 22 are disposed between the end wall 6 and the flange 10, and the end wall 7 and the flange 11, respectively, of the rear portion 3 of the housing 2, with the lower edge portion of the front wall 19 of the front portion 4 disposed in parallel juxtaposition to the flange 12, FIG. 5. The top wall 8 of the rear portion 3 of the housing 2 is disposed above the bottom of the rear wall 5 a sufficient distance that when the front portion 4 of the housing 2 is disposed in the aforementioned operative position, the top wall 8 is disposed in upwardly spaced relation to the top wall 20 to thereby afford a passageway 26 between the top walls 8 and 20. The passageway 26 extends the full length of the top wall 20 of the front portion 4 of the housing 2, and is in communication with the interior of the housing 2 through a passageway 27 afforded by the forward spacing of the rear longitudinal edge portion of the top wall 20 from the rear wall 5, FIG. 5.

The top wall 20 of the front portion 4 of the housing 2 has a grill 28 formed therein. The grill 28 extends both longitudinally and laterally across substantially the full length and width of the top wall 20 and has a plurality of elongated, substantially straight parallel spaced slots 29 therethrough, the slots 29 extending across the top wall 20 in substantially perpendicular relation to the length thereof. The lateral sides of the slots 29 are defined by rectangular-shaped, substantially parallel spaced fins or baffles 30.

As shown in FIG. 4, the fins 30 disposed at the longitudinal central portion of the grill 28 are disposed in planes which are substantially vertical, and the fins 30 on both sides of the aforementioned centrally disposed fins 30 are disposed at acute angles to the vertical, with the acute angle of each successive fin 30 becoming progressively greater from the central portion of the grill 28 to each of the end walls 21 and 22. The fins 30, which are closest to the respective end walls 21 and 22 are preferably disposed at a substantial acute angle to the vertical, such as, for example, an angle of sixty-five degrees.

Two grills 33 and 34 which are somewhat similar to the grill 28 are formed in the end walls 21 and 22, respec-

tively, of the front portion 4 of the housing 2, FIGS. 2 and 4. The grills 33 and 34 extend laterally across the major portion of the widths of the end walls 21 and 22, and extend from closely adjacent the tops of end walls 21 and 22 downwardly toward the bottom thereof, terminating in upwardly spaced relation to the lower ends of the end walls 21 and 22 below the level of the upper ends of the baffle plates 14 and 15, respectively, in the rear portion 3 of the housing. Like the grill 28, the grills 33 and 34 embody substantially parallel spaced slots 35 and 36, respectively, extending laterally thereacross. The upper and lower longitudinal edge portions of each of the slots 35 in the grill 33 are defined by a pair of rectangular-shaped, substantially parallel fins or baffles 37, FIGS. 2 and 5. The fins 37 extend longitudinally across substantially the entire width of the end wall 22, and are preferably disposed in horizontal planes. As may be seen in FIGS. 2 and 4, the grill 34 is constructed similarly to the grill 33, the upper and lower longitudinal edges of each of the slots 36 being defined by substantially straight, elongated parallel fins or baffles 38 which are disposed in horizontal planes.

Two flexible baffles 39 and 40, in the form of substantially rectangular-shaped sheets or strips of flexible material are mounted on the upper end portions of the end walls 21 and 22, respectively, in depending relation thereto. The baffles 39 and 40 are preferably made from a suitable fabric material such as, for example, nylon or canvas duck but, if desired, may be made from other suitable materials such as, for example, suitable plastic material, or the like.

The upper portion 41 of the baffle 39 is secured to the inner face of the end wall 21 above the grill 33, and the lower end portion 42 of the baffle 39 is secured to the lower end portion or bite portion 43 of a substantially U-shaped hanger 44, which is pivotally mounted at its upper end on a supporting bracket 45 attached to the top wall of the front portion 4 of the housing 2, FIGS. 2 and 4. Similarly, the upper end portion 46 of the baffle 40 is attached to the inner face of the end wall 22 above the grill 34, and the lower end portion 47 of the baffle 40 is secured to the lower end portion or bite 48 of a substantially U-shaped hanger 49, which is pivotally mounted at its upper end on a supporting bracket 50 mounted on the top wall 20. The baffles 39 and 40 are preferably of the somewhat greater width than the grills 33 and 34, and are secured to the end walls 21 and 22, respectively, in laterally centered relation to the grills 33 and 34.

The hangers 44 and 49 are of such size, and are so disposed in the housing 2, that they may be swung on the brackets 45 and 50 between one position wherein the lower end portions of the hangers 44 and 49 are disposed in abutting engagement with the inner face of the upper end portions of the baffle plates 14 and 15, respectively, as shown in broken lines in FIG. 4, and another position wherein the lower end portions of the hangers 44 and 49 are disposed in inwardly spaced relation to the baffle plates 14 and 15, as shown in solid lines in FIG. 4. The flexible baffles 39 and 40 are of such length, and are so constituted and arranged in the housing 2, that when the hangers 44 and 49 are disposed in the aforementioned one position shown in broken lines in FIG. 4, the baffles 39 and 40 drape downwardly over the upper edge portions of the baffle plates 14 and 15 in engagement therewith; and when the hangers 48 and 49 are disposed in the aforementioned other position shown in solid lines in FIG. 4, the baffles 39 and 40 are pulled taut thereby and extend downwardly and inwardly from the upper end portions of the end walls 21 and 22 at an acute angle to the vertical, with the lower end portions of the baffles 39 and 40 being disposed downwardly and inwardly relative to the baffle plates 14 and 15, as shown in solid lines in FIG. 4.

In the air diffuser 1 shown in the drawings, a thermostatic control unit 51 is afforded for controlling the

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aforementioned movement of the hangers 44 and 49 and, therefore, the aforementioned positioning of the baffles 39 and 40, for a purpose which will be discussed in greater detail presently. The thermostatic control unit 51 shown in the drawings includes a helically coiled bi-metal strip 52, the outer end portion 53 of which is stationarily secured to a suitable mounting bracket 54 mounted on the inner face of the front wall 19 of the front portion 4 of the housing 2, FIGS. 2 and 4. The inner end portion 55 of the bi-metal member 52 is mounted in and secured to an elongated shaft 56, which is rotatably mounted on the center portion of the front wall 19 of the front portion 4 of the housing 2 and projects rearwardly therefrom.

Two lever arms 57 and 58 are mounted on and rotatable with the shaft 56 in substantially diametrically opposed relation to each other, FIG. 5. An elongated link 59 has one end portion secured to the lever 57 by suitable means such as a pin or bolt 60, and the other end portion secured to the hanger 44 by suitable means such as a pin or bolt 61, FIGS. 4 and 5. Similarly, an elongated link 62 has one end portion secured to the lever 58 by suitable means such as a pin or bolt 63, and the other end portion secured to the hanger 49 by a pin or bolt 64.

The bi-metal member 52, of course, is sensitive to temperature changes, and variations in the temperature to which it is subjected causes it to coil and uncoil. The outer end portion 53 of the bi-metal strip 52 being secured against movement, such coiling and uncoiling of the strip 52 causes the shaft 56 to rotate around its longitudinal axis. The levers 57 and 58, the links 59 and 62, and the hangers 44 and 49 are so constituted and arranged in the front portion 4 of the housing 2 relative to each other that when the temperature to which the bi-metal strip 52 is subjected is above a predetermined temperature, the links 59 and 62 are held in such position by the bi-metal strip 52 that the hangers 44 and 49, respectively, are held in the inwardly spaced relation to the baffle plates 14 and 15, respectively, shown in solid lines in FIGS. 4, and, when the temperature drops from this aforementioned predetermined temperature, the resulting movement of the bi-metal strip 52 is effective to move the links 59 and 62 outwardly to thereby swing the hangers 44 and 49 outwardly around the brackets 45 and 60, respectively, toward the position wherein the hangers 44 and 49 are disposed in abutting engagement with the upper end portions of the baffle plates 14 and 15, shown in broken lines in FIG. 4. On the other hand, when the temperature to which the bi-metal strip 52 is subjected is below another predetermined temperature the hangers 44 and 49 are held by the strip 52 in the aforementioned position wherein they are disposed in engagement with the baffle plates 14 and 15, as shown in broken lines in FIG. 4, as the temperature to which the strip 52 is subjected rises above the aforementioned other predetermined temperature, the links 59 and 62 are moved inwardly by the strip 52 to thereby swing the hangers 44 and 49 toward the aforementioned position wherein they are disposed in inwardly spaced relation to the baffle plates 14 and 15, as shown in solid lines in FIG. 4.

Thus, it will be seen that raising and lowering of the temperature to which the bi-metal strip 52 is subjected through a predetermined range of temperature is effective to swing the hangers 44 and 49 between the two positions shown in solid and broken lines, respectively, in FIG. 4. It will be remembered that the opening 13 in the bottom of the housing 2 is the inlet opening through which air is fed into the air diffuser 1. Thus, it will be seen that when the baffles 39 and 40 are disposed in the extended positions shown in solid lines in FIG. 4, a portion of the air passing into the housing 2 from the opening 13 is deflected outwardly by the baffles 39 and 40 through the slots 35 and 36 in the grills 33 and 34 in the end walls 21 and 22, respectively, of the diffuser 1. On the other hand, when the hangers 44 and 49 are disposed in the aforementioned abutting engagement with the upper end

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portions of the baffle plates 14 and 15, as shown in broken lines in FIG. 4, the baffles 39 and 40 extend from the upper end portions of the end walls 21 and 22 downwardly into engagement with the upper ends of the baffle plates 14 and 15, respectively, in position to effectively block the passage of air from the inlet opening 13 outwardly through the grills 33 and 34, respectively. In this latter position of the baffles 39 and 40, they afford effective side walls for a passageway directing air from the inlet opening 13 to the top of the housing 2.

With this construction, as the temperature in the housing 2 decreases within the aforementioned predetermined temperature range, the baffles 39 and 40 are so moved that a progressively smaller amount of air is fed outwardly through the grills 33 and 34, and the air that is fed outwardly through the grills 33 and 34 is directed by the baffles 39 and 40 at a progressively higher angle.

In addition, it will be seen that the hangers 44 and 49 and the baffles 39 and 40 are so disposed in the housing 2 that even when the hangers 44 and 49 are disposed in fully inwardly projecting position, as shown in solid lines in FIG. 4, the baffles 39 and 40 afford a relatively small impediment to the flow of air outwardly from the inlet opening 13 through the grill 28; and when the hangers 44 and 49 are disposed in fully outwardly disposed position, as shown in broken lines in FIG. 4, they afford substantially no impediment to the flow of air from the inlet opening 13 outwardly through the grill 28.

In the operation of the novel diffuser 1, shown in the drawings, when the temperature of the air being fed into the housing 2 is below a predetermined temperature, the thermostatic control 51 is effective to hold the hangers 44 and 49 in the aforementioned position shown in broken lines in FIG. 4, wherein they are disposed in abutting engagement with the upper end portions of the baffle plates 14 and 15, respectively. With the hangers 44 and 49 disposed in this position, the flexible baffles 39 and 40 are draped over the upper edge portions of the baffle plates 14 and 15 and hang downwardly between the plates 14 and 15 and the end walls 21 and 22, respectively, to effectively stop the feeding of air from the end grills 33 and 34. Under such conditions, the major portion of the air entering the housing 2 through the inlet opening 13 passes upwardly through the grill 28, with the air passing from the longitudinal central portion of the grill 28 being discharged directly upwardly toward the ceiling, and the air which is discharged from the left and right end portions of the grill 28, as viewed in FIG. 4, being discharged upwardly toward the ceiling at an angle slanting to the left and right, respectively, at approximately twenty-five degrees to the vertical. A minor portion of the air being discharged from the housing 2 under these conditions is fed upwardly through the passageway 27 and forwardly outwardly through the passageway 26, from which passageway 26 it is carried upwardly with the air being discharged from the grill 28. The air discharging from the passageway 26 tends to cause the air discharging from the grill 28 to be deflected outwardly somewhat away from the wall 18.

During such operation of the air diffuser 1, the cooling air being fed through the duct 17 for discharge from the air diffuser 1 is directed by the air diffuser 1 upwardly toward the ceiling. Such operation has several advantages, including lowering the temperature of the warmer air normally located in the upper portions of a room, and preventing undesirable drafts of relatively cold air.

If, subsequently, the temperature of the air being fed into the air diffuser 1 through the inlet opening 13 rises above the last-mentioned predetermined temperature, the resulting increase in temperature of the bi-metal strip 52 causes the latter to tend to coil up. This causes rotation of the shaft 56 in a clockwise direction, as viewed in FIG. 4, to thereby move the links 59 and 62 inwardly away from the end walls 21 and 22, respectively. Such movement of the links 59 and 62 is effective to swing the

hangers 44 and 49 inwardly from the positions shown in broken lines in FIG. 4 toward the positions shown in solid lines in FIG. 4. Such movement of the hangers 44 and 49 causes the baffles 39 and 40 to be stretched taut, and to swing outwardly away from the baffle plates 14 and 15 into a position wherein they are no longer effective to close communication between the grills 33 and 34 and the inlet opening 13. In fact, as the baffles 39 and 40 swing inwardly toward their fully inwardly disposed position, such as the position shown in solid lines in FIG. 4, they become effective to deflect and direct air issuing from the inlet opening 13 outwardly through the grills 33 and 34, respectively. The size of the passageways afforded between the baffle 39 and the baffle plate 14, and the baffle 40 and the baffle plate 15, and the effectiveness of the baffles 39 and 40 to deflect air outwardly through the grills 33 and 34 becomes progressively greater as the temperature of the air in the housing 2 increases. Hence, as the temperature of the air being discharged from the air diffuser 1 increases within the aforementioned predetermined temperature range, a progressively greater proportion of that air is directed outwardly from the air diffuser 1 at a relatively low level through the end grills 33 and 34, so that the warm air is directed into the lower levels of the room in which the air diffuser is disposed.

If desired, an indicator disk 65 may be mounted on the shaft 56, for rotation therewith, between the levers 57 and 58 and the front wall 19 of the front portion 4 of the housing, FIGS. 4 and 5. Suitable indicia such as colored symbols 66 and 67 may be disposed on the outer face of the disk 65 in position to be viewed through an aperture 68 in the front wall 19, so that by viewing the indicia 66 and 67 through the aperture 68 an occupant of the room may determine the temperature of the air discharging from the air diffuser 1.

From the foregoing it will be seen that the preferred form of the present invention illustrated in FIGS. 1-5 affords a practical and efficient air diffuser which may be used either in heating systems or cooling systems, or in air conditioning systems which comprise both heating and cooling systems.

In FIGS. 6 and 7 a modified form of the present invention is illustrated, with parts which are the same as parts shown in FIGS. 1-5 being indicated by the same reference numerals as are the corresponding parts shown in FIGS. 1-5, and with parts which are similar to parts shown in FIGS. 1-5 being indicated by the same reference numerals as the similar parts in FIGS. 1-5, but with the suffix "a" added thereto.

The air diffuser 1a shown in FIGS. 6 and 7 is identical in construction to the air diffuser 1 shown in FIGS. 1-5 except for the manner in which, and the means by which the flexible baffles 39 and 40 are actuated.

Instead of a single thermostatic control 51, as embodied in the air diffuser 1 shown in FIGS. 1-5, the air diffuser 1a embodies two separate thermostatic controls 70 and 71 for controlling the positions of the flexible baffles 39 and 40, respectively. Each of the thermostatic controls 70 and 71 includes a respective helically coiled bi-metal strip 52a, which is the same as the bi-metal strip 52 except that, preferably, the strips 52a are somewhat smaller in size.

The bi-metal strips 52a are both fixedly mounted at their centers on respective posts 72, which are fixedly mounted on, and project inwardly from the front wall 19 of the front portion 4a of the housing 2a. Two plates 73 are secured to the outer ends of respective ones of the bi-metal strips 52a, and the lower ends of the flexible baffles 39 and 40 are secured to the lower ends of the plates 73 mounted on bi-metal strips 52a of the controls 70 and 71, respectively.

The bi-metal strips 52a are so constituted and arranged in the front portion 4a of the housing 2a that when the temperature to which they are subjected is at or below a predetermined temperature, they are effective to hold the plates 73 thereon in engagement with the

upper ends of the respective adjacent one of the stationary baffles 14 and 15. In such position of the plates 73, the flexible baffles 39 and 40 drape downwardly over the upper edges of the stationary baffles 14 and 15, into the positions shown in broken lines in FIG. 6, in which positions they are effective to shut off the flow of air through the grills 33 and 34, respectively.

A rise in the temperature, to which the bi-metal strips 52a are subjected, above the aforementioned predetermined temperature is effective to move the plates 73 inwardly and upwardly away from the stationary baffles into a position such as that shown in solid lines in FIG. 6, in which positions they are effective to deflect a portion of the air outwardly through the slots 35 and 36 in the grills 33 and 34, respectively.

From the foregoing it will be seen that the modified form of the present invention shown in FIGS. 6 and 7, like the form thereof shown in FIGS. 1-5, affords a practical and efficient air diffuser which may be used either in heating systems or in cooling systems, or in air conditioning systems which comprise both heating and cooling systems.

Also, it will be seen that the present invention affords novel air diffusers wherein the direction that air is being discharged therefrom is automatically controlled in a novel and expeditious manner in accordance with the temperature of that air.

In addition, it will be seen that the present invention affords novel and practical air diffusers which may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. An air diffuser comprising

(a) a housing having

- (1) an upwardly facing top wall, and
- (2) horizontally facing end walls,

(b) said housing having

- (1) air inlet means for feeding air into said housing, and
- (2) air outlet means in said top wall and in said end walls for feeding said air out of said housing,

(c) said outlet means in said top wall being disposed in position to discharge said air from said housing in a more upward direction than said outlet means in said end walls,

(d) heat sensitive means, operable in response to temperature changes, mounted in said housing in position to be responsive to changes in the temperature of said air passing through said housing,

(e) baffle means projecting downwardly and inwardly from said end walls and pivotably mounted in said housing, and

(f) means connecting said heat-sensitive means to said baffle means for movement of said baffle means between a raised position and a lowered position for progressively opening and closing communication between said air inlet means and said air outlet means in said end walls in response to raising and lowering, respectively, of the temperature of said air passing through said housing, without substantially opening or closing communication between said air inlet means and said air outlet means in said top wall.

2. An air diffuser comprising

(a) an elongated housing having

- (1) a longitudinally extending upwardly facing top wall, and
- (2) two substantially parallel horizontally facing

- end walls disposed at respective ends of said top wall,
- (b) air inlet means for feeding air into said housing,
- (c) fins in said top wall and end walls defining air outlet means for discharging said air from said housing, 5
- (d) said fins in said top wall
- (1) being spaced from each other across the major portion of the length of said top wall,
 - (2) with said fins in the longitudinal central portion of said top wall extending substantially vertically, and 10
 - (3) with the fins in each end portion of said top wall disposed at an acute angle to the vertical with the upper portion of the fin tipped from the vertical toward the adjacent end of said top wall, 15
- (e) said fins in said end walls
- (1) being spaced from each other vertically across the upper end portions of said respective end walls, 20
 - (2) with said fins in each of said end walls tilted upwardly at a minor acute angle to the horizontal outwardly from said housing,
- (f) said inlet means 25
- (1) being disposed on the opposite side of said housing from said top wall, and
 - (2) including an elongated opening spaced from said end walls and extending across the major portion of the length of said opposite side, 30
- (g) two baffle plates, 30
- (h) each of said baffle plates
- (1) extending substantially vertically from one end of said opening toward said top wall between said one end of said opening and the adjacent one of said end walls, and 35
 - (2) terminating short of said top wall,
- (i) baffle means movably mounted in said housing for movement between 40
- (1) one position wherein said baffle means engage the top edges of said baffle plates to close communication between said inlet means and said outlet means in said end walls, and
 - (2) another position wherein said baffles means are spaced from said baffle plates in position to open communication between said inlet means and said outlet means in said end walls, and 45
- (j) control means
- (1) including heat-sensitive means
 - (a') responsive to variations in temperature in said housing, and 50
 - (b') operatively connected to said baffle means,
 - (2) for moving said baffle means toward said one position and toward said other position in response to raising and lowering, respectively, of the temperature of said air in said housing. 55
3. An air diffuser as defined in claim 2, and in which
- (a) said baffle means comprise sheet members
- (1) pivotally supported at one edge adjacent the top of respective ones of said end walls and 60
 - (2) having another edge portion extending downwardly therefrom to a point on the opposite side of the adjacent one of said baffle plates from said respective end wall.
4. An air diffuser as defined in claim 3, and in which 65
- (a) said control means includes
- (1) hanger means
 - (a') pivotally mounted in said housing, and
 - (b') operatively connected to said other edge portion of respective ones of said sheet members in supporting relation thereto. 70
5. An air diffuser as defined in claim 4, and in which
- (a) said sheet members
- (1) comprise flexible sheeting, and
 - (2) are each substantially uniplanar when said 75

- baffle means are disposed in said one position, and
- (3) are each convex outwardly from said edge portions thereof toward the respective adjacent one of said end walls when said baffle means are disposed in said other position.
6. An air diffuser comprising
- (a) an elongated housing having
- (1) a longitudinally extending upwardly facing top wall, and
 - (2) two substantially parallel horizontally facing end walls disposed at respective ends of said top wall,
- (b) air inlet means for feeding air into said housing,
- (c) fins in said top wall and end walls defining air outlet means for discharging said air from said housing,
- (d) said fins in said top wall
- (1) being spaced from each other across the major portion of the length of said top wall,
 - (2) with said fins in the longitudinal central portion of said top wall extending substantially vertically, and
 - (3) with the fins in each end portion of said top wall disposed at an acute angle to the vertical with the upper portion of the fin tipped from the vertical toward the adjacent end of said top wall,
- (e) said fins in said end walls
- (1) being spaced from each other vertically across the upper end portions of said respective end walls,
 - (2) with said fins in each of said end walls tilted upwardly at a minor acute angle to the horizontal outwardly from said housing,
- (f) said inlet means
- (1) being disposed on the opposite side of said housing from said top wall, and
 - (2) including an elongated opening spaced from said end walls and extending across the major portion of the length of said opposite side,
- (g) two baffle plates,
- (h) each of said baffle plates
- (1) extending substantially vertically from one end of said opening toward said top wall between said one end of said opening and the adjacent one of said end walls, and
 - (2) terminating short of said top wall,
- (i) baffle means movably mounted in said housing for movement between
- (1) one position wherein said baffle means engage the top edges of said baffle plates to close communication between said inlet means and said outlet means in said end walls, and
 - (2) another position wherein said baffle means are spaced from said baffle plates in position to open communication between said inlet means and said outlet means in said end walls,
- (j) said baffle means comprising sheet members
- (1) pivotally supported at one edge adjacent the top of respective ones of said end walls and
 - (2) having another edge portion extending downwardly therefrom to a point on the opposite side of the adjacent one of said baffle plates from said respective end wall, and
- (k) control means
- (1) including heat-sensitive means
 - (a') responsive to variations in temperature in said housing, and
 - (b') operatively connected to said baffle means,
 - (2) for moving said baffle means toward said one position and toward said other position in response to raising and lowering, respectively, of the temperature of said air in said housing,
- (l) said control means including

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- (1) hanger means
 - (a') pivotally mounted in said housing, and
 - (b') operatively connected to said other edge portion of respective ones of said sheet members in supporting relation thereto, 5
- (m) said heat-sensitive means including
 - (1) a substantially spiral-shaped bi-metallic element
 - (a') disposed in the central portion of said housing, and 10
 - (b') having
 - (1') an outer end fixedly secured in said housing, and
 - (2') an inner end secured to a shaft rotatably mounted in said housing for rotating said shaft upon variations in the temperature of said air in said housing, and 15
- (n) said control means including two links operatively connected to said hanger means and said shaft for moving said baffle means between said one position and said other position upon said rotation of said shaft. 20
- 7. An air diffuser as defined in claim 3, and in which
 - (a) said other edge portions of said sheet members are disposed in engagement with the upper edges of the respective adjacent ones of said baffle plates when said baffle means are disposed in said one position, and 25
 - (b) said other edge portions of said sheet members project horizontally inwardly past respective ends said opening for a minor portion of the length of said opening when said baffle means are disposed in said other position. 30
- 8. An air diffuser comprising 35
 - (a) a housing having
 - (1) an upwardly facing portion, and
 - (2) substantially horizontally facing portions,
 - (b) said upwardly and horizontally facing portions having air outlet means therein for discharging air from said housing, 40
 - (c) air inlet means in the bottom of said housing and opening upwardly into said housing for feeding said air into said housing,
 - (d) said inlet means 45
 - (1) being disposed in position to discharge said air into said housing substantially directly toward said outlet means in said upwardly facing portions,

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- (2) being disposed inwardly of said outlet means in said horizontally facing portions in position discharge said air into said housing substantially transversely to said last-mentioned outlet means, and
- (3) including baffle plates extending upwardly from said bottom and spaced inwardly from said horizontally facing portions,
- (e) baffle means
 - (1) mounted in said housing and
 - (2) movable relative to said inlet means between
 - (a') one position wherein said baffle means engages said baffle plates in position to close communication between said inlet means and said outlet means in said horizontally facing portions, and
 - (b') another position wherein said baffle means is spaced above said baffle plates in position to open communication between said inlet means and said last-mentioned outlet means, and
- (f) temperature responsive means in said housing and operatively connected to said baffle means for moving the latter toward said one position and toward said other position upon lowering and raising, respectively, of the temperature of said air in said housing.
- 9. An air diffuser as defined in claim 8, and in which
 - (a) said baffle means are disposed in such position in said housing when in said other position that the project into a minor portion of the path of said air from said inlet means to said outlet means in said upwardly facing portion, and
 - (b) said baffle means are disposed in such position in said housing when in said one position as to afford side wall portions of an air passage leading from said inlet means to outer edge portions of said outlet means in said upwardly facing portions.

References Cited by the Examiner

UNITED STATES PATENTS

2,437,878	3/48	Dunville	236—93
2,511,490	6/50	Bauer	98—114 X
2,787,946	4/57	Gannon	98—38
2,906,287	9/59	Kreuttner	98—38 X
3,068,776	12/62	Day	98—38 X

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