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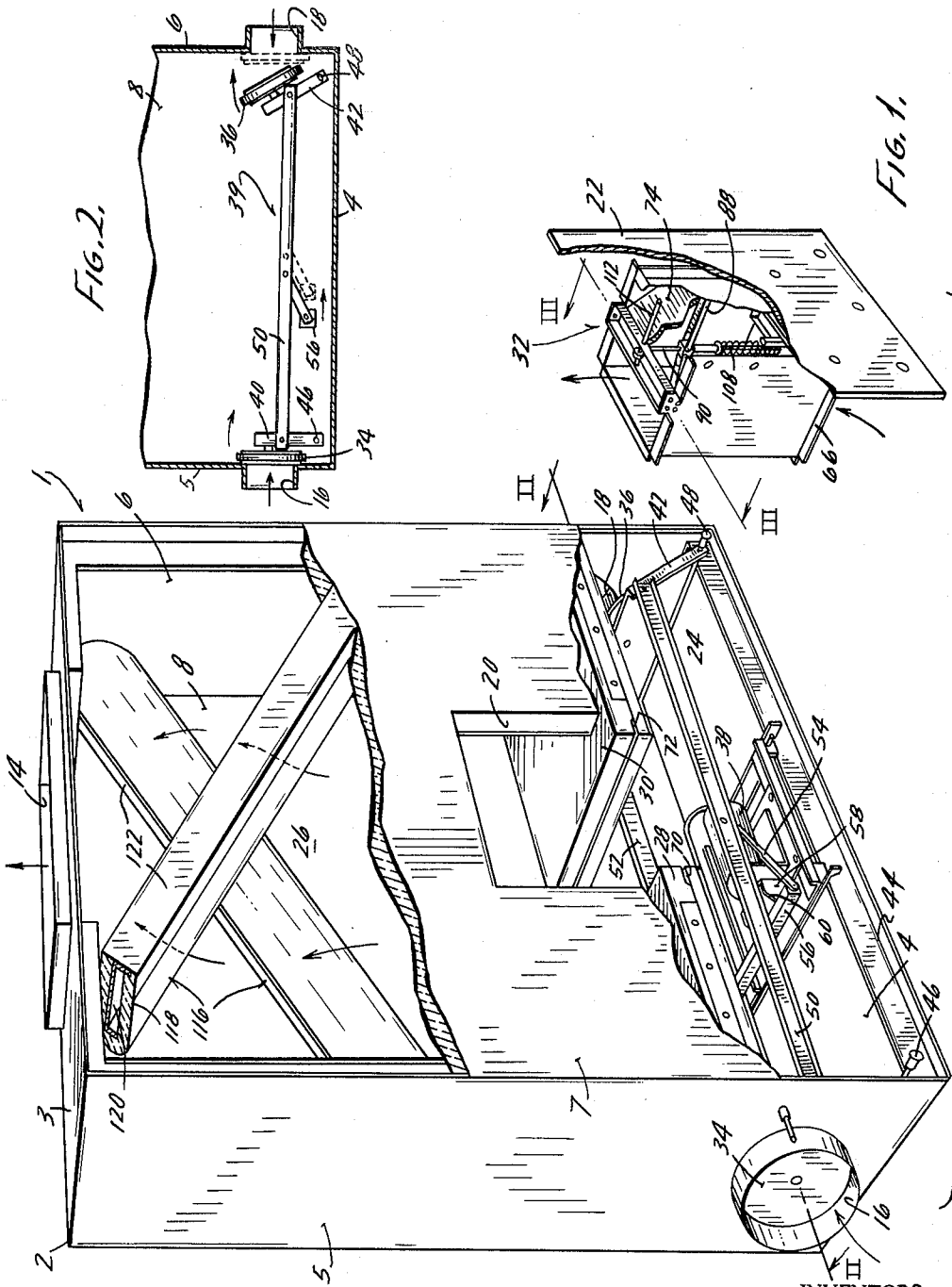
J. W. SPRADLING ET AL

3,250,203

AIR DISTRIBUTING DEVICE

Filed July 3, 1963

4 Sheets-Sheet 1



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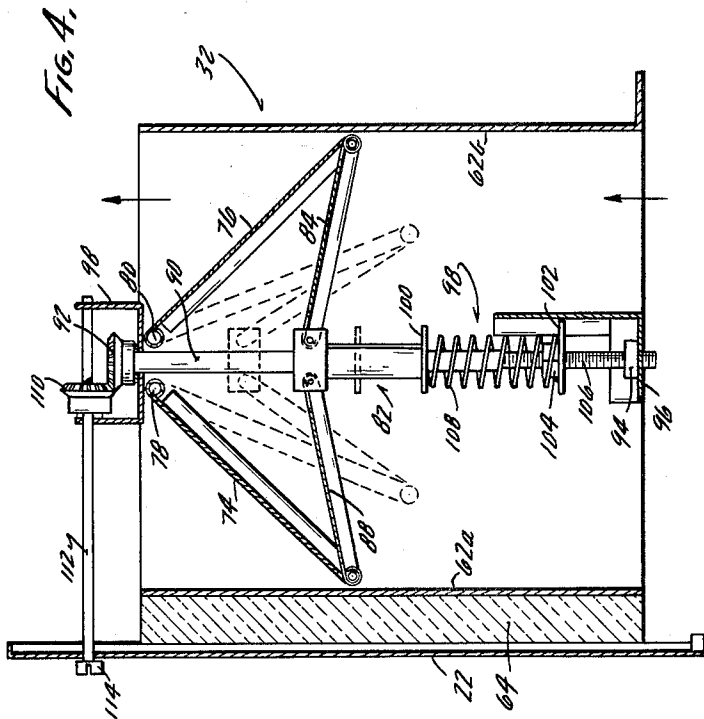
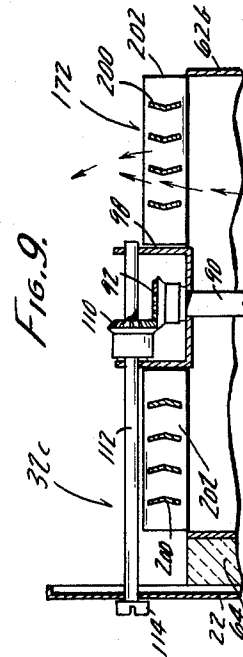
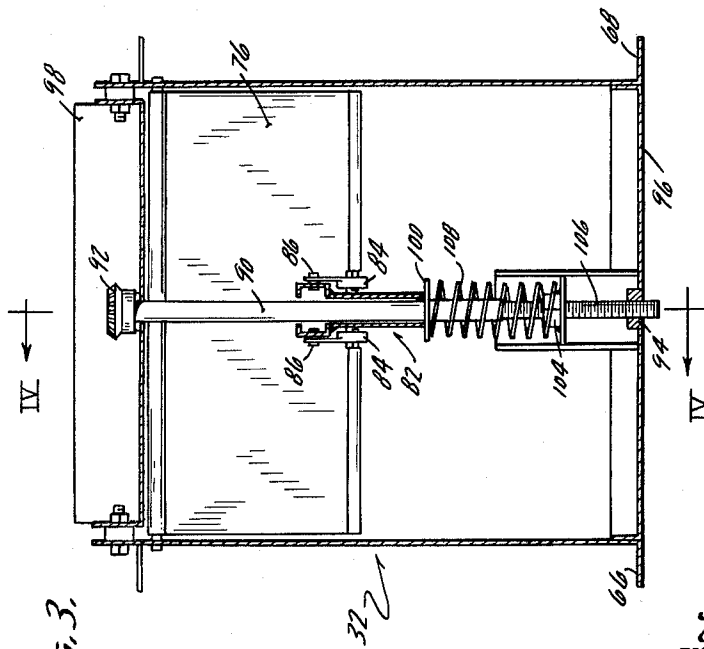
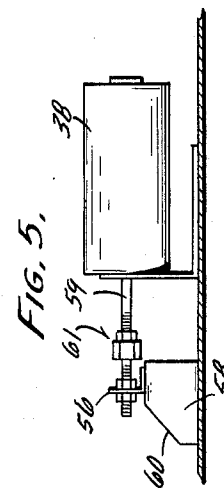
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4 Sheets-Sheet 2



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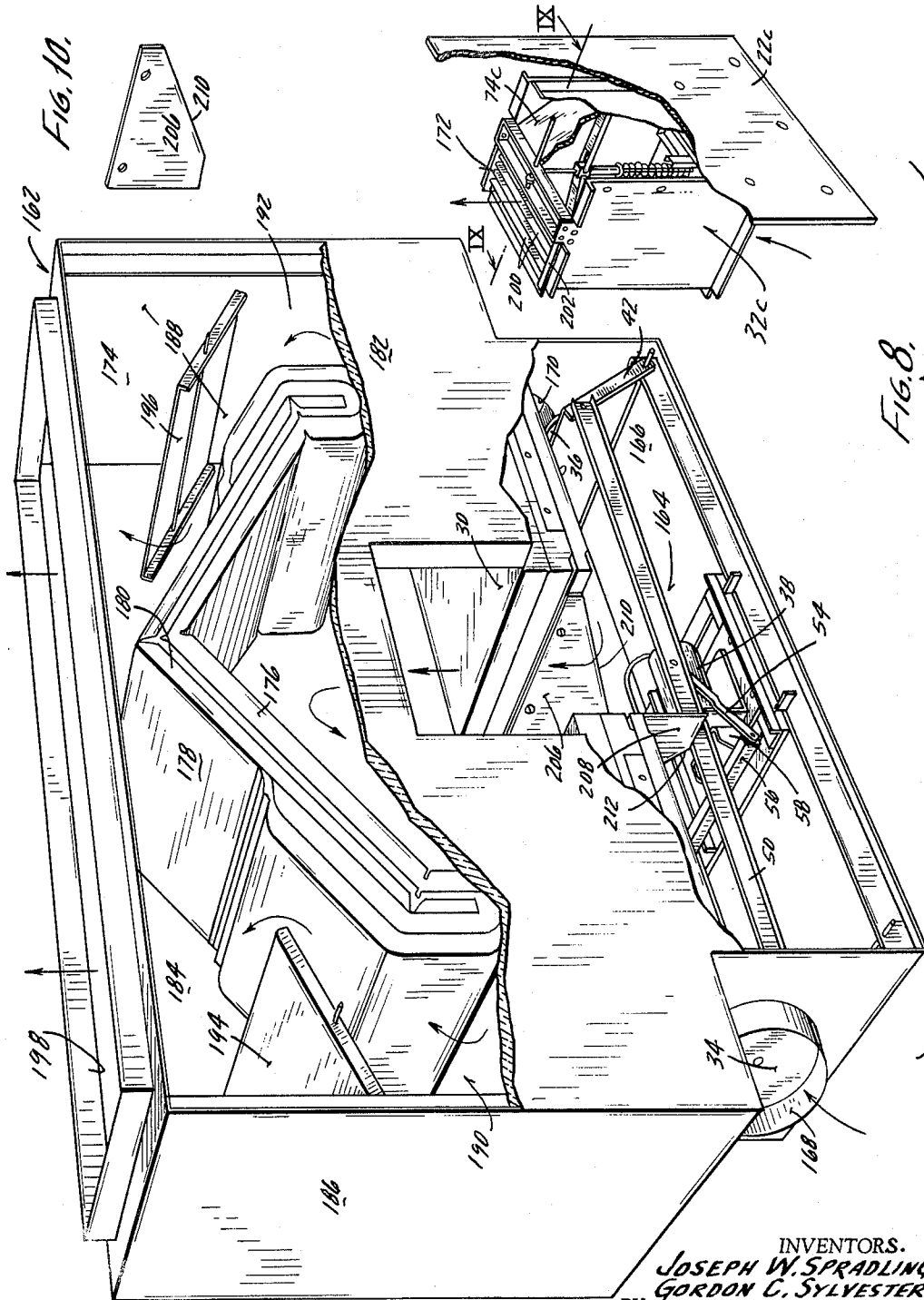
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AIR DISTRIBUTING DEVICE

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4 Sheets-Sheet 4



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3,250,203

AIR DISTRIBUTING DEVICE

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18 Claims. (Cl. 98—38)

This invention relates to air distributing systems and, more particularly, to control units adapted to mix hot and cold air in desired proportions to achieve a particular temperature and to deliver a constant volume of the mixed air to a given area.

Such control units are commonly located at the discharge points in an air distributing system and, for convenience, they will be referred to throughout this application as terminal control units; however, it will be appreciated that they can be connected for discharge directly into a room, or other area, or can be connected for discharge through suitable duct-work. Terminal control units have been provided which include a thermostatically controlled mechanism for mixing hot and cold air in predetermined proportions to achieve a mixture of air at a desired temperature and also have included suitable mechanisms for controlling delivery of the mixed air. The arrangements of the duct-work of various air delivery systems are not completely standardized and the terminal units may be mounted in various positions, e.g. vertically, horizontally, along a wall or for discharge through the ceiling. To accommodate these various types of installations a number of different unit constructions must be available, for example end and side inlets and/or top and side discharge constructions.

An object of this invention is to provide a terminal control unit having a simplified construction while providing improved performance.

Another object of this invention is to achieve some degree of standardization in the component parts of the various terminal control units so that they will have universal application to the various unit constructions.

Still another object of this invention is to provide a constant volume regulator having improved operation and being supported in a unit for most facile assembly, disassembly and convenient and ready access for inspection, cleaning and/or repair.

Another object of this invention is to insure thorough mixing of the hot and cold air.

A further object of this invention is to attenuate system noise and the self-generated noise of a terminal control unit.

A further object of this invention is to simplify the assembly of a terminal control unit.

For the achievement of these and other objects, this invention proposes a terminal control unit wherein the unit interior is divided into high and low pressure chambers. Air is admitted into the high pressure chamber through hot and cold inlets with the degree of opening of the inlets being determined by valves which are connected for simultaneous movement by an operating linkage. The operating linkage is designed so as to be usable with both side and end inlet constructions. Movement of the linkage simultaneously moves one valve toward a full closed position as the other valve is being moved to a full open position and is capable of achieving various degrees of opening and closing of the inlets. Movement of the linkage is produced by a thermostatically controlled actuator so that the amounts of hot and cold air admitted into it can be properly proportioned to achieve a desired air temperature.

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Delivery of a predetermined constant volume of mixed air is controlled and maintained by a constant volume regulator which is sensitive to the air flow through the terminal control unit and, in response to that flow, is capable of varying the air flow as required to maintain the constant volume. Preferably the constant volume regulator is located between the high and low pressure chambers and controls the amount of air which is delivered to the low pressure chamber from the high pressure chamber. For ease of assembly, disassembly and repair, the volume regulator is mounted on a panel which is releasably connected to the terminal control unit so that the volume regulator is releasably connected in the terminal control unit. The constant volume regulator is adjustable to vary the volume of delivered air to be maintained, the mechanism for achieving this adjustment being accessible from the exterior of the terminal control unit so that adjustment can be achieved without disassembly of the units.

The discharge opening for the terminal control unit is located in the low pressure chamber which also has baffle means arranged to prevent direct passage of air between the constant volume regulator and the discharge opening. The baffles achieve attenuation of system noise and self-generated noise level of the terminal control unit and are also acoustically constructed to provide still further attenuation. The baffling also produces air turbulence in the low pressure chamber to enhance mixing of the hot and cold air prior to discharge, in some instances it may also be desirable to include suitable baffles in the high pressure chamber to achieve some degree of mixing in the high pressure chamber as well. In some installations the space available for the control unit is restricted so that adequate baffling cannot be provided to achieve the desired attenuation. An additional object of this invention is to achieve attenuation within a terminal control unit even where the available space is restricted. To this end a suitable arrangement for breaking up the air flow is positioned in the path of the air as it passes between the high and low pressure chambers so that the low frequency noise is converted into high frequency noise which is easier to attenuate.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the embodiments shown in the drawings, in which:

FIG. 1 is a perspective view of an embodiment of this invention;

FIG. 2 is a generally schematic, partial section view taken generally along lines 2—2 of FIG. 1;

FIG. 3 is a section view taken generally along lines 3—3 of FIG. 1;

FIG. 4 is a section view taken generally along lines 4—4 of FIG. 3;

FIG. 5 is an enlarged view of the pneumatic operating motor and its connection to the tie-bar;

FIG. 6 is a perspective view of an alternative embodiment;

FIG. 7 is a generally schematic, partial view taken along lines 7—7 of FIG. 6;

FIG. 8 is a perspective view of still another embodiment of this invention;

FIG. 9 is an enlarged section view taken along lines 9—9 of FIG. 8; and

FIG. 10 is a perspective view of one of the mixing baffles used in the high pressure chamber of the embodiment of FIG. 8.

With particular reference to FIG. 1 of the drawings, a terminal control unit 1 is illustrated as including a gen-

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erally rectangular housing 2 comprising end walls 3 and 4, opposed side walls 5 and 6, a front wall 7 and a rear wall 8. An exhaust opening 14 is provided in end wall 3 and a cold air inlet 16 and a hot air inlet 18 are provided in the opposed side walls. In the system the inlet openings are suitably connected in the duct-work. An access opening 20 is provided in front wall 7 and, as will be discussed more fully hereinafter, is normally covered by an access door 22. It will be appreciated that housing 2 can take forms other than rectangular. The interior of housing 2 is separated into a high pressure chamber 24 and a low pressure chamber 26 by horizontal partitions 28 and 30 and a constant volume regulator 32, the volume regulator will be described in detail hereinafter. As viewed in the drawings, the unit of FIG. 1 is a top exhaust and side inlet device, however, this invention can be embodied in units having other forms as will be illustrated by the discussion of the invention in connection with alternative embodiments as the specification proceeds.

Turning now to the high pressure chamber 24, a pair of valves 34 and 36 are associated with the hot and cold air inlet openings 16 and 18, respectively. The valves are moved toward and away from the inlet openings by a pneumatic motor 38 to effect various degrees of opening and closing of the inlet openings as desired. The pneumatic motor is controlled by a suitable thermostatic mechanism (not shown) in a manner well known in the art and is connected by linkage 39 to the valves. Structurally, linkage 39 includes valve carriages 40 and 42 pivotally connected at their lower ends to support frame 44 by pins 46 and having valves 34 and 36 suitably mounted to provide limited relative movement between valve and carriage to insure proper seating of the valve. The valve carriages are tied together for unitary movement by a pair of drive bars 50 and 52 which are pivotally connected to the valve carriages. A pair of valve bar links 54 (only one of which is shown in the drawings) extend from the drive bars to a tie-bar 56 carried by and movable with operating ram 59 of the pneumatic motor. With this arrangement, actuation of pneumatic motor 38 moves tie-bar 56 and this motion is transmitted through valve bar links 54 to drive bars 50 and 52. The drive bars move the valve carriages about their respective pivots to move the valves toward or away from their respective inlet openings. Accordingly, the linear motion of the pneumatic motor is transmitted to the valve members in the form of pivotal movement of the valve members, relative to the inlets, to effect simultaneous movement of both valves and alternate opening and/or closing of the valve. The hot and cold air valves, 34 and 36, move together so that either hot or cold air alone or any desired mixture thereof can be admitted into the high pressure chamber 24 as required by thermostatic control to achieve a particular temperature.

In pivoting the valve carriage to effect movement of the valve, some vertical displacement of the drive bars occurs, and this is accommodated by the pivotal connection of the valve bar links 54 to the tie-bar 56 and the drive bars and includes a front edge 60 which is angled downwardly and away from the motor. The stabilizer provides a stable bearing for tie-bar 56 as it is moved by the pneumatic motor and holds against any tendency the tie-bar may have to cock during motor actuation. During its drive stroke the ram 59 may extend beyond the stabilizer and angular face 60 is provided to insure re-engagement of the tie-bar on the stabilizer if the tie-bar becomes cocked. A stop limits movement of the ram and tie-bar toward the motor. The valve arrangement and actuating linkage therefor just described admits hot and/or cold air, in any desired proportion, into the high pressure chamber 24 where it is mixed and discharged through constant volume regulator 32 into the high pressure chamber.

Reference will now be made to FIGS. 3 and 4 for a

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more detailed description of the constant volume regulator 32. The volume regulator comprises a generally hollow rectangular housing 62 mounted on access door 22. A layer 64 of suitable insulating material is provided between the housing 62 and the access door, the insulating material conforming to that which is used within all the walls of the housing 2. Being mounted on the access door the volume regulator can be moved with the door into and out of the access opening and when assembled in the housing cooperates with partitions 28 and 30 in separating the high and low pressure chambers. As can be seen in FIG. 1, the partitions 28 and 30 terminate in spaced relation from each other and, in cooperation with the side, front and rear walls, define a restricted opening between the chambers. It is at this opening that the volume regulator is positioned so that air must pass through the volume regulator in moving between chambers. More particularly, housing 62 includes flanges 66 and 68 extending from the opposed sides thereof and arranged to fit into grooves 70 and 72 provided in the ends of partitions 28 and 30. In this manner constant volume regulator 32 slides into and out of unit 1 to position the volume control 32 at the opening defined by the spaced apart ends of baffles 28 and 30. With the volume control 32 suitably positioned, the access door 22 can be fixed in position in any well known or desired manner.

Structurally, the constant volume regulator 32 includes a pair of valve blades 74 and 76 each having one end pivotally supported from housing 62 by pins 78 and 80. The opposite or free ends of the valve blades are connected to a slide block assembly 82 by a link 84 connecting the free end of valve blade 76 to slide block assembly 82, link 84 being pivotally connected to opposed sides of the slide block assembly by a pin 86. Similarly, the free end of valve blade 74 is connected to the slide block assembly 82 by a link.

The slide block assembly 82 is positioned on a support rod 90 which is arranged generally along the central axis of housing 62. Support rod 90 carries a miter gear 92 at one of its ends and its opposite end extends into a gromet 94 mounted on a cross support bracket 96 fixed to and extending between opposed walls of housing 62. For a purpose which will be more completely described hereinafter, the end of support rod 90 which carries miter gear 92 engages a bracket 98 so that it is held against axial movement, whereas the opposite end of the support rod, which extends into and is free to rotate in the gromet, includes a threaded portion 106. A spring assembly 98 is also positioned on support rod 90 and includes relatively spaced spring seating plates 100 and 102. Plate 102 is fixed to a nut 104 which threadedly engages portion 106 of rod 90 and plate 100 abuts the end of slide block assembly 82. A compression spring 108 is seated between plates 100 and 102 and biases the slide assembly 82 towards the upper end of support rod 90 as viewed in the drawings. With this construction valve blades 74 and 76 are biased by spring 108 toward an open position as illustrated by the dotted line in FIG.

4. The flow of air in the terminal control unit is from the high pressure to the low pressure chamber or in the direction of the arrows in FIG. 4. Thus the free ends of the valve blades extend downstream or into the path of air flow and the flow of air through the constant volume regulator acts against the biasing force of spring 108 to urge the valve blades outwardly toward opposed walls 62a and 62b of the volume control housing with the degree of opening and closing being dependent on the air flow. Thus, the constant volume regulator is biased toward a full open position and will be moved toward its closed position in accordance with the flow of air therethrough to maintain the volume of air flowing through the regulator at a constant value. Preferably, valve blades 74 and 76 are metallic, e.g. stainless steel,

and have the particular advantage of being resistant to deterioration. The metallic blades provide extremely accurate volume control and, being deterioration resistant, exhibit such accurate control over an extended period of time. This will perhaps best be appreciated when it is kept in mind that constant volume regulator is intended to function primarily in maintaining a constant volume flow and not to act as an on-off damper control, although with slight modification it could serve as an on-off control.

The volume of air passing through the regulator is also determined by the biasing force exerted by spring 108 so that the volume of air to be delivered can be varied by adjusting the force exerted by the spring. This adjustment is accomplished by varying the relative position between spring seats 100 and 102 by manipulating an adjusting mechanism which is arranged for access from the exterior of the unit 1. More particularly, a shaft 112 is rotatably supported in bracket 98 and carries a miter gear 110 arranged to engage miter gear 92. The end 114 of shaft 112 extends through access door 22. Rotation of shaft 112 is transmitted through miter gears 92 and 110 to rotate support rod 90 and move plate 102 and nut 104 axially on the support rod. This varies the relative position between the spring seats and correspondingly varies the biasing force which is exerted by spring 108. Accordingly, a readily accessible mechanism is provided for adjusting the predetermined volume of air to be passed through the constant volume regulator. When adjusted the regulator is responsive to air flow therethrough to move the valve blades and vary the air flow and maintain a constant volume flow of air. With this regulator construction the range of air flow (CFM) which can be controlled is determined by spring 108. This offers the additional advantage that the range of control can be varied merely by changing the compression spring, a relatively simple procedure and a relatively inexpensive component. Accordingly, a volume control regulator of simplified and compact construction is provided which is capable of achieving precise control over volume of air delivered and which also is readily adjustable both within a given operating range (vary the biasing force of spring 108) and to achieve different operating ranges (changing spring 108).

After having passed through regulator 32 the mixed air enters low pressure chamber 26 of the terminal control unit 1. Angularly disposed baffles 116 are supported in low pressure chamber 26 in the path of the air to prevent direct passage of air from regulator 32 to exhaust opening 14, thereby interrupting the flow of air and causing it to follow a tortuous path through chamber 26. Structurally, baffles 116 are identical and only one will be described. The baffle comprises a fiber glass body 118 built up on metal frame 120, it being appreciated that other materials can be used for the baffle provided they possess the requisite acoustical properties to attenuate noise. In addition to noise attenuation, the baffles create turbulence in the low pressure chamber to achieve a mixing of hot and cold air. Each baffle is supported from a bracket 122 and exhaust opening 14 can discharge directly into the area to which the air is being delivered or, alternately, it can be connected to an outlet by suitable duct-work.

This invention is not limited to use in a terminal control unit having any particular arrangement of inlet and/or exhaust openings and FIGS. 6 and 7 illustrate another form which it may take. More particularly, terminal control unit 130 includes a rectangular housing 132 having hot and cold air inlets 134 and 136 positioned in end wall 135 and exhaust opening 138 provided in side wall 137. The same actuating mechanism, the pneumatic motor and its connecting linkage, is utilized to effect movement of the hot and cold air valves into and out of engagement with their respective inlets; it will be noted that a slight modification of the valve carriage is necessary to accommodate the different position of

the inlet however they may be considered, for practical purposes, as being equivalent structures. Referring to FIGS. 2 and 7, it will be noted that the linkage connecting the valves is so arranged that it translates the motion of the pneumatic motor in such a manner as to make that motion usable in controlling both a side and an end inlet construction. More particularly, the motion of the linkage is generally parallel to the end wall of the terminal control unit housing and this motion is effective to produce pivotal movement of the valves toward and away from their respective inlets whether those inlets be provided in the side or end walls. The same actuating mechanism can be used in both constructions and occupies the same general position in both, thus affording the particularly desirable advantages of achieving a measure of standardization in terminal control unit construction in that the same valve actuating linkage is usable with two common inlet arrangements and the further advantage of facilitating assembly procedures and reducing inventory.

Structurally hot and cold air valves 34a and 36b are suitably supported (again to insure proper valve seating) on valve carriages 139 and 140 which are pivotally supported on drive bars 50a and 52a. The drive bars interconnect the valve carriages for unitary pivotal movement, about their connection to fixed housing member 44a, toward and away from inlet openings 134 and 136. The drive bars are connected to pneumatic motor 38a by links 54a connected to the operating ram of the pneumatic motor by a connection identical to that described in connection with FIG. 5. A stabilizer bracket 58a is positioned adjacent the tie-bar to prevent misalignment of the tie-bar during actuation of the pneumatic motor. The pneumatic motor is thermostatically controlled and moves valves 34a and 36a toward and away from their respective inlets to admit hot and/or cold air into the low pressure chamber in any desired proportion to achieve a particular air temperature. The hot and cold air is admitted into low pressure chamber 24a, mixed and then passes from that chamber through constant volume regulator 32a, which is identical in construction to that described in relation to terminal control unit 1, into low pressure chamber 26a.

Another possible low pressure chamber baffle arrangement is illustrated in connection with terminal control unit 130 and comprises a baffle 142 having its downstream end 148 connected to front wall 150 of housing 132 by bracket 152 and extends angularly from the front wall toward rear wall 154 of the housing. The downstream end 156 of baffle 142 terminates in spaced relationship from rear wall 154 and the ends 158 and 160 of the baffle are also positioned in spaced relationship from the inner walls of the housing so that air passing from regulator 32a must follow a path around and over the baffle before it is discharged through opening 138.

The terminal control unit 162 of FIG. 8 illustrates yet another form of unit in which this invention may be incorporated. A thermostatically controlled valve operating mechanism 164 is positioned in a high pressure chamber 166 and is identical to that described in relation to the embodiment of FIG. 1 and will not be specifically described at this point. Mechanism 164 controls the opening and closing of inlets 168 and 170 to admit a desired mixture of hot and cold air into the high pressure chamber. Similarly, the constant volume regulator 32c is identical to that which was described in connection with the embodiment of FIG. 1, except for the provision of a converter 172 which will be described more particularly hereinafter, and accordingly the regulator will not be specifically described. However, the baffle arrangement in low pressure chamber 174 is different from those described in connection with FIGS. 1 and 6. More particularly, a baffle 176 is generally in the form of an inverted V having its apex positioned generally directly above the discharge end of the volume regulator 32c. Baffle 176

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comprises a fiber glass body 178 built on a metal frame 180 which, as can be seen in FIG. 8, extends beyond the ends of the body 178. This construction is particularly useful in assembly in that the front and rear walls 182 and 184 of the housing are provided with openings (not shown) conforming generally to the formed shape of metal frame 180 for receipt of the extensions of the metal frame. With the frame 180 so positioned the fiber glass body is in engagement with and extends between walls 182 and 184. This construction greatly facilitates assembly while affording positive and accurate location of the baffle in the low pressure chamber.

The ends of baffle 176 terminate in spaced relationship from opposed end walls 186 and 188 to define passages 190 and 192. A pair of auxiliary baffles 194 and 196 are connected in spaced relation from and extend angularly from end walls 186 and 188 and are arranged generally parallel to the upper surfaces of baffle 176 and complete a baffle arrangement defining a tortuous path through the low pressure chamber. The auxiliary baffles distribute the air to achieve an air discharge of a more uniform temperature through outlet opening 198.

As was stated above, the baffling in the low pressure chamber provides some attenuation of the internal noise generated by the flow of air through terminal control unit. The acoustical construction of the baffles contribute to this noise reduction. The arrangement of FIG. 8 illustrates the type of terminal control unit used where the available space is restricted, i.e. the space available does not permit a unit having the height of either of the devices illustrated in FIGS. 1 or 6. The restricted height places a limitation on the baffling which can be used and correspondingly restricts the degree of attenuation which can be achieved in the low pressure chamber. In order to provide for satisfactory attenuation even where the overall height is restricted, a baffle or converter assembly 172 is provided in the path of air as it flows between the high and low pressure chambers. More particularly, the converter 172 extends over the discharge end of regulator 32c and comprises a plurality of relatively spaced vanes 200 supported in a rectangular frame 202 positioned at the discharge end of the regulator. Vanes 200 present sharp edges to the air as it is discharged from the regulator 32c, and effectively break up the air flow pattern as it enters the low pressure chamber. By breaking up the air flow pattern low frequency noise is converted into high frequency noise which is substantially easier to attenuate.

The terminal control unit of FIG. 8 also illustrates the use of a baffling arrangement in the high pressure chamber to insure a thorough mixing of the air. Baffles 206 and 208 are supported in the high pressure chamber intermediate the inlet openings and the constant volume regulator 32c so that the flow of air is interrupted and a portion of the air is redirected before passing through the regulator to achieve a further mixing of the hot and cold air. Each baffle, see FIG. 10, includes an angular edge 210 and 212 and is suitably connected to the partitions which divide the terminal control unit into high and low pressure chambers, being mounted immediately adjacent the opening provided for the regulator 32c.

Terminal control units constructed in accordance with this invention provide an effective, thermostatically controlled mixing of hot and cold air to achieve a desired temperature with the mixing of the air being accomplished through a highly versatile operating arrangement which is not limited to any one type of construction. The delivery of the mixed air is accurately controlled by a constant volume regulator of particularly advantageous construction; it is completely resistant to deterioration; it is readily adjustable from exteriorly of the terminal control unit so that adjustment within a given range can be achieved without disassembly of the unit, but should the constant volume regulator have to be removed, for any reason, this too is facilitated by mounting the con-

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trol on the access door; it affords accurate control within a given control range; and is constructed such that the component parts thereof are readily accessible for changing the operating range by replacement of the biasing spring. Furthermore, the construction provides optimum noise attenuation regardless of the space available for the unit.

Although this invention has been illustrated and described in connection with particular embodiments thereof, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What we claim is:

1. Apparatus of the type described comprising, in combination,
 - means defining an enclosure,
 - an access opening in said enclosure,
 - an access panel releasably connected to said enclosure at said access opening,
 - partition means within and dividing said enclosure into first and second chambers,
 - means defining relatively spaced inlets in said first chamber for ingress of a fluid medium,
 - means defining an exhaust in said second chamber for egress of said fluid medium,
 - flow control means connected to said access panel for movement therewith and positioned at said partition means for providing a passage for said fluid medium between said first and second chambers and operative to maintain a constant volume flow of said fluid medium therethrough,
 - means extending from a point exteriorly of said enclosure through said access panel for support from said access panel and connected to said flow control means to adjust said flow control means to vary the volume of flow which will be maintained constant by said flow control means,
 - valve means,
 - means for pivotally mounting said valve means adjacent each of said inlets for movement toward and away from said inlets,
 - and actuating means for moving said valve means toward and away from said inlets including motor means and means connecting said valve means to said motor means for joint movement relative to said inlets, said connecting means also arranged to connect said valve means to assume a first position wherein one of said inlets is closed and the other inlet is open and a second position wherein said one inlet is open and said other inlet is closed and for movement between said first and second positions.
2. The apparatus of claim 1 wherein said flow control means includes converter means positioned at the discharge end thereof for interruption of said fluid medium as it is discharged from said flow control means into said second chamber to convert low frequency noise into high frequency noise.
3. The apparatus of claim 2 wherein said converter means comprises a plurality of relatively spaced vanes arranged parallel to said flow and presenting sharp edges to and breaking up the flow of said fluid medium.
4. The apparatus of claim 1 wherein said enclosure includes end and side walls and wherein said actuating means includes a connecting member extending between and connecting said valve means for joint movement and means connecting said member to said motor means and supporting said member for movement generally parallel to said end wall in response to actuation of said motor means.
5. The apparatus of claim 1 including baffle means within said first and second chambers with the baffle means in said first chamber arranged intermediate said inlets and said flow control means to divert the direct flow of air between said inlets and said flow control means and

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the baffle means in said second chamber is positioned between said flow control means and said exhaust to thereby insure thorough mixing before and after passage through said flow control means.

6. Apparatus of the type described comprising, in combination,

means defining an enclosure,
an access opening in said enclosure,
an access panel releasably connected to said enclosure at said access opening,

partition means within and separating said enclosure into first and second chambers,
relatively spaced inlets in said first chamber and an exhaust in said second chamber,

said partition means including means defining a restricted opening between said first and second chambers, flow control means positioned at said restricted opening and means providing a releasable connection between said flow control means and said means defining said restricted opening, said flow control means mounted on said access panel for movement therewith into and out of registry with said restricted opening and including metallic, rigid valve means disposed in the path of flow through said flow control means and said flow control means being operative to maintain a constant volume of flow through said flow control means,

means extending from a point exteriorly of said enclosure through said access panel for support from said access panel and connected to said flow control means to adjust said flow control means to vary the volume of flow which will be maintained constant by said flow control means,

valve means pivotally mounted adjacent each of said inlets for movement toward and away from said inlets,

and actuating means for moving said valve means toward and away from said inlets including motor means, first means connecting said valve means for joint movement, and means connecting said first means to and for movement in response to said motor means, said first means arranged relative to said inlets to connect said valve means to assume a first position wherein one of said inlets is closed and the other of said inlets is open to a second position wherein said one inlet is open and said other inlet is closed and for movement between said first and second positions.

7. Apparatus of the character described comprising, in combination,

an enclosure having end and side walls,
an access opening in one of said walls,
an access panel releasably connected to said one wall at said access opening,

partition means within and separating said enclosure into first and second chambers,
relatively spaced inlets in said first chamber and an exhaust in said second chamber,

said partition means including partitions engaging said enclosure and positioned in relative spaced relation to define with said enclosure a restricted opening between said first and second chambers and flow control means positioned in registry with said restricted opening, said flow control means connected to said access panel for movement therewith,

means providing a sliding connection between said flow control means and said partitions so that said flow control means is movable with said access panel into and out of registry with said restricted opening,

valve means adjacent each of said inlets,

and actuating means for moving said valve means toward and away from respective ones of said inlet openings, said actuating means including a valve support member connected to each of said valve means and pivotally mounted in said enclosure ad-

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jacent each of said inlets, motor means, an elongated member arranged to extend generally parallel to said end wall and connecting said valve supports for joint movement relative to said inlets, and means connecting said member to said motor means for movement generally parallel to said end wall in response to actuation of said motor means, said member arranged relative to said inlets to connect said valve means to assume a first position wherein one of said inlets is closed and the other is open to a second position wherein said one inlet is opened and said other inlet is closed and for movement between said first and second openings.

8. The apparatus of claim 7 wherein said flow control means includes valve means positioned in the path of flow through said flow control means between said first and second chambers and including a rigid valve member and means mounting said valve member in the path of and for movement in response to said flow between a first position generally parallel to said flow and a second position generally normal to said flow, said valve means also including means biasing said valve member to said first position and arranged so that movement of said valve member from said first position is against said bias, and means extending exteriorly of said access panel for adjusting said biasing force.

9. Apparatus of the character described comprising, in combination,

means defining an enclosure,
an access panel releasably mounted at an access opening in said enclosure,

partition means within and separating said enclosure into first and second chambers,

means defining at least one inlet in said first chamber, means defining an exhaust opening in said second chamber,

flow control means connected to said access door for movement therewith and positioned at said partition means for providing a passage for air between said first and second chambers and operative to maintain a constant volume flow of air therethrough,

means extending from a point exteriorly of said enclosure through said access panel for support from said access panel and connected to said flow control means to adjust said flow control means to vary the volume of flow which will be maintained constant by said flow control means,

valve means positioned adjacent said inlet, actuating means for moving said valve means toward and away from said inlet to open and close said inlet opening,

baffle means mounted in said second chamber between said flow control means and said exhaust opening to interrupt direct flow of air therebetween so that air follows a tortuous path in said second chamber prior to egress through said exhaust opening, and baffle means in said first chamber mounted between said inlet opening and said flow control means to divert the direct flow of air between said inlet opening and said flow control means.

10. The apparatus of claim 9 wherein said baffle means in said second chamber comprises,

a frame,
a body of acoustical material on said frame arranged in spaced relation from opposed ends of said frame, and means defining openings in said enclosure conforming to said frame so that said frame is receivable therein to mount said baffle means.

11. In a terminal control unit having an enclosure and inlet and outlet openings in said enclosure, the combination of,

partition means arranged in and separating said enclosure into first and second chambers with said inlet opening in one and said outlet opening in the other of said chambers,

an access door releasably supported at an access opening in said enclosure,
 said partition means including flow control means connected to said access door for movement therewith and operative to maintain a predetermined constant volume flow of fluid between said first and second chambers,
 and means extending from a point exteriorly of said enclosure through said access panel for support from said access panel and connected to said flow control means to adjust said flow control means to vary the volume of flow which will be maintained constant by said flow control means.

12. Apparatus of the type described comprising, in combination,
 means defining an enclosure,
 an access opening in said enclosure,
 an access panel releasably connected to said enclosure at said access opening,
 partition means within and dividing said enclosure into first and second chambers,
 means defining relatively spaced inlets in said first chamber for ingress of a fluid medium,
 means defining an exhaust in said second chamber for egress of said fluid medium,
 flow control means connected to said access panel for movement therewith and positioned at said partition means for providing a passage for said fluid medium between said first and second chambers and operative to maintain a constant volume flow of said fluid medium therethrough, said flow control means including rigid valve means positioned in the path of said fluid medium, means mounting said valve means to normally assume a first position generally parallel to the flow of said fluid medium and for movement transversely of said path in response to said fluid medium flow so that said valve means is movable in said passage to vary the degree of obstruction thereof and maintain a predetermined constant volume flow of fluid medium between said first and second chambers, means biasing said valve means toward said first position and arranged so that movement of said valve means from said first position is against said bias, and means extending exteriorly of said access panel and connected to said biasing means for adjusting said biasing force,
 second valve means,
 means for pivotally mounting said second valve means adjacent each of said inlets for movement toward and away from said inlets,
 and actuating means for moving said second valve means toward and away from said inlets including motor means and means connecting said second valve means to said motor means for joint movement relative to said inlets, said connecting means also arranged to connect said second valve means to assume a first position wherein one of said inlets is closed and the other inlet is open and a second position wherein said one inlet is open and said other inlet is closed and for movement between said first and second positions.

13. In apparatus of the type described having first and second generally aligned inlet openings arranged in relative spaced relation, the combination of,
 an enclosure having end and side walls,
 valve means pivotally supported from said end wall adjacent each of said inlet openings for movement toward and away from said inlet openings.
 motor means having a generally linear output,
 first connecting means comprising a pair of relatively spaced parallel elongated bars extending generally parallel to said end wall between said inlet openings and connecting said valve means for joint movement and arranged to connect said valve means to assume a first position wherein said first inlet opening is open

and second inlet opening is closed, a second position wherein said first inlet opening is closed and said second inlet opening is open and for movement between said first and second positions,
 second means including tie bar means extending between and connecting said parallel bars and connecting said first connecting means for movement by said motor means in said direction,
 and including stabilizing means adjacent said motor means and arranged for engagement with said tie bar to provide a bearing for and prevent misalignment of said tie bar upon movement by said motor means.

14. A constant volume regulator for controlling the flow of a fluid medium and comprising, in combination, walls defining a passage unobstructed except for rigid, metallic, imperforate valve means and the support and adjusting mechanism therefor disposed in said passage,
 means supporting said valve means in said passage for movement, in response to flow through said passage, transversely of said path of flow toward said walls with the relative spacing between said walls and said valve means determining flow through said passage, said means further effective to support said valve means to assume a first position generally parallel to said path of flow wherein said passage is open and flow therethrough is substantially unobstructed and for movement from said first position to reduce the relative spacing between said valve means and said walls to obstruct said flow and maintain said flow at a substantially constant predetermined value, means connected to and exerting a predetermined force on said valve means in opposition to said transverse valve means movement,
 and means operatively connected to said last mentioned means and extending exteriorly of said constant volume regulator for adjusting said predetermined force to vary said constant value.

15. A constant volume regulator comprising, in combination,
 means defining a generally rectangular in cross section elongated passage for flow of a fluid medium therethrough,
 rigid, imperforate, generally rectangular valve means disposed within said passage and extending normal to one set of opposed walls of said passage and parallel to the other set of opposed walls of said passage, means supporting said valve means in said passage with a marginal edge of said valve means directed into the flow through said passage and for movement of said valve means, in response to said flow, transversely of said flow about a point downstream of said marginal edge, the relative spacing between said marginal edge and said passage walls determining flow through said passage, said means further effective to support said valve means to assume a first position generally parallel to said flow wherein said passage is substantially unobstructed and for movement from said first position transversely of said path to reduce the relative spacing between said marginal edge and said passage walls to obstruct said flow and maintain said flow at a substantially predetermined value,
 means biasing said valve means toward said first position and opposing movement of said valve means transversely of said flow,
 and means operatively connected to said biasing means for adjusting said force.

16. The constant volume regulator of claim 15 wherein said valve means comprises a pair of generally rectangular valve members each disposed in said passage with a marginal edge thereof directed into said flow and support for pivotal movement about a point downstream of said marginal edges,
 a support member extending longitudinally of said passage,

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means connecting said valve means to said support member for sliding movement thereon to move said marginal edges toward and away from said other set of passage walls,

and spring means mounted on said support member and connected to said valve means to bias said valve means toward said first position. 5

17. The constant volume regulator of claim 15 including means at the discharge end of said restricted passage for interrupting said fluid medium as it is discharged from said passage and operative to convert low frequency noise into high frequency noise. 10

18. The constant volume regulator of claim 17 wherein said noise converting means comprises a plurality of relatively spaced vanes arranged generally parallel to the flow of said fluid medium to present sharp edges to said fluid medium. 15

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