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[54] **COMBINATION VALANCE AND CONDITIONED AIR ADMISSION DUCT**

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[51] **Int. Cl.** **F24f 13/06**

[58] **Field of Search** ..... 98/40 D, 40 C, 40 N, 98/37, 40 R, 98, 88, 90; 52/710, 303, 37

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[57] **ABSTRACT**

In a structure adapted for human habitation there is provided in the ceiling of a room an elongated aperture parallel to and closely adjacent to a wall, particularly an outside wall provided with a window with which there may be associated a drapery. Depending from the ceiling paralleling and adjacent to the sides of the aperture are shallow and deep boards or panels, the former being located between the drapery and the aperture, and the latter being on the other side of the aperture. Above the ceiling and in communication with the aperture in the ceiling there is a plenum chamber to which is connected a duct for supplying heated, cooled or otherwise controllably conditioned air to the plenum chamber and through the aperture in the ceiling into the room. The depth of the shallower of the panels is preferably such as to overlap by a small amount the top of the drapery and thereby to serve as a baffle to direct the flow of air downwardly along the room side of the drapery rather than to permit the air to enter the space between the drapery and the window. The depth of the deeper board or panel is largely a matter of aesthetics, since it functions to serve as a valance and conceal from view the shallow baffle board and the aperture in the ceiling, except when the point of viewing is more or less directly below the valance boards, as well as serving the function of confining the initial flow of air to a downward direction along the wall. The aperture may be provided with adjustable baffle vanes for controlling the amount of air admitted into the room through the orifice.

8 Claims, 3 Drawing Figures

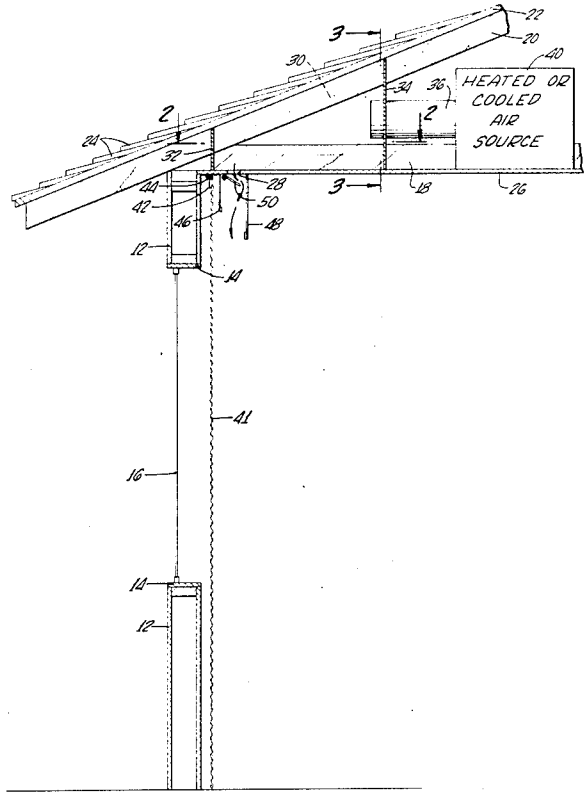
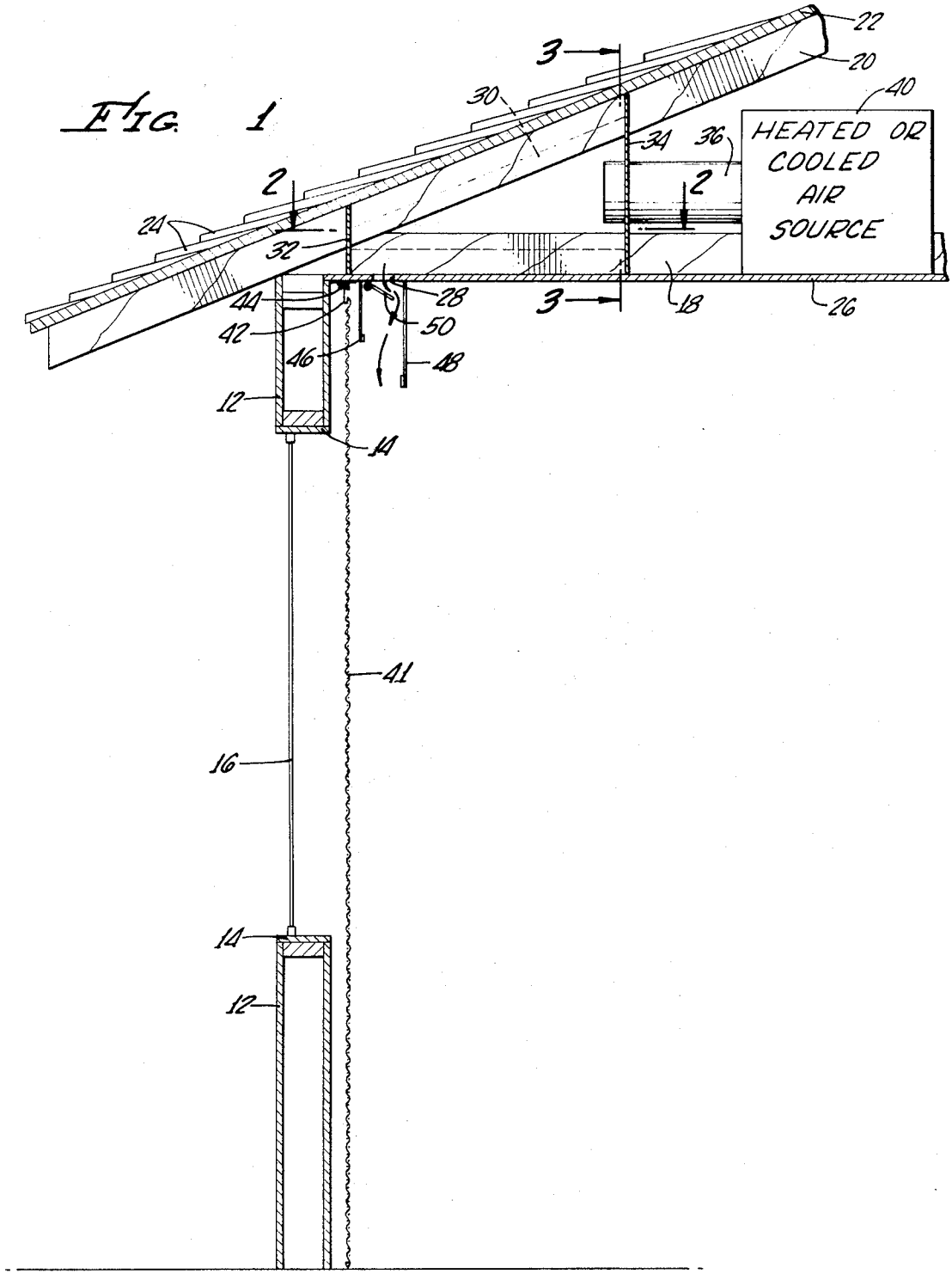


FIG. 1



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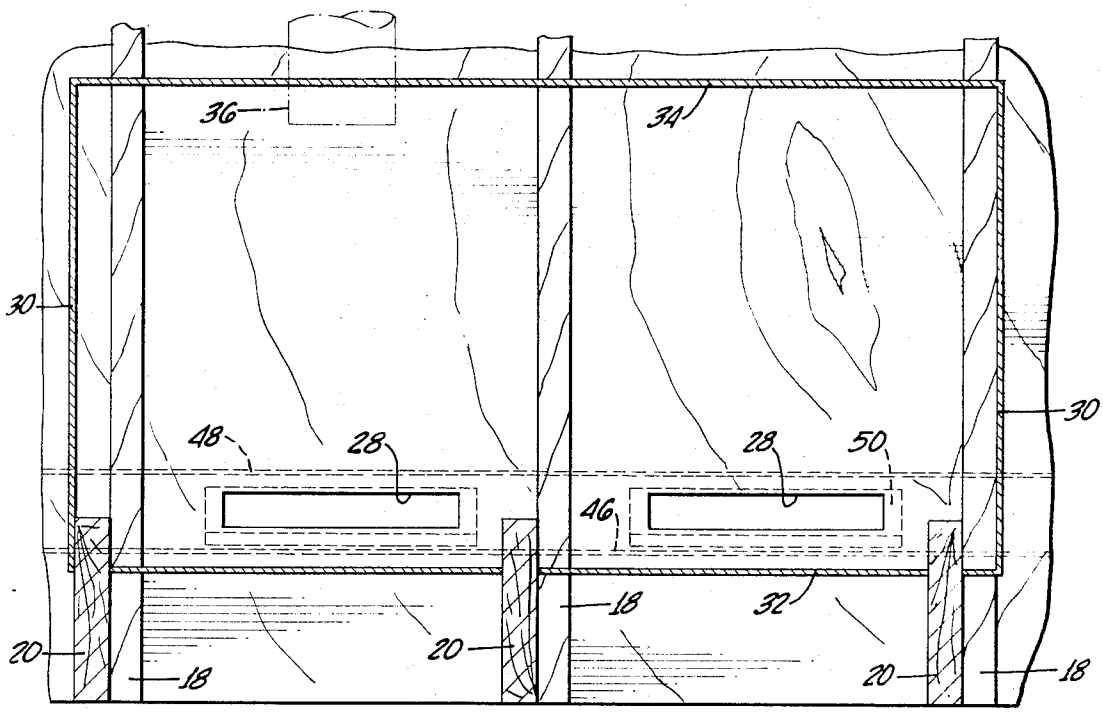
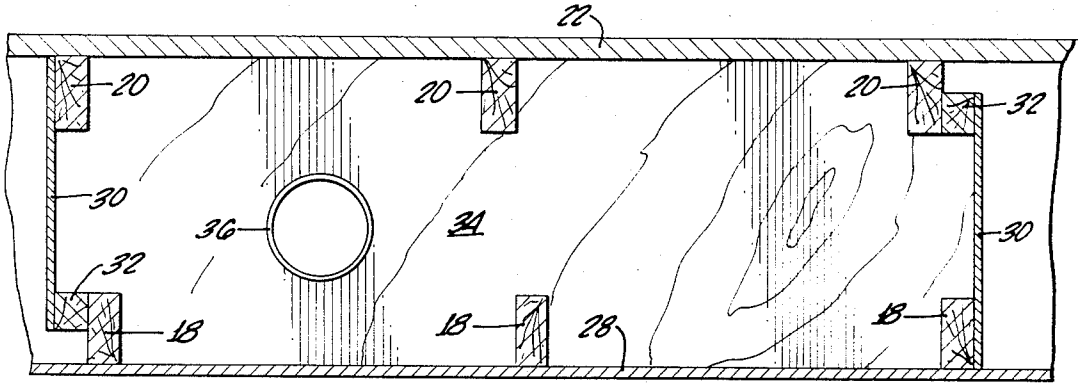


FIG. 2.

FIG. 3.



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COMBINATION VALANCE AND CONDITIONED AIR ADMISSION DUCT

BACKGROUND OF THE INVENTION

The heating of rooms in structures adapted for human habitation has generally involved any of three heating methods, one being the circulation of heated liquids in closed piping systems with radiation structures associated with the piping at the points where heat is to be diffused; another being the admission of heated air through one or more diffusers into a room; still another being electrical resistance unit heating with or without a blower for causing a flow of air past the heating unit. It has been considered good practice to locate the heat emitter along a part at least of the perimeter of the room, preferably along an outside wall of the room and especially below a window in an outside wall where the temperature inside the room is most likely to be affected adversely by the outside temperature, whether the result be a warming or a cooling of the inside room temperature.

Baseboard heaters, of aesthetically pleasing appearance and having built in tubes for circulating water heated at a central point in a furnace have been employed to a considerable extent. These are reasonably satisfactory where the structure has a basement or a crawl space below the ground floor of the structure affording access to the piping associated with the baseboard heating system. However, with the currently widely used concrete slab which supports a dwelling, necessitating as it does that the pipe connections to the baseboard heating units be embedded in the concrete, there arises the possibility of costly and messy repairs in the event of the occurrence of leakage in the embedded piping. These possibilities are also present in the case of so-called radiant heating, in which the pipes for conducting the heated liquid are embedded in the poured concrete floor to heat the room by heating the concrete itself.

The concrete slab type of foundation for a dwelling is not well suited to perimeter heating at the baseboard level using forced hot air as the heating medium because the concrete slab will not readily accommodate ducts of sufficient cross-section to conduct the necessary amounts of heated air, and unless such ducts are made of relatively heavy metal, much heavier than the usual hot air heating ducts, they are likely to be crushed and blocked off by the fluid concrete as it is being poured.

It has generally been the custom, in the case of dwellings built on concrete slabs or dwellings having only a crawl space beneath their ground floors, to provide diffusers for heated air in the walls or the ceilings of rooms, the ducts lying in the space between studs in the case of wall diffusers, between joists in the case of ceiling diffusers for rooms other than top floor rooms in dwellings, and in attics in the case of single story dwellings or the top floors of multiple story dwellings. In the case of wall diffusers it has not been feasible to locate them strategically relative to windows, and whether they have been located in walls or ceilings the diffusers have detracted from the overall pleasing effect created by tastefully selected furnishings for the room.

SUMMARY OF THE INVENTION

Because of the very prevalent custom of providing the windows on outside walls of dwellings with draperies hung on traverse rods, whereby the draperies may be drawn back to expose the window and admit light or may be drawn into place covering the window to keep out light, heat or cold and also to afford privacy, and because it is an equally prevalent custom to associate with such a drapery a valance as long as the span of the drapery for concealing the rod from which the drapery is suspended, when the drapery is open, it is proposed, in accordance with the present invention, to combine with such a valance a conditioned air diffuser. In the preferred embodiment of the invention the diffuser comprises an elongated relatively narrow aperture in the ceiling of the room, its extent, whether it be a single continuous aperture or a plurality of aligned apertures, being generally at least equal to the width of the window. Apertures extending along substantially the entire exterior wall permit lower velocity of the air flowing into the room thereby creating less of a drafty feeling, while at the same time providing an effective conditioned air shield along a greater portion of the exterior wall. The width is preferably substantially as great but not greater than the distance spanned by the draperies associated with the window. Above the ceiling of the room, in the case of a single-story dwelling in the attic, a plenum chamber is located above and in communication with the aperture or aligned apertures in the ceiling and an air supply duct for supplying heated or cooled air to the plenum from a heating or air conditioning unit is provided. Between the drapery and the aperture or apertures a shallow baffle board depends from the ceiling, its principal function being to direct air emerging from the aperture downwardly from the aperture and to serve as a baffle to block a flow of air over the top of the drapery and into the space between the drapery and the window.

Along the opposite side of the aperture or apertures, the side toward the center of the room, a valance board depends from the ceiling. Its depth is preferably sufficient to conceal from view the shallower baffle board, which itself conceals the drapery rod, but more importantly the valance board conceals the air diffuser from view except when such viewing is done directly upwardly from below the valance board, and directs the air downward along the exterior wall.

With this structure, there is achieved the very desirable result of establishing a layer of conditioned air along the exterior wall between the window and the room, whether or not the drapery is drawn into position to conceal the window, and thereby the comfort in the room is enhanced. The valance board, in addition to concealing the components as hereinbefore mentioned, also directs the flow of air downwardly and assists in creating the wall of conditioned air between the window and the room.

If desired, a valance of fabric, matching the drapery and pleated to create a pleasing appearance, may be attached to the valance board, thereby concealing the valance board itself and producing the familiar combination of a drapery and a matching valance. In accordance with the preferred embodiment of the invention, the aperture or apertures in the ceiling may be provided with one or more adjustable closure vanes by means of which the quantity of conditioned air admitted to the room through the aperture or apertures may be controlled.

DESCRIPTION OF THE DRAWINGS

For a complete understanding of the invention reference may be had to the following detailed description to be interpreted in the light of the accompanying drawings wherein:

FIG. 1 is a vertical sectional view of a portion of a room, attic and roof of a residential structure;

FIG. 2 is a horizontal sectional view taken generally on the line 2—2 of FIG. 1; and

FIG. 3 is a vertical sectional view taken generally on the line 3—3 of FIG. 1.

DETAILED DESCRIPTION

Referring now to the drawings and particularly to FIG. 1, the reference numeral 12 designates an outside wall of an inhabitable structure such as a dwelling. At the point at which the sectional showing of FIG. 1 is taken, the wall 12 is provided with framing 14 for a window 16.

At its top, the wall 12 supports an end of each of a plurality of ceiling joists 18, the other end of each joist being supported by another wall (not shown) of the structure. At its upper end, the wall 12 also supports a plurality of rafters 20 which slope downwardly from a ridge (not shown) and may extend beyond the wall as shown in FIG. 1, forming an eave. The rafters 20 support sheathing 22 which encloses the attic of the structure and which in turn supports finished surfacing, such as the shingles 24. The joists have attached to the lower surfaces thereof the ceiling 26 which may be of any conventional form, such as lath and plaster or plasterboard panels, sometimes called gypsum board or drywall panels.

Joists and rafters are usually uniformly spaced, sometimes on 16-inch centers, sometimes on 24-inch centers and the upper surface of the ceiling structure is exposed to view between the joists in the attic, although it is a common practice to fill the space between joists with insulating material.

In order to admit controllably conditioned air, conditioned as to temperature and if desired as to moisture content, to the room from the attic in the vicinity of the window 16 the ceiling may be provided with elongated apertures 28 located near and extending parallel to the wall 12 and generally above the window 16. If the window is of greater width than the space between two adjacent joists 18, two or more aligned apertures in the ceiling, each confined within the space between two adjacent joists, may be provided as shown in FIG. 2. Each such aperture may be as long as the distance between two adjacent joists or shorter as desired. It is considered preferable to provide separate aligned apertures as indicated in FIG. 2 rather than to continue the aperture through the ceiling at a point where it crosses beneath a joist, since the joist itself would be a discontinuity and would divide the aperture into parts so far as its effectiveness in passing air into the room is concerned.

In order to provide for the admission of air into the room from the attic, a plenum chamber is provided above and in communication with the apertures 28 in the ceiling. A simple form of plenum chamber is shown in the drawings and may be constructed of panels of plywood, particle board or fiber board. It is comprised of generally triangularly shaped side panels 30 attached to the outer surfaces of joists 18 and rafters, furring or spacing strips 32 of a thickness corresponding to the thickness of the joists 18 and the rafters 20 being required along one edge of each of the panels 30 because of the offset between each joist 18 and the rafter 20 above it, since the two lie side by side above the wall 12. In some roof structures prefabricated trusses are employed to support the roof instead of separately applied joists and rafters, and some trusses are so constructed that the tie-beam or joist lies in the plane of the rafter beam. In a roof constructed in this way the spacer or furring strips 32 would not be required, since the triangular panels 30 would lie flat against the horizontal and inclined beams of the truss. The two panels 30 are the end panels for the plenum chamber.

Between the top of the wall, which is usually hollow, and the aperture 28 in the ceiling a closure panel 32 is installed, spanning the space between adjacent joists and rafters. The panel 32 stands vertically between the upper surface of the ceiling 26 and the lower surface of the sheathing 22, and the tips of the triangular plates 30 may be cut off so that the small ends of the panels 30 shall have surface-to-surface contact with the closure panel 32.

On the opposite side of the aperture or apertures 28 in the ceiling from the closure panel 32, and at any desired distance therefrom the plenum chamber is completed by a second closure panel 34 which extends vertically from the upper surface of the ceiling 26 to the lower surface of the sheathing 22 and has surface-to-surface contact with the inner or large ends of the triangular end panels 30 of the plenum chamber. The closure panel 34 may be notched as necessary, at the corners and also intermediate its ends to permit it to be fitted to the joists and rafters to provide a substantially completely enclosed plenum chamber.

The closure panel 34 is provided with an orifice for the entry into the plenum chamber of a duct 36 from a source 40 of heated or cooled or otherwise conditioned air, under pressure provided by a suitable blower. Although the conditioning unit 40 has been shown as being located in the attic it will be understood that it may be located at any appropriate place in the dwelling and connected by the duct 36 to the plenum chamber.

As shown in FIG. 1, the window 16 may be provided with a drapery 41 suspended by hooks 42 mounted in a track 44 which is shown in FIG. 1 as being secured to the ceiling, although traverse tracks or rods for draperies are sometimes secured to the wall a short distance below the ceiling. It will be understood that drapery traverse hardware may be provided for moving the drapery back and forth on the track 44 to conceal or reveal the window.

Between the drapery 41 and the aperture 28 through which conditioned air is admitted to the room, there is secured to the ceiling a baffle board or panel 46. The board 46 may be of any relatively stiff material such as wood, plywood, fiber board or metal. Its principal function is to serve as a baffle to direct air admitted into the room through the aperture 28 downwardly and prevent the conditioned air from passing across the top of the drapery 41 and downwardly into the space between the drapery and the window when the drapery is drawn into position to conceal the window. Accordingly, its depth need be such as to extend a short distance below the top of the drapery 41. Being mounted in close proximity to the drapery traverse track 44 it also conceals the

track and drapery hooks from view except from a viewing point almost directly below the track **44.** The length of the baffle board **46** is largely a matter of choice. In order to serve as a baffle it should at least be coextensive with the aperture or apertures **28** in the ceiling. If it is also to serve the purpose of concealing the drapery traverse track **44,** it should at least be coextensive with that track.

On the opposite side of the aperture **28** from the baffle board **46** a valance board **48** is secured to the ceiling. The valance board **48** conceals the aperture **28** from view except from a viewing point generally directly below the aperture **28** and it is shown as being deeper than the baffle board **46,** for the purpose of concealing the board **46** from view from anywhere in the room except a narrow zone in the vicinity of the wall **12.** The valance board **48** also serves the additional purpose of directing air entering the room through the aperture **28** downwardly into the room rather than across the lower surface of the ceiling **26.**

The length of the valance board **48** is, as in the case of the baffle board **46,** a matter of choice. As in the case of any valance it should be long enough to conceal those things that may be unpleasing to the sight. The ceiling apertures **28,** the baffle board **46** and the drapery traverse track **44** and hooks **42** may fall into this category. It should be noted that if the window is not provided with a drapery, the baffle board **46** may be omitted.

It will be understood that the valance board **48** may be ornamented as desired to give it an attractive appearance. For example, it may be painted or otherwise decorated to harmonize with the ceiling or furnishings in the room. It may be covered with fabric matching or harmonizing with the fabric of the drapery, and it may have attached to its face a frontal in the form of a pleated hanging of fabric matching that of the drapery **41,** thereby achieving the appearance of the usual valance for a drapery.

Since it is desirable to be able to control the amount of air entering the room, there may be attached to the ceiling hinged damper of closure vanes **50** for the aperture or apertures **28.** The hinge mountings for the vanes **50** are preferably friction hinges so that the vanes **50** will remain in any positions to which they are adjusted.

It will be understood that there are many ways of implementing the combination air diffuser and valance structure within the contemplation of the invention. For example, the shallow and deep boards **46** and **48** may be interconnected so as to be attachable to the ceiling **26** as a unitary structure. The air admission apertures **28** may receive heat diffuser elements, made of metal or perhaps plastic, and including the damper or deflector vanes **50.** In fact, a unitary structure comprising a diffuser with control vanes and the boards **46** and **48** might be installable into the apertures **28** in the ceiling. Also a complete plenum chamber, of sheet metal or other suitable material, might be installed as a unit in the attic above the aperture **28,** or the duct **36** might be fitted with an adapter conformed to the configuration of the aperture or apertures **28,** thereby eliminating the plenum chamber.

It should be noted that in the drawings the invention has been implemented in relation to the delivery of air in the proximity of a wall that supports and accordingly extends at right angles to the joists and rafters. The invention is, of course, applicable to the delivery of air adjacent to a wall which parallels the joists and the rafters. In that case, the aperture would parallel the joists and a differently constructed plenum chamber would be employed.

What is claimed is:

1. A combination air emitter and valance for a room having walls and a ceiling which comprises:

an overhead chamber associated with the ceiling and having at least a portion thereof in a position of close proximity to a wall;

an elongated aperture in the chamber facing downwardly in close proximity to the wall and paralleling the wall for venting the chamber to the room;

means for generating a flow of air from the chamber through the aperture and into the room;

a suspended valance member adjacent to the side of the aperture most remote from the wall for optimum concealment of the aperture from view within the room;

a drapery and means for suspending the drapery between the aperture and the wall to which the aperture is adjacent; and

a baffle member extending downwardly between the aperture and the drapery suspending means for minimizing entry of air emitted from the aperture into the space between the drapery and the wall and for concealing the drapery suspending means.

2. Apparatus in accordance with claim **1** in which the depth of the valance member exceeds that of the baffle member sufficiently to afford optimum concealment of the baffle member from view within the room.

3. Apparatus in accordance with claim **1** including means associated with the aperture for varying its air emitting capability below a predetermined maximum.

4. Apparatus for supplying treated air to a ceilinged room from above comprising:

a plenum chamber disposed above the ceiling of the room and in communication with the room through an elongated aperture in the ceiling of the room adjacent to a wall of the room with the major axis of the aperture generally parallel with said wall;

a duct for admitting treated air under pressure to said plenum chamber;

a baffle member at least co-extensive with the aperture extending downwardly from the ceiling adjacent to the edge of the aperture most remote from the wall for directing the flow of treated air downwardly and for concealing the aperture from view over a major portion of the room;

a window in said wall co-extensive at least to a major extent with said aperture; and

a drapery suspended above said window and presentable in covering relation to said window, said baffle member serving in relation to said drapery as a valance to conceal the upper part of said drapery as well as said aperture.

5. Apparatus in accordance with claim **4** including an ornamental attachment for the face of the baffle member comprised of fabric matching that of the drapery and simulating a conventional matching drapery valance.

6. Apparatus in accordance with claim **4** including a second baffle member extending downwardly from the ceiling between the aperture and the drapery a sufficient distance to overlap the top of the drapery and direct the flow of treated air from the aperture away from

the top of the drapery and downwardly along the face of the drapery presented toward the room.

7. Apparatus in accordance with claim 6 in which the depth of first-mentioned baffle member exceeds the depth of the second baffle member sufficiently to conceal the second baffle from view over a major portion of the room.

8. Apparatus for controllably conditioning the air in a room having a window in an outside wall, comprising

means for suspending a drapery to cover the window;

a drapery suspendable from said suspending means and presentable in covering relation to the window;

a ceiling for the room having an elongated aperture in front of the drapery and co-extensive with said window over a major portion of its width;

a plenum chamber disposed above the ceiling and in communication with the aperture;

means for supplying conditioned air under pressure to the plenum chamber and thus through the aperture into the room;

a barrier member abutting the ceiling and extending downwardly therefrom between the aperture and the drapery a sufficient distance to overlap the top of the drapery and deflect air downwardly in front of the drapery and away from the top of the drapery as well as to conceal the drapery suspending means;

and a valance member abutting the ceiling and extending downwardly therefrom on the far side of the aperture from the wall for concealing the barrier member and the aperture in the ceiling from view over a major portion of the room.

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