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REGISTER OUTLET FOR WARM AIR HOUSE-HEATING SYSTEMS

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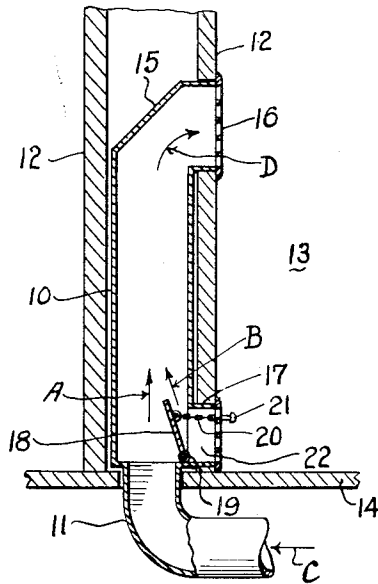


FIG. 1.

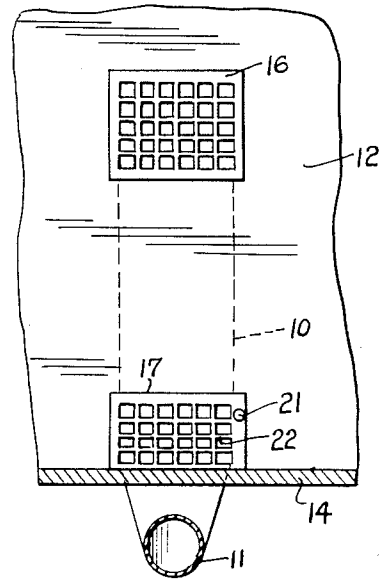


FIG. 2.

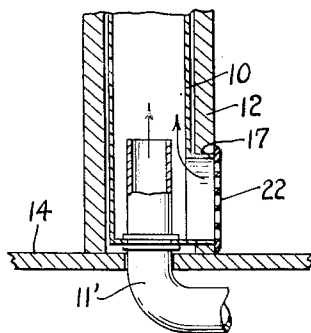


FIG. 3

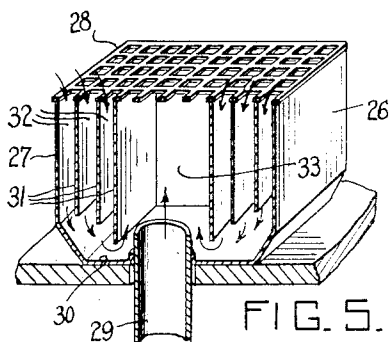


FIG. 5.

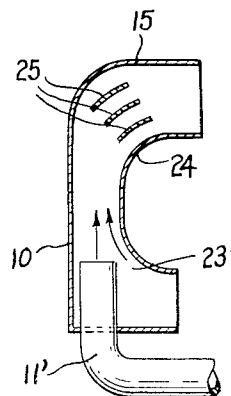


FIG. 4.

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REGISTER OUTLET FOR WARM AIR
HOUSE-HEATING SYSTEMS

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2 Claims. (Cl. 98—38)

1 This invention relates to room outlets for warm air house-heating and other air-conditioning or temperature-modifying systems.

In conventional systems of this character, it is an accepted practice to provide one or more rooms of a building with relatively spaced air inlets and outlets for conducting air from a heater, furnace or other condition-modifying unit, to the room space for distribution therein, and, following such delivery, to return separately the spent air to the heater or other condition-modifying unit for restoration to a desired state for recirculation.

Such air circulation from the conditioning unit to the room or rooms and back to the unit for rejuvenation, involve considerable time and travel on the part of the air, often producing objectionable room drafts and resulting in loss in the overall efficiency of the air-heating or conditioning system. In such systems, the air inlet fixture or register is utilized solely for controlling air admission into a room or rooms from a central heater, and the outlet fixture solely for withdrawing room air and returning it to the central heater. The operation of circulating conditioned and room air is characterized by its slow response to average condition demands in the room atmosphere.

To correct or obviate these conditions, and improve generally the operation of delivering conditioned air to and circulating the same in the room or rooms of a building, the present invention consists in providing a single composite outlet and inlet fixture or register for use in association with such systems, and wherein the fixture or register is constructed to provide means for delivering a temperature-modified stream of air to a building room or rooms, and in addition thereto simultaneously and conjointly cause the entering stream of conditioned air through an aspirating action to draw air from the room or rooms proper, and commingle the same with the freshly conditioned air, whereby to effect an interchange of properties in the two streams of air commingled in the fixture and to produce a more uniform condition on the part of the room atmosphere controlled by the system.

Among the objects of the invention are to provide: an improved composite outlet for controlling the discharge of air modified in certain respects and delivered to a compartment or room serviced or in communication with the outlet; to provide an outlet of the composite character indicated providing for quick diffusion of the incoming air into the room; to provide a fixture

2 for the aspiration of the room air into the incoming conditioned air; to provide such a composite register with an adjustable damper valve capable of being regulated to govern air flow at will through the register outlet; and to provide an air outlet of the character set forth of simplified economical construction and capable of being readily adapted to existing systems handling conditioned air.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a vertical transverse sectional view taken through a composite register embodying the present invention;

Fig. 2 is a front elevational view thereof, looking toward the room side of the register;

Fig. 3 is a detail fragmentary vertical sectional view disclosing a modified form of the invention;

Fig. 4 is a similar view; and

Fig. 5 is a vertical transverse sectional view taken through a floor-mounted register, as distinguished from the wall registers disclosed in the previous views of the drawing.

In the form of my invention as it has been shown in Figs. 1 and 2 of the drawings, the improved composite outlet device or register embodies a vertically disposed duct 10 which, in this instance, has been shown as being substantially rectangular in its transverse cross section although it may be otherwise formed. At the bottom of the duct, the latter communicates with the open upper end of a delivery pipe 11 which is employed in transmitting conditioned air to the outlet or register. The conditioned air may, of course, be warmed air, such as that obtained from a conventional furnace or other type of heater, or, in other instances, the air delivered to the register may be cooled air for use in lowering room temperatures, or the air so supplied may be of normal temperature, and conditioned by passage through filtering agencies, or otherwise, to remove dust, dirt and/or bacteria therefrom, or in any one of the many capacities to which air conditioned in various respects is delivered under controlled conditions of flow to the room or rooms of inhabitable buildings.

As shown in Figs. 1 and 2, the duct 10 is placed in the vertical wall 12 adjoining a building room 13, the duct being disposed above the floor 14 of the room. In this instance, the floor is provided with an opening through which the outlet end of the pipe 11 extends in entering the bottom of the duct 10. Conditioned air flowing into the duct 10 travels upwardly and passes into a discharge

elbow 15, communicating with the atmosphere of the room 13. Preferably, the open side of the elbow 15, which constitutes the conditioned air outlet of the register, is closed by a conventional grille or the like 16.

In accordance with the present invention, the lower part of the duct 10 is formed with a lateral extension 17 which constitutes an air inlet by which the atmosphere within the room 13 may be drawn into the duct 10 and therein commingle with the conditioned air delivered to said duct from the pipe 11 and its associated air conditioning unit, not shown. To regulate the inflow of the room air into the duct, I provide a swinging damper plate 18, the latter being pivotally mounted as at 9 in connection with the bottom of the duct 10. Extending from the plate 18 is a chain or the like 20, which joins with a manual control knob, ring or the like 21 accessible from the room side of the grille 22.

Through the operation of the knob 21 and its associated chain 20 the damper plate 18 may be rocked about its pivot mounting 19 and thereby regulating the spacing between the upper edge of the plate 18 and the inner wall of the inlet extension 17. The region controlled by the adjustment of the plate 18 constitutes an aspirator throat, whereby the primary stream of conditioned air passing upwardly through the register, as indicated by the arrow A, produces a suction or vacuum in said throat, so that air is drawn from the atmosphere of the room 13, advanced through the inlet extension 17, thence through said throat and into commingled relationship, as shown by the arrow B, with the primary stream of air C. By being so commingled the air streams exchange their properties, forming a merged stream which flows, as indicated by the arrow D, through the elbow 15 and is thence discharged into the room 13.

With this arrangement, the air within a room is readily maintained in a state of positively induced circulation, with the conditioned air delivered to the room held more closely under desired average conditions of mechanically attained modification, avoiding the usual peaks and valleys representing upper and lower limits of modification.

In the form of my invention as disclosed in Fig. 3, the air inlet pipe 11' projects upwardly through the floor 14 into the interior of the duct 10, the upper edge of the pipe 11' terminating above the top of the lateral extension 17 forming the room air inlet, so that the pipe 11' acts to form a positively defined throat 23 of a restricted nature by which the aspirating action of the register is carried out. In Fig. 4, a similar arrangement is set forth except that the throat 23' is formed by the curved duct wall 24. If desired, spaced arcuate baffle plates 25 may be arranged in the outlet elbow 15 in relatively spaced order, the baffles serving to avoid eddy currents and undue turbulence on the part of the merged air stream when travelling through the outlet end of the register.

In the form of my invention illustrated in Fig. 5, the same comprises a floor-mounted register 26, involving a substantially cubical casing 27 having an outlet grille 28 provided in the top thereof. A pipe 29 delivers conditioned air to the lower interior of the casing 27, the upper end of the pipe 29 terminating above the horizontal bottom wall 30 of said casing. As illustrated, the upper end of the pipe 29 is located above the lower edges of a plurality of vertically

depending partition walls 31, the latter extending downwardly into the interior of the casing 27 from the outlet or upper end 28 thereof.

In the construction of Fig. 5, air from the room of a building enters the register by way of the passage or passages 32 formed between the partition walls 31 and the outer walls of the casing 27, the room air passing downwardly through the passage or passages 32 and thence into the central or axial passage 33 into the lower end of which the conditioned air delivery pipe 29 projects, whereby air flowing from the upper end of the pipe 29 through the axial passage 33, produces an aspirating action causing the positive movement of air through the outer passages 32 and thence into the central passage 33, the room air traveling first in a generally downward direction and secondly in an opposite or upward direction.

In the use of my improved room air recirculating register, the construction thereof is such as to permit during periods of cold weather, and when the register is used in association with a centrally disposed air heater, the withdrawal of relatively cool air from the room atmosphere and the quick heating thereof through heat exchange with warm air delivered to the register from a central source. Likewise, in periods of warm weather when the modifying centrally disposed unit comprises an air cooler, warm air from the room or rooms under control is admitted into the register and commingled with cool air to obtain a quick reduction in temperature. It will be understood that the system may be operated in conjunction with the usual air return ducts leading from the room under control back to the central source, since the purpose of the apparatus comprising the present invention is to obtain the conditions of room air temperatures most satisfactory to its occupants.

When the device is employed in conjunction with a heating system, room temperatures may be regulated by controlling the operating positions of the damper plate, whereby to admit more or less of the room air into the duct 10, depending upon room temperatures desired. It is for this reason that the provision of the damper plate is indicated, although as shown in the remaining forms of my invention, the use of such a manual control is optional, since reliance may be placed upon temperature-averaging conditions effected through the commingling of unit-conditioned air with room air.

I claim:

1. A room outlet fixture for the discharge of temperature-conditioned air, comprising: a casing having imperforate side and bottom walls and a perforate horizontally extending top wall; vertically extending partition walls stationarily disposed in said casing in spaced relation to the imperforate side walls of the casing, said partition walls defining an inner vertical passageway extending through the central portion of the fixture and communicating with the atmosphere of an associated room through the perforate top wall of the casing, said partition walls being spaced from the outer walls of said casing to define a plurality of outer passageways which communicate at their lower ends with the lower portion of said inner passageway and at their upper ends with the room atmosphere through said perforate top wall; and a conduit entering the bottom of said casing, said conduit terminating within the lower portion of said inner passageway to introduce under forced flow into the

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latter a stream of temperature-modified air, the inflow of the temperature-modified air into said inner passageway serving to induce movement of room air downwardly through said outer passageways and thence into said inner passageway for admixture with the temperature-modified air, the resultant commingled air passing upwardly through said inner passageway for delivery to the atmosphere of an associated room.

2. A floor-positioned outlet register for the discharge of temperature-conditioned air into a room atmosphere, comprising: a substantially cubical casing comprising imperforate side and bottom walls and a perforate horizontally extending top wall in the form of a grille; vertically extending partition walls stationarily disposed in said casing in spaced relation to the imperforate outer side walls of the casing, said partition walls defining an inner vertical passageway extending through the central portion of the fixture and opening to the room atmosphere by way of said grille, said partition walls being spaced from each other and from the outer side walls of the casing to define a plurality of parallel outer passageways which communicate relatively at their lower ends with each other and with the lower portion of said inner passageway, said parallel outer passageways being in open communication at their upper ends with the room atmosphere through said perforate top grille; and conduit means entering the bottom of said

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casing, said conduit means terminating within the lower portion of said inner passageway to introduce under forced flow into the latter passageway a stream of temperature-modified air, the latter being adapted for discharge through the open grille at the top of said casing, the introduction of said temperature-modified air serving to induce air flow downwardly through said outer passageways for merger with the temperature-modified air in the inwardly located central passage.

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