

July 6, 1937.

B. GOERG

2,086,076

AIR MIXING APPARATUS

Filed March 22, 1935

3 Sheets-Sheet 1

Fig.1.

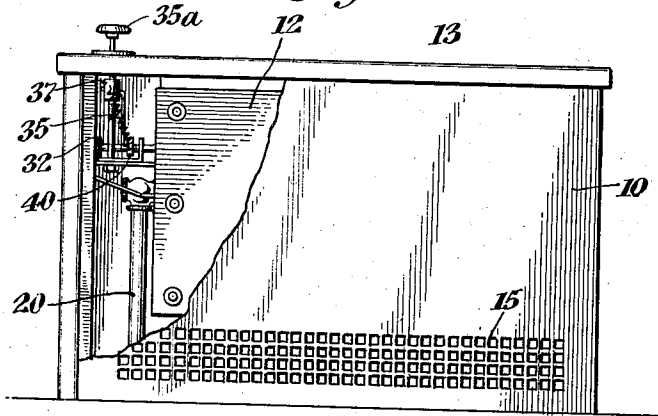


Fig. 2.

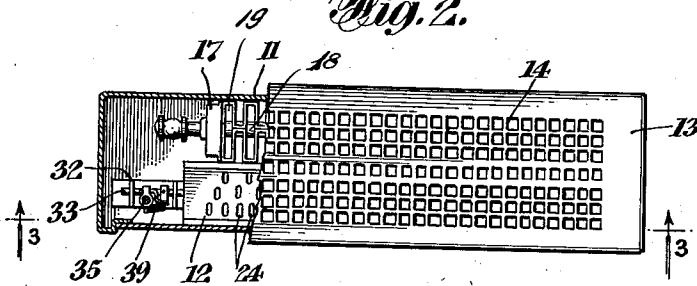
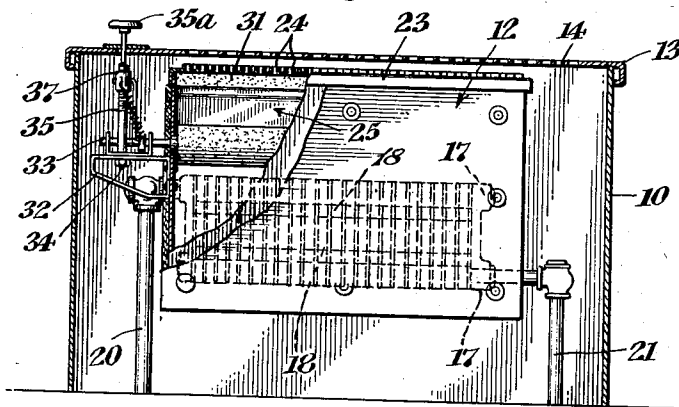


Fig. 3.



INVENTOR

Bernhard Goerg
BY
Comad A. Vitush
his ATTORNEY

ATTORNEY

July 6, 1937.

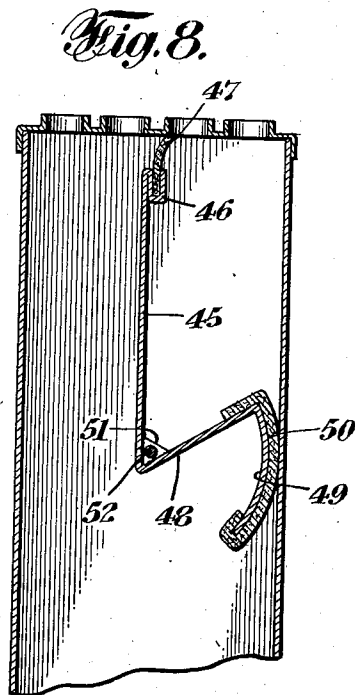
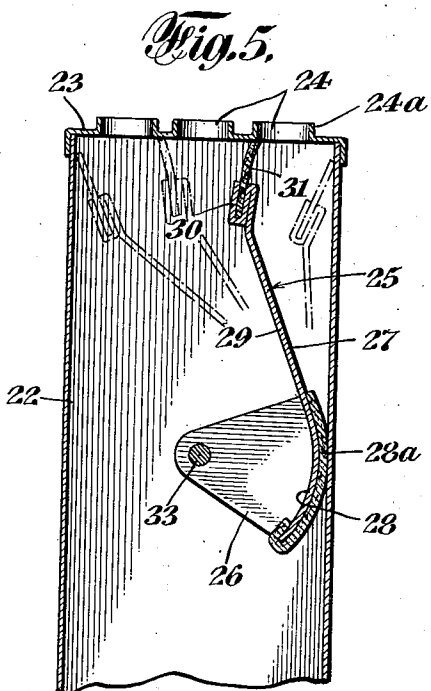
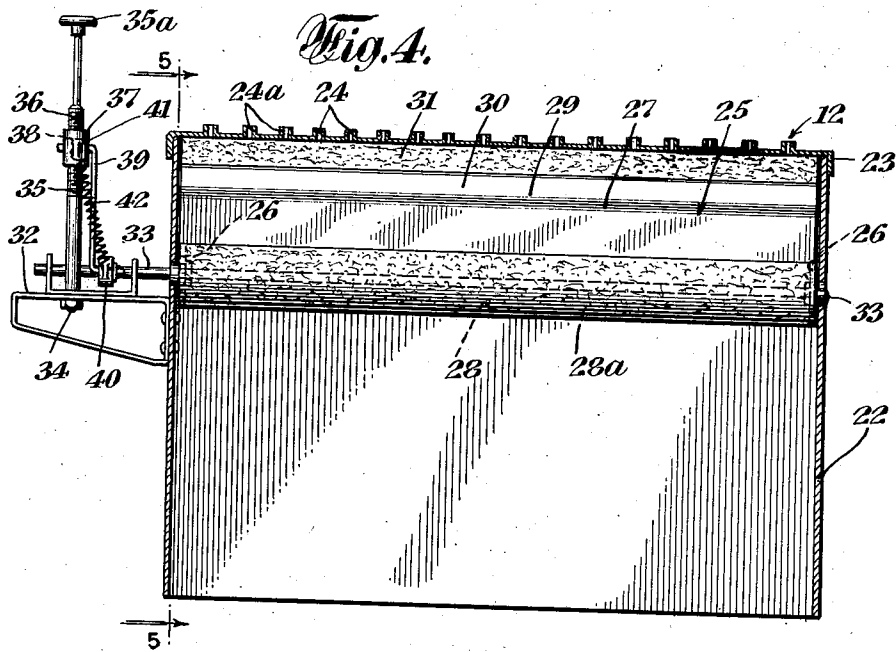
B. GOERG

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AIR MIXING APPARATUS

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3 Sheets-Sheet 2



INVENTOR
Bernhard Goerg
BY
Conrad A. Kretzer
his ATTORNEY

July 6, 1937.

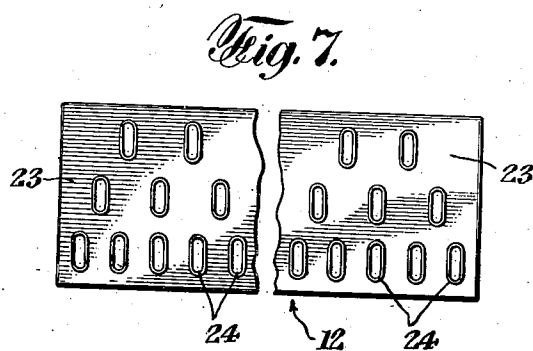
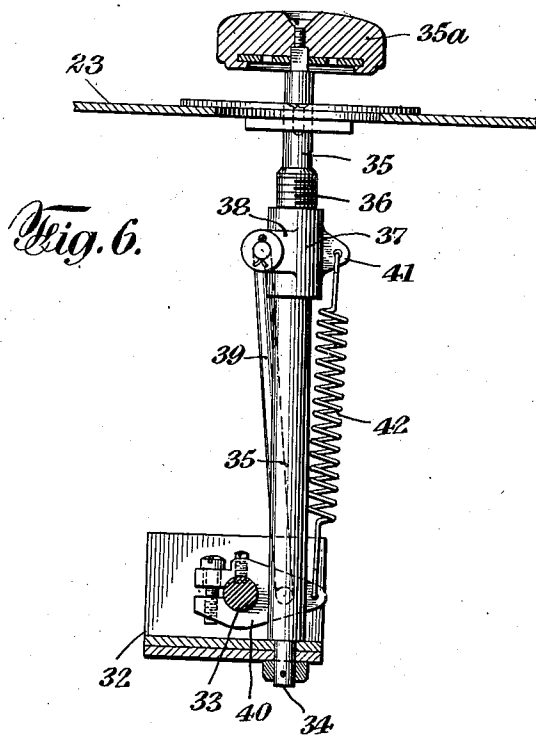
B. GOERG

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AIR MIXING APPARATUS

Filed March 22, 1935

3 Sheets-Sheet 3



INVENTOR
Bernhard Goerg
BY *Conrad A. Nitzsch*
his ATTORNEY

UNITED STATES PATENT OFFICE

2,086,076

AIR MIXING APPARATUS

Bernhard Goerg, Mount Vernon, N. Y., assignor
to American Radiator Company, New York,
N. Y., a corporation of New Jersey

Application March 22, 1935, Serial No. 12,356

15 Claims. (Cl. 98—38)

My invention relates to improvements in means for controlling the passage of air through casing or enclosures for radiators, air conditioning units, and other structures of similar nature, and the same has for its object generally to provide an enclosure which is simple in construction, efficient in operation and comparatively inexpensive to manufacture.

Further, said invention has for its object to provide an apparatus by means of which air received from two or more separate sources of supply may be continuously and effectively intermixed without regard to the volumes of air treated or the velocity of flow thereof.

Further, said invention has for its object to provide a casing having air inlet means at its base or lower portion, and outlet openings at or near its upper end, and means whereby a substantially uniform velocity of flow of air may be maintained at said outlet openings without regard to the number of outlets open for the passage of air therethrough.

Further, said invention has for its object to provide an apparatus of the character described in which the casing is provided with a plurality of longitudinal rows of outlets in its top, and valve means whereby said outlet may be controlled, row by row, in succession.

Further, said invention has for its object to provide an apparatus of the character described having air inlet openings or means at its lower portion, and outlets at or near its top so controlled by a damper disposed intermediate said inlet and outlets that the velocity of air discharged through said outlets may be maintained constant while the volume of air admitted into the enclosure through said inlets may vary.

Further, said invention has for its object to provide an apparatus of the character described in which the outlet openings for the air are arranged in rows extending longitudinally of the apparatus, and are controllable by a damper which is substantially coextensive in width with the length of the apparatus so that certain rows of the outlets may be closed and still maintain a discharge of air through the remaining outlets longitudinally across the entire length of the apparatus through the remaining row or rows of outlets.

Further, said invention has for its object to provide an apparatus of the character described in which the air outlets in the casing are arranged in rows extending longitudinally thereof, and in which the number of outlets in each row becomes progressively less in the direction of the

closing movement of the damper or element controlling said rows of outlets.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends my invention consists in the novel features of construction, and in the combination, connection and arrangements of parts hereinafter more fully described and then pointed out in the claims.

In the accompanying drawings—

Figure 1 is a front elevation partly broken away showing an enclosed radiator with one form of air mixer constructed according to, and embodying my said invention;

Fig. 2 is a top view thereof partly broken away;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail front elevation of the air mixer with the front wall partly broken away;

Fig. 5 is a vertical section thereof on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged detail end elevation, partly in section, showing a portion of the casing, and the damper actuating means;

Fig. 7 is a detail top view of the casing cover, and

Fig. 8 is a section, similar to Fig. 5, showing a modification.

In said drawings 10 designates an enclosure with a radiator 11 and an air mixer 12 embodied therein. The enclosure or casing 10 is preferably made of sheet metal, rectangular in form, and provided at its open top with a cover 13 having suitable outlet openings or a grill 14 for the escape of air. The front of the casing is provided at its lower portion with an intake opening or grill 15 for the admission of air to be heated or otherwise treated.

Within the casing 10, adjacent its rear, and at a point about midway of its height is disposed the radiator 11 comprising headers 17, between which are arranged heating elements 18 communicating with said headers 17, and one or more series of vertical air flues 19. A supply pipe 20 and return pipe 21 communicating with a source of heating medium supply are connected to said headers 17.

Between the front of the radiator 11 and the front of the casing 10 is supported an air mixer comprising a casing 22, of rectangular form, open at its bottom and top, and provided at its top with a removable cover 23 having longitudinal rows of apertures 24 extending across the same. The number of apertures in each row is preferably

the same, but the number of said apertures may become progressively less as the rows approach the rear edge of the cover 23 in order to restrict further the air output as the damper or valve, hereinafter described, is gradually closed. The apertures 24 are preferably elongated in form and are arranged with their longer axes extending transversely of the cover, and are provided with relatively short, upwardly-extending peripheral flanges 24^a.

25 denotes a damper or valve comprising segmental end plates 26 connected by a transverse member 27 which has a curved or rounded lower portion 28 corresponding to and secured to the curved or rounded edges of the segmental end plates 26, and a flat upwardly-extending portion 29 having its upper edge folded upon itself, and then bent rearwardly and upwardly to form a channel 30 in which is secured the lower edge of a flat, longitudinal strip 31 of flexible or elastic material such as felt, rubber, or other suitable material whose upper edge is adapted to engage snugly with the underside of the cover 23 throughout the range of movement of the upper end of said damper 25. The entire outer or forward surface of the curved, lower portion 28 is provided with a facing of felt, or other suitable material, 28^a to form an air seal between said curved portion 28 and the inner side of the enclosure front with which it contacts throughout the full range of movement of the damper 25.

The damper 25 is mounted upon a shaft 33 which extends through the point ends of said segmental end plates 26, and has its ends supported in the end walls of the air mixer casing 22 at a point midway of the width of said walls, and at such distance below the cover 23 as will insure a perfect wiping contact of the edge of the felt strip 31 at the upper end of the portion 29 with the under side of the cover 23 throughout the operative travel of the end of said portion 29 and the felt strip 31 thereon with respect to said cover 23 and the rows of outlet apertures 24 therein.

To actuate the damper 25 and to secure the same to its adjusted positions, the casing 22 is provided at one end with a bracket 32 in which is rotatably supported the reduced lower end 34 of a vertical shaft 35 whose upper end extends through the top of the casing, and is provided at its projecting end with an operating hand-wheel 35^a. Intermediate its ends the shaft 35 is provided with a threaded portion 36 on which works a traveling nut 37 having a lug 38 thereon to which is pivotally connected one end of a link 39 whose other end is pivotally connected to an arm 40 fixed upon the outer end of the damper shaft 33. The nut 37 is also provided on its side opposite to the lug 38 with short projection 41 to which is connected one end of a spring 42 whose lower end is connected to the arm 40 on the damper shaft 33.

By rotating the vertical shaft 35 the nut 37 will be caused to move up or down upon said shaft, and in so doing cause the link 39 to actuate the arm 40, and cause the damper shaft 33 to rotate partially, and thereby cause the upper end 29 of the damper 25 to move backward or forward, as the case may be, in a direction transversely of the casing 22, and cover or uncover certain of the rows of apertures 24 in the cover 23 thereof. As the lower, rounded portion 28 of the damper, and the felt facing 32 thereon are always in contact with the inner side of the casing front, regardless of the position of the upper end 29 of

said damper and the felt strip 31 thereof, all of the air entering the casing at the bottom thereof must pass between the damper 25 and the rear wall (the left-hand wall as seen at Figs. 5 and 6) of the casing and issue through those outlet openings 24 which communicate, for the time being, with the said space between the damper 25 and the rear wall of the casing 22.

In the modification illustrated at Fig. 8, the principle of construction is the same as that of the main construction, above described, except that in the modification the damper consists of a flat vertical member 45 having its upper free edges bent to form a channel 46 in which is secured a longitudinal strip of felt 47, and the lower end portion of the member 45 is bent to form an angular outwardly-extending portion 48 and terminates in a curved end 49 upon the outer surface of which is secured a facing of felt 50. The vertical member 45 is provided at each end at the junction thereof with the angular member 48 with a bearing plate 51 through which extends a shaft or pivot 52 whose ends are supported in end walls of the casing 22^a.

Having thus described my said invention, what I claim and desire to secure by Letters Patent is:

1. A device of the character described comprising a casing having air inlet means and outlet means, and a valve member of greater height than the width of said casing mounted to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet means; said valve member, at one end, serving to control said outlet means, and having its other end in constant engagement with a wall of said casing throughout the range of movement of said first-named end.

2. A device of the character described comprising a casing having air inlet means and a succession of outlet means, a valve member of greater height than the width of said casing mounted to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet means; said valve member, at one end, serving to successively control said outlet means, and having its other end in constant wiping engagement with a wall of said casing throughout the range of movement of said first-named end, and means for actuating said valve member.

3. A device of the character described comprising a casing having air inlet means and a plurality of rows of outlets, and a movable member in said casing for controlling the passage of air from said inlet to said outlets; said movable member serving to partition the interior of said casing and separate certain of said rows of outlets from the remaining rows, and to direct the flow of air to said remaining rows of outlets.

4. A device of the character described comprising a casing having air inlet means and a plurality of rows of outlets, and a member of greater height than the width of said casing mounted to oscillate transversely thereof for controlling the passage of air from said inlet to said outlets by rows; said member, when actuated, serving to partition the interior of said casing and cut out certain of said rows of outlets and direct the flow of air to the remaining rows of outlets.

5. A device of the character described comprising a casing having air inlet means and a plurality of rows of outlet means, and a member coextensive in width with the length of said casing and mounted to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet by rows; said member, when actuated,

serving at one end to partition the interior of said casing and cut out certain of said rows of outlets from the remaining rows, and having its other end in constant wiping engagement with a wall of said casing throughout the range of movement of said first-named end to direct all of the air entering said casing to said remaining rows of outlets.

6. A device of the character described comprising a casing having air inlet means and outlet means, and a valve member of greater height than the width of said casing and substantially coextensive in width with the length of said casing and mounted to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet means in succession; said valve member, at one end, serving to control said outlet means, and having its other end in constant engagement with a wall of said casing throughout the range of movement of said first-named end.

7. A device of the character described comprising a casing having air inlet means at its base, a plurality of longitudinal rows of outlet in the top thereof, and a valve member of greater height than the width of said casing mounted lengthwise therein and to oscillate transversely thereof for controlling the passage of air from said inlet to said rows of air outlets row by row; said valve member, at one end having an elastic edging and serving to control said outlet means, and having at its other end a curved portion in constant engagement with a wall of said casing throughout the range of movement of said first-named end.

8. A device of the character described comprising a casing having air inlet means and outlet means, and a valve member of greater height than the width of said casing and substantially coextensive in width with the length of said casing and pivotally supported in said casing to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet means; said valve member, at one end, serving to control said outlet means, and having its other end rounded and in constant engagement with the adjacent wall of said casing throughout the range of movement of said first-named end of the valve member.

9. A device of the character described comprising a casing having air inlet means at its base, and a plurality of longitudinal rows of outlets at its top, and a valve member substantially coextensive in width with the length of said casing and pivotally supported adjacent its lower end in said casing to oscillate transversely thereof for controlling the passage of air from said inlet to said outlet openings, a yielding member at one end of said valve serving to control said outlets; said valve member having its other end rounded, and having a yielding facing thereon in constant engagement with a wall of said casing throughout the range of movement of the first-named end of said valve member.

10. A device of the character described comprising a casing having air inlet means, a cover, air outlets in said cover, and a valve member substantially coextensive in width with the length of said casing and pivotally mounted adjacent its lower end in said casing to oscillate transversely thereof for controlling the passage of air from said inlets to said outlets, a channel at the upper end of said valve member, an elastic strip disposed in said channel adapted to engage with the underside of the cover of the casing and serving to control the outlets therein, said valve member

having its other end rounded and provided with an elastic facing in constant engagement with a wall of said casing throughout the range of movement of the first-named end of said valve member.

11. A device of the character described comprising a casing, a cover therefor, said casing having air inlet means, and said cover a plurality of longitudinal rows of elongated air outlets having their longer axes disposed transversely of said casing, and a valve member substantially coextensive in width with the length of said casing and pivotally mounted therein to oscillate transversely thereof for controlling the passage of air from said inlet means to said air outlets; a channel at one end of said valve member, an elastic strip secured in said channel serving to control said air outlets by rows, said valve member having its other end rounded and provided with an elastic facing in constant engagement with the adjacent wall of said casing throughout the range of movement of the first-named end of said valve member.

12. A device of the character described comprising a casing having air inlet and outlet means therein, and a movable member in said casing for controlling the passage of air from said inlet to said outlet means; said member having parts in wiping engagement with angularly related walls of said casing, and one of said parts serving to render certain of said air outlet means inoperative and the other of said parts serving to prevent access of air from said inlet means to the outlet means rendered inoperative by said first-named part.

13. A device of the character described comprising a casing having air inlet and outlet means therein, and a movable member in said casing for controlling the passage of air from said inlet to said outlet means; said member having both of its ends in wiping engagement with angularly related walls of said casing, and one of said ends serving to render certain of said air outlet means inoperative and the other of said ends serving to prevent access of air from said inlet means to the outlet means rendered inoperative by said first-named end.

14. A device of the character described comprising a casing having air inlet and outlets therein, and a movable member in said casing for controlling the passage of air from said inlet to said outlets; said member having angularly-related ends in wiping engagement with walls of said casing arranged at right angles to each other, and one of said ends serving to render certain of said air outlets inoperative and the other of said ends serving to prevent access of air from said inlet to the outlets rendered inoperative by said first named end.

15. A device of the character described comprising a casing having an air inlet in its lower portion and air outlets in its top, a damper pivotally mounted in said casing having one end in wiping engagement with said top for controlling the air outlets therein to render certain thereof inoperative, and having an angularly-related end in wiping engagement with one of the side walls of said casing; said angularly-related end serving to prevent access of air from said inlet to the outlets rendered inoperative by said first-named end throughout the range of its movement, and to direct the flow of all air entering said casing to the remaining operative outlets.

BERNHARD GOERG.