Feb. 11, 1958 W. W. KENNEDY 2,822,741

AIR DISTRIBUTION OUTLET

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Fig. 1.

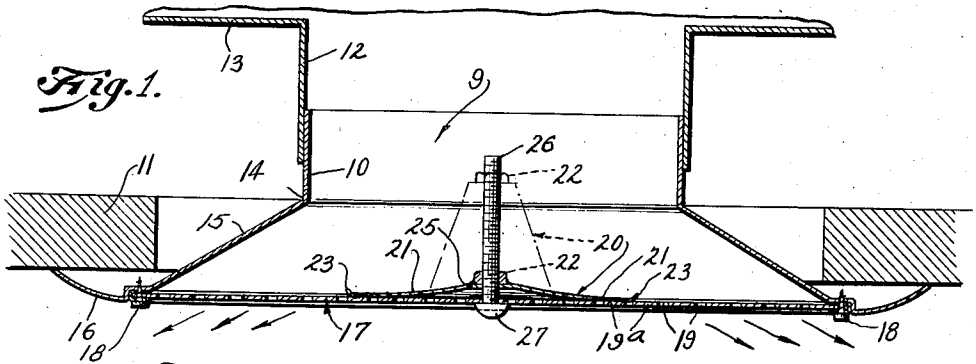
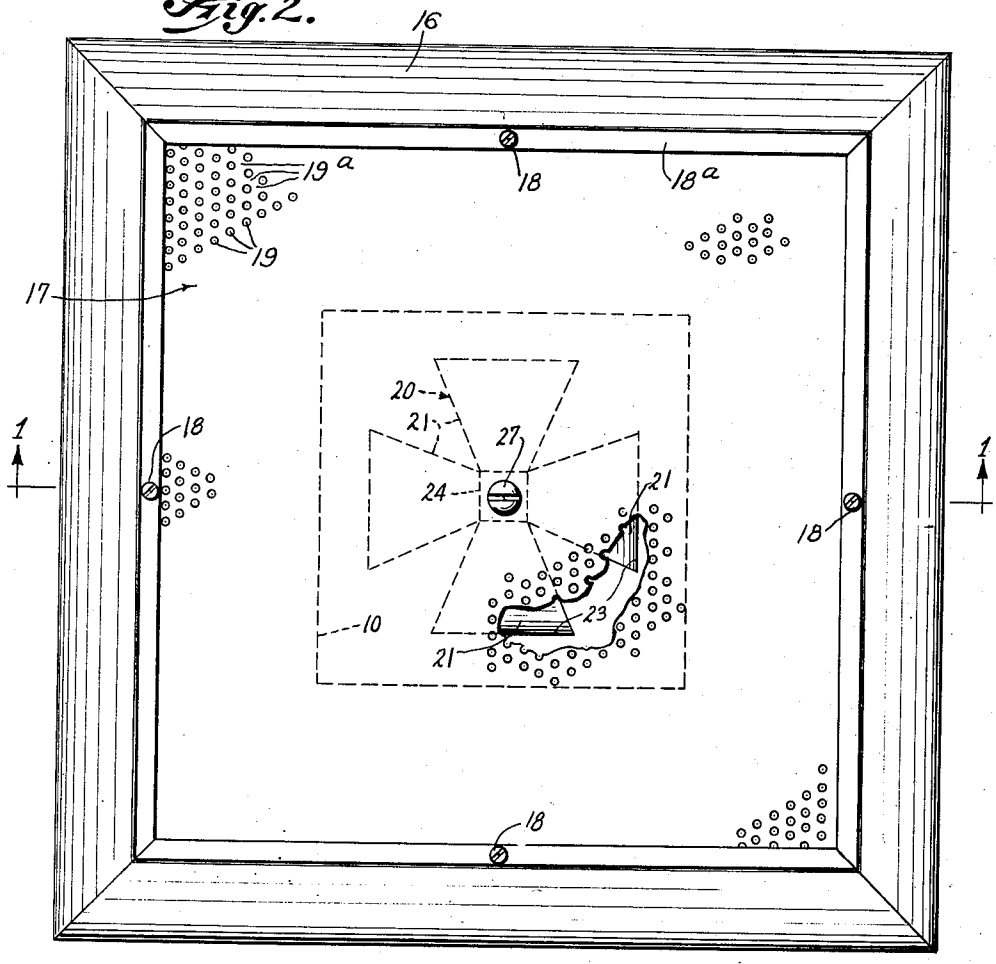


Fig. 2.



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Fig. 3.

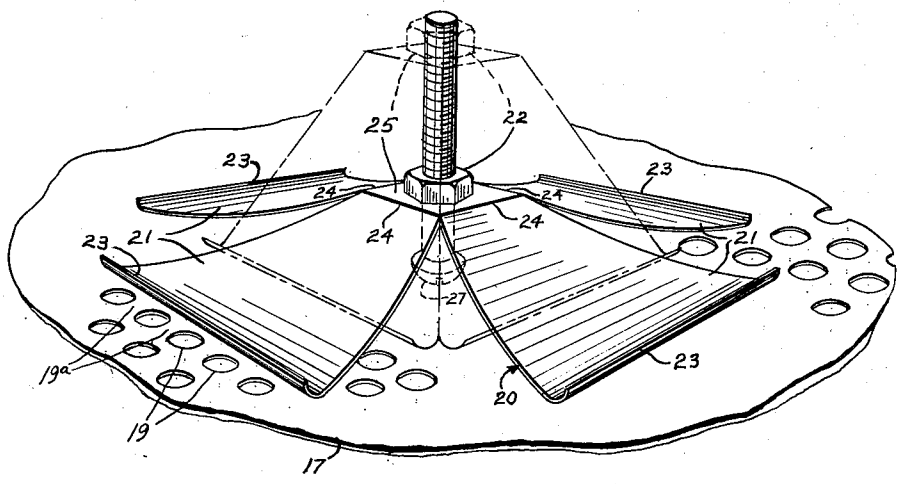
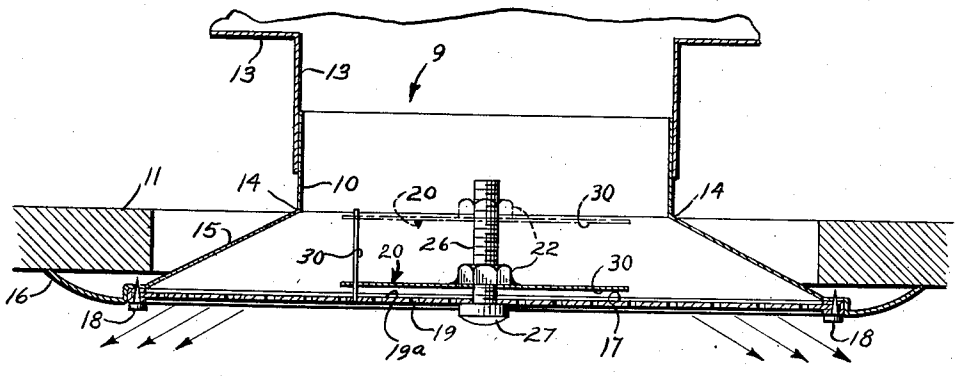


Fig. 4.



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United States Patent Office 2,822,741 Patented Feb. 11, 1958

2,822,741

AIR DISTRIBUTION OUTLET

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Application July 19, 1954, Serial No. 444,196

8 Claims. (Cl. 98—40)

This invention relates to an air distribution outlet of the type having a face plate with closely spaced perforations therethrough and combined with a deflector element disposed above the central part of the plate adjustable to vary the covering of the perforations and therefore the pattern of the air discharged through the perforations.

One object is to provide an outlet of the above character in which the effective area of the deflector is varied by adjustment of a part toward and away from the top of the face plate.

Another object is to achieve the area variation by changing the inclination of wings or baffle elements sloping downwardly and outwardly toward the top of the face plate.

A further object is to adjust the deflector wings in response to turning of a screw extending along the outlet axis and accessible from beneath the latter.

The invention also resides in the novel construction and mounting the deflector wings to enable the outer ends thereof to be shifted radially of the plate in response to opposite movements of the adjusting member.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary cross sectional view of a room wall equipped with an air distribution unit embodying the novel features of the present invention, the section being taken along the line 1—1 of Fig. 2.

Fig. 2 is a bottom plan view of the unit shown in Fig. 1.

Fig. 3 is a fragmentary perspective view of the deflector and perforated face plate.

Fig. 4 is a sectional view similar to Fig. 1 showing a modification.

In the drawings, the invention is embodied for purposes of illustration in an air discharge unit which includes a tubular casing having a collar 10 at one end defining an air inlet 9 and flaring at the opposite or outlet end which is adapted to be set in a recess in a ceiling or room wall 11. The collar 10 is adapted to telescope within and be connected to the branch 12 of an air supply duct 13. The flat sides of the collar merge at 14 with walls 15 which are flat all the way to the discharge edge of the outlet and form a pyramidal frustum. Flanges 16 at the outer edges of the walls 15 preferably overlap the adjacent parts of the ceiling and are depressed to provide a seat for receiving the edges of a perforated face plate 17 secured in the seat by screws 18 and covered by a narrow molding 18a.

The perforations 19 in the plate are relatively small, of equal size, and circular in the present instance so as to leave intervening solid metal 19a for intercepting the incoming air and causing lateral spreading of the separate air streams discharged through the perforations. The perforations are spaced apart uniformly and correlated in size with the plate thickness so as to permit the free

flow of air outwardly and at large angles relative to the plane of the plate as indicated by the arrows in Fig. 1. Herein, the face plate is less than .035 of an inch thick and the total area of the holes 19 is from 35 to 55 percent of the total plate area. The area of the plate is at least four times the free air area of the inlet 9.

In the preferred form of the invention shown in Figs. 1 to 3, variation in the pattern of the air discharged from the outlet is achieved through the use of a deflector 20 which is smaller in size than the collar 10 and is disposed within the flared portion of the casing immediately above the plate 19 so as to intercept part of the air stream delivered through the inlet, the deflector being adjustable to enable the amount of such interception to be varied as desired. The deflector comprises a plurality of wings or baffles 21 which in one extreme position form a shallow substantially imperforate assembly and in other positions converge upwardly and toward the axis of the outlet, the baffles being swung through the different positions by connections with a member 22 which is adjustable along the outlet axis to vary the angle of convergence of the baffles and therefore the area of the part of the incoming air which is intercepted and deflected outwardly as it approaches the exposed perforations of the face plate. In the present instance, where four baffles are employed, these coact to form a hollow pyramid which is extensible and collapsible vertically to vary the size of the base as permitted by radial shifting of the outer ends along the top of the face plate.

For the sake of simplicity of construction, the baffles are, in this instance, made of relatively thin resilient material, each being of trapezoid shape with the larger end curled upwardly as indicated at 23 to facilitate sliding along the face plate. These edges of the baffles parallel the corresponding edges of the face plate 17 as shown in Fig. 2. The smaller ends 24 are attached, integral in this instance, to a flat center piece 25 to which the adjustable member 22 is secured as by soldering or welding. Herein the member 22 comprises a nut threaded onto a screw 26 which projects through and is journaled in the face plate 17 along the axis of the outlet with the screw head 27 disposed beneath and abutting against the plate so as to be accessible from the exterior of the unit after installation. While special means may be provided for holding the nut 22 and the deflector against turning, it has been found that this is achieved by virtue of the friction between the face plate and the edges 23 of the baffles 21.

By turning the screw in opposite directions, the nut and the center piece 24 will be raised and lowered relative to the face plate. This movement is permitted primarily by bending of the baffles 21 about axes defined by the lines 24, such swinging being accompanied by radial sliding of the baffle edges 23 along the top of the face plate. When the nut is disposed near the face plate as shown in full in Fig. 1, the pyramid formed by the baffles will be collapsed axially and expanded radially, and the side edges of the baffles at the corners of the pyramid will be separated somewhat as shown in Figs. 2 and 3. At the same time, the intermediate parts of the baffles will be flexed somewhat as shown in Fig. 1 and thus stressed so as to hold the edges 23 tightly against the face plate.

In this condition, the slope of the baffles downwardly to the face plate is gradual and the overall intercepting effect is large. Thus the incoming air stream is divided into four parts by the deflector 20 and the separate parts impinge against the tops of the baffles and are deflected outwardly. The separated streams are thus directed at a relatively small angle against the perforations 19 which are exposed outwardly beyond the edge 23 of each baffle. This results in substantial outward spreading of the air streams delivered through the individual perforations and

provides for the discharge of the air streams at a comparatively small angle relative to the room wall.

Now, if the screw is turned to raise the nut and collapse the deflector radially, the inclination of the baffles relative to the face plate will be increased and the area of the base of the pyramid will be reduced correspondingly. As a result, more perforations nearer the center of the face plate will be uncovered and the angle of impingement of the divided air streams against the face plate will be increased thus reducing the spreading of the pattern of the air discharged into the room. The unit is thus adjusted to produce a more direct downward throw of the air into the room.

Such a reduction in the slope of the baffles will be continued during raising of the nut **22** all the way to the position shown in phantom in Figs. 1 and 3. At this time, the edges of the baffles at the corners of the pyramid come into substantial abutment and only a small area of the face plate at the center thereof is covered by the deflector.

The preferred construction above described provides a very wide range of adjustment for spreading of the pattern of the discharged air. Where a smaller adjustment range is permissible, the deflector **20** may be simplified and take the form of a flat plate or circular disk **30** attached at its center as before to the nut **22**. A pin **31** upstanding from the face plate **17** projects through a hole in the disk and thus serves to hold the latter and the nut **22** against turning with the screw **26**. By turning the latter, it will be apparent that the disk **30** may be raised and lowered between the positions shown in full and phantom in Fig. 4 thus varying the effective area of the exposed portions of the face plate and also the angle at which the air delivered through the outlet **9** will be moving at the time it encounters the exposed perforations.

I claim as my invention:

1. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, a deflector smaller than said inlet for intercepting part of the air stream delivered therethrough, said deflector comprising a screw extending through and journaled in said face plate along the axis of the plate, a nut threaded onto said screw above said plate, and a single sheet of resilient material having a central portion secured to said nut and four independently flexible trapezodial wings sloping downwardly to the top of said face plate, the inclination of said wings relative to said plate being varied in response to movement of said nut toward and away from said plate.

2. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, and a deflector smaller than said inlet for intercepting part of the air stream delivered therethrough, means engaging said deflector to hold the same against turning, said deflector comprising a screw extending through and journaled in said face plate along the axis of the plate, a nut threaded onto said screw above said plate, and baffle members each swingably supported on said nut and sloping downwardly and outwardly to the top of said plate, the free ends of said members moving radially of said screw toward and away from each other and along said plate as said nut is advanced away from and toward the plate by turning of said screw.

3. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, a deflector smaller than said inlet for intercepting part of the air stream delivered therethrough, said deflector comprising a screw extending through and journaled in said face plate along the axis of the plate, a nut threaded onto said screw above said plate, a plurality of imperforate baffles sloping downwardly and outwardly to the top of said plate, and means swingably connecting said baffles and nut and operable to vary the inclination of the baffles relative to said plate in response to movement of said nut along said screw.

4. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, a deflector for intercepting part of the air stream delivered through said inlet comprising baffles sloping downwardly and outwardly toward said face plate, a member mounted above said plate and supporting the inner ends of said baffles for swinging about axes paralleling said plate, and means for moving said member toward and away from said plate when the outer free ends thereof are pressed against the plate.

5. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, a deflector for intercepting part of the air stream delivered through said inlet, a device spaced from said face plate and held against turning, said deflector comprising baffle members each swingably supported on said device and sloping downwardly and outwardly therefrom to the top of said plate, and a screw mechanism operable to move said device toward and away from said plate and thereby vary the inclination of said baffles and the area of said outlet covered by said deflector.

6. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, means interposed in the path of the air stream directed from said inlet toward said plate and including a plurality of swingable baffle members angularly spaced apart and flaring toward said face plate to form a deflector, and means for adjusting the inclination of said members relative to said face plate.

7. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, means interposed in the path of the air stream directed from said inlet toward said plate and including a plurality of angularly spaced baffle members diverging toward said plate to form a deflector, means swingably supporting said members for adjustment of their angle of inclination relative to the plate, a screw rotatably mounted on said face plate, and means actuated by the thread of said screw for swinging said baffles in unison in one direction as the screw is turned in a corresponding direction.

8. An air distribution unit having, in combination, a hollow casing having an inlet at one end and a larger outlet at the other end, a perforated face plate covering said outlet, a deflector smaller than said inlet and covering the central portion of said plate for intercepting part of the air stream delivered through the inlet, said deflector comprising a screw extending through and journaled in said face plate along the axis thereof, a nut threaded onto said screw above said plate, a baffle carried by said nut and movable toward and away from said face plate in response to opposite movements of the nut along the screw to respectively increase and decrease the flow of air through said central portion of the face plate, and means for holding said nut and baffle against turning during rotation of said screw.

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