Feb. 13, 1945. F. J. KURTH ET AL 2,369,303

AIR OUTLET DEVICE

Filed March 13, 1942 3 Sheets-Sheet 1

Fig. 1.

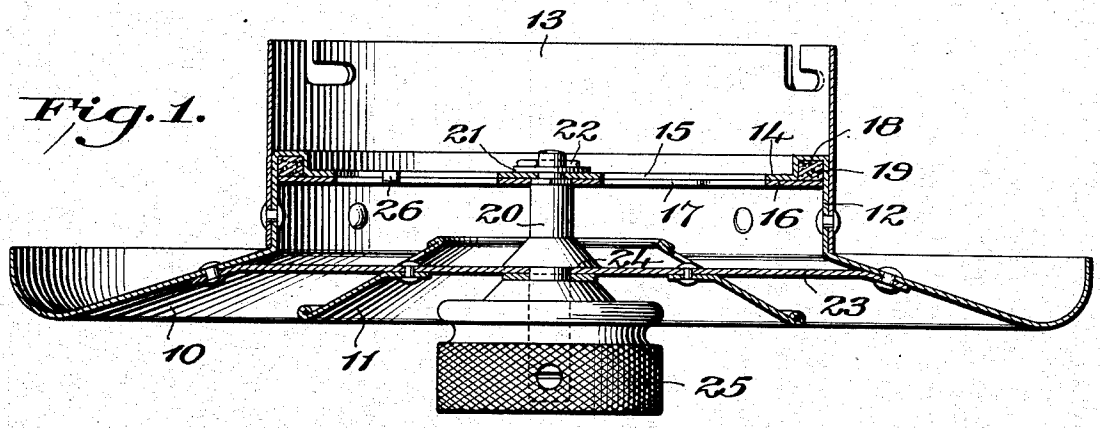
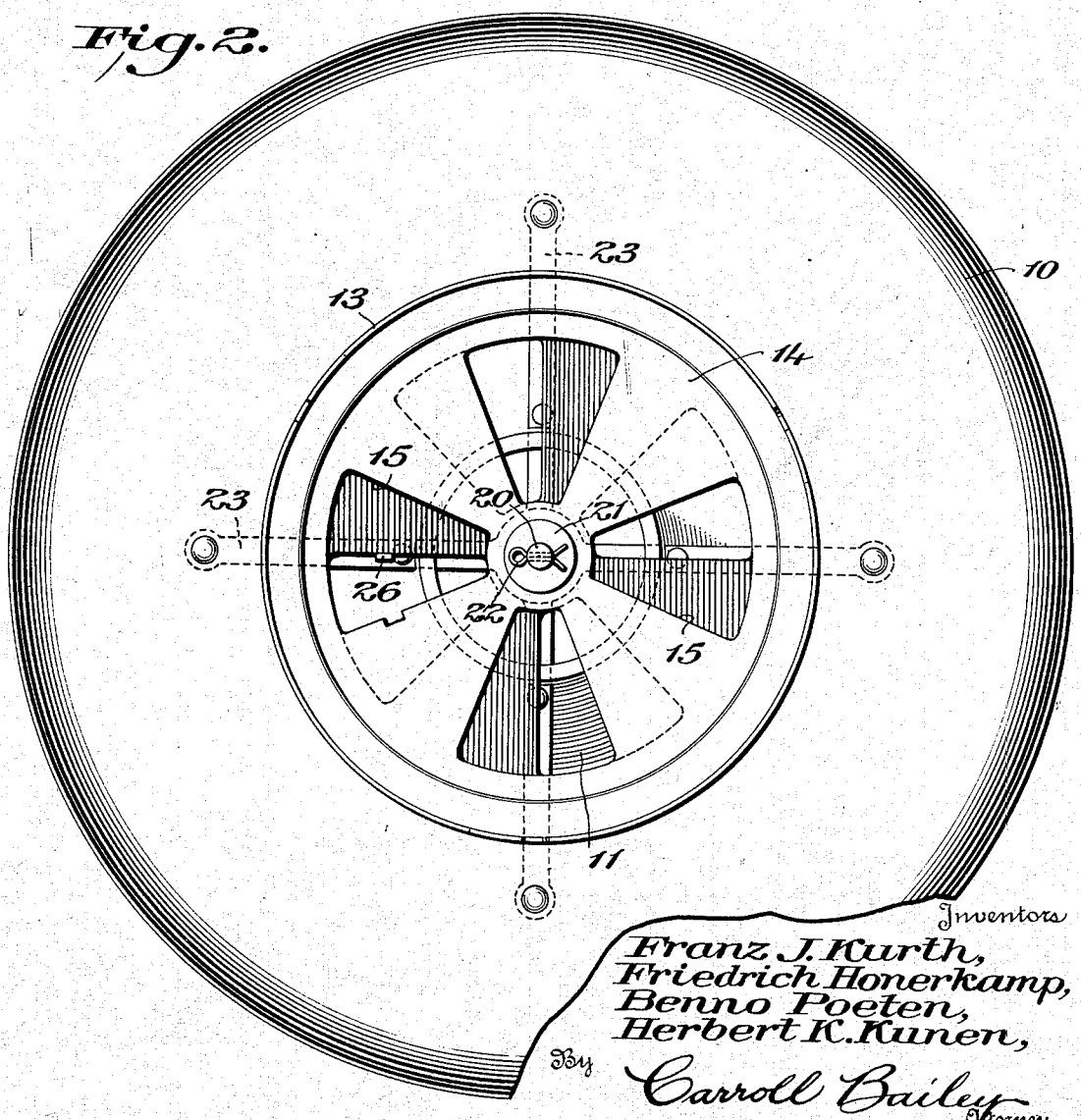


Fig. 2.



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Filed March 13, 1942 3 Sheets-Sheet 2

Fig. 3.

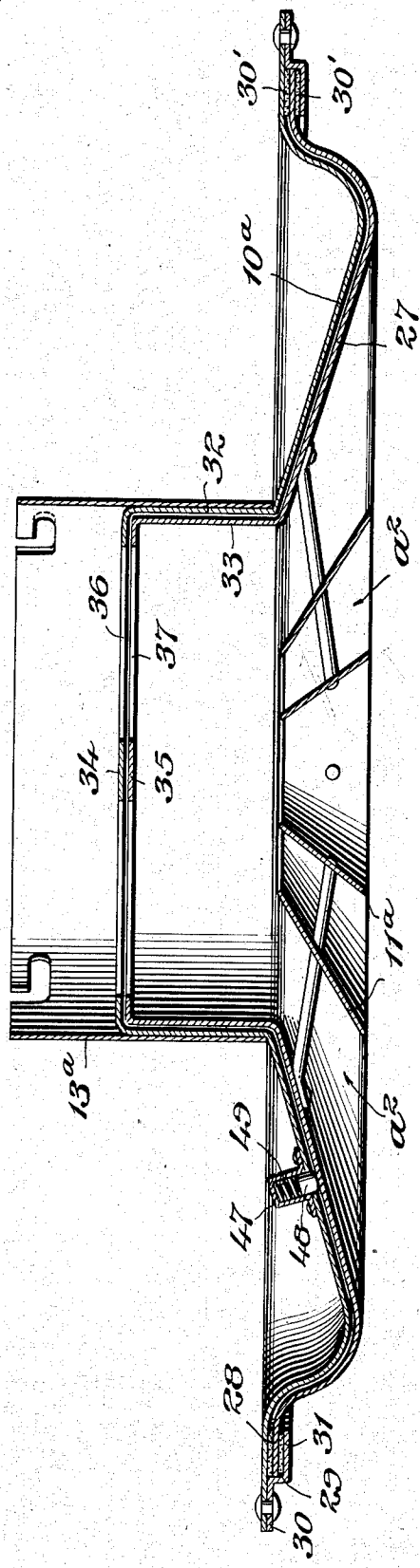
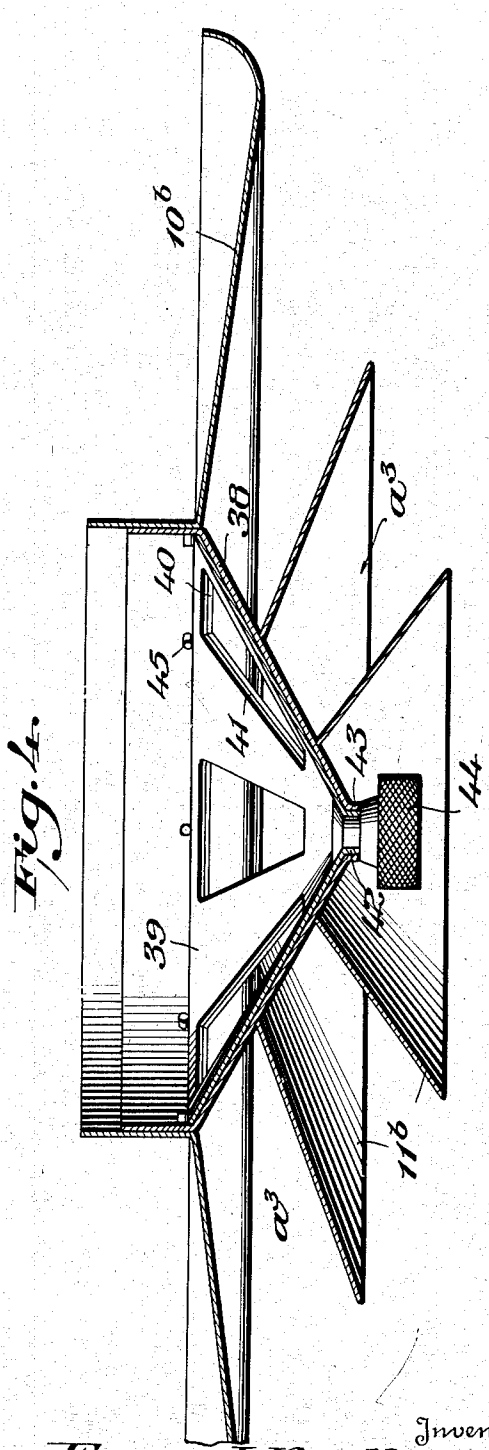


Fig. 4.



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Filed March 13, 1942 3 Sheets-Sheet 3

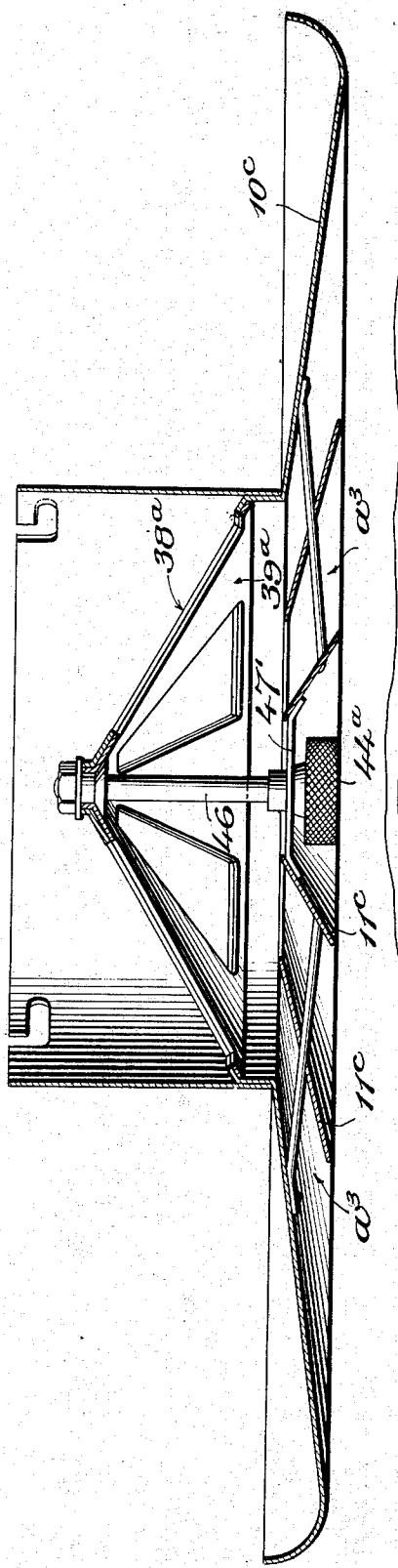


Fig. 5.

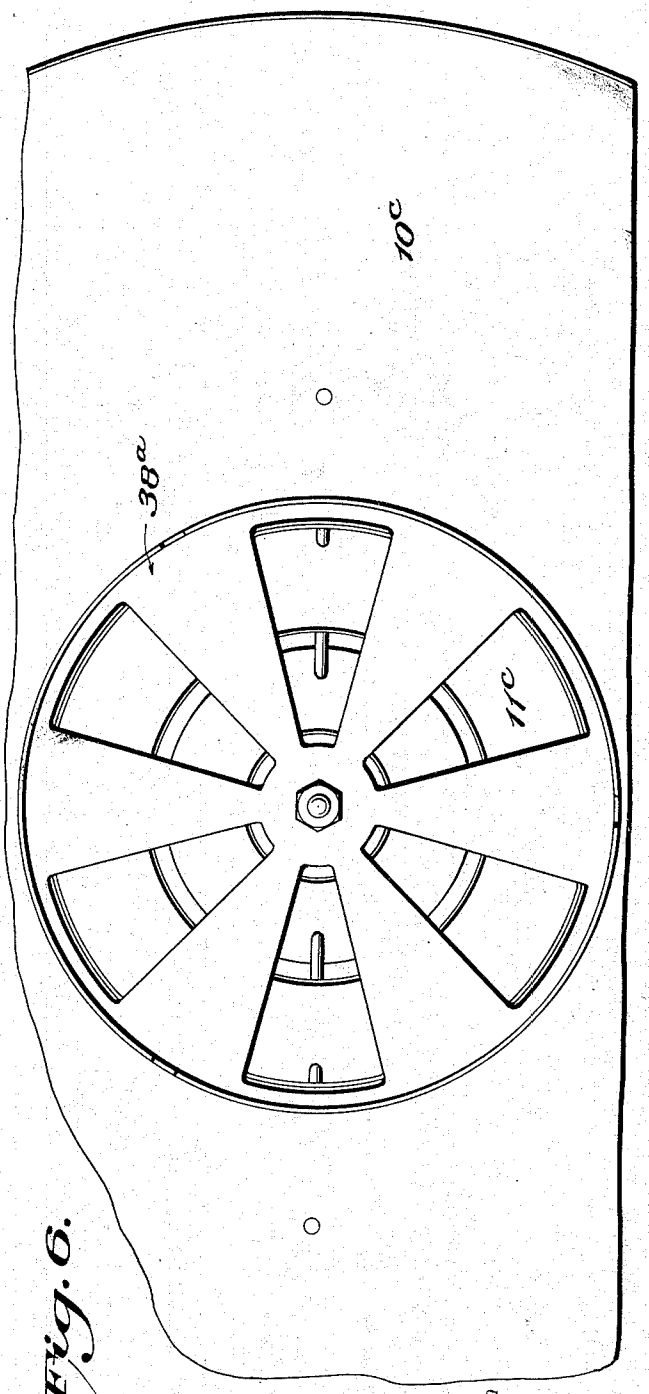


Fig. 6.

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2,369,303

AIR OUTLET DEVICE

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Application March 13, 1942, Serial No. 434,602

11 Claims. (Cl. 98—41)

This invention relates to the art of ventilation, and has particular reference to improvements in outlet devices for effecting diffused or substantially draftless delivery of fresh or treated air from air supply ducts into rooms or other enclosures for ventilating, air conditioning or other purposes.

More particularly, the invention relates to air outlet devices of the general type comprising any desired number of flaring members arranged to cooperate with each other to provide therebetween any desired number of flaring passageways through which supplied air flows, whereby diffusion and substantially draftless delivery of the supplied air is obtained, and the object of the invention, generally speaking, is to provide an air outlet device of this general type having embodied therein simple, practical means for adjustment to regulate flow of supplied air to and through the device.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in an air outlet device of the general type mentioned embodying the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the accompanying drawings, wherein are illustrated different practical embodiments of the invention and wherein like characters of reference denote corresponding parts in related views:

Figure 1 is a central, vertical section through an air outlet device constructed in accordance with one practical embodiment of the invention.

Figure 2 is a plan view of the device shown in Fig. 1.

Figures 3, 4 and 5 are views similar to Fig. 1 illustrating other practical embodiments of the invention; and

Figure 6 is a plan view of the device shown in Fig. 5.

Referring to the drawings in detail, first with particular reference to the specific embodiment of the device illustrated in Figs. 1 and 2, 10 designates a larger or outermost, open-ended, hollow, flaring member to be connected in any suitable manner at its upper, smaller end to an air supply duct, and 11 designates a smaller flaring member spaced inwardly from said member 10 to provide between said members an open-ended, flaring passageway *a* for flow of supplied air through and from the device. In this connection and according to the specific embodiment of the invention illustrated in the drawings, the member 11 is hollow and is open at its ends for flow of air therethrough. It is to be understood, however, that the member 11 may be solid instead of hollow and, if hollow, may, if desired, be closed at either or both ends. Also, it is to be understood that instead of the device including only a single smaller flaring member 11, it may include a series of any desired number of successively smaller, open-ended flaring members 11 spaced successively inwardly of one another to provide therebetween a series of any desired number of open-ended flaring passageways for flow of supplied air through the device. In any event, because of delivery of the supplied air through either a single flaring passageway, or through a plurality of flaring passageways, its velocity is reduced and it is delivered from the device in diffused form, with the result that any sensation of draft largely is eliminated. In fact, if the device includes a series of successively smaller flaring members, these members may be constructed and arranged in accordance with the teachings of F. J. Kurth Patent No. 2,142,134, of January 3, 1939, to provide for the supplied air producing an aspirating or recirculation flow of air through the device, thereby to promote diffusion of the supplied air and further to eliminate any sensation of draft.

As aforesaid, the larger open-ended flaring member 10 may be connected at its upper or smaller end to an air supply duct (not shown) in any suitable manner. In this connection and as illustrated in the present instance, said member 10 has at its upper end a neck 12 which may be directly connected in any suitable manner with an air supply duct. On the other hand, and as further illustrated in the present instance, the neck 12 may have attached thereto any auxiliary neck 13 for bayonet-joint connection or connection in any other suitable manner with an air supply duct. In any event, and in further accordance with the invention, a disk 14 is formed either as an integral part of the neck 12, or as a part separate from said neck and attached thereto in any suitable manner, and extends across said neck and is provided with any desired number of segmental slots or openings 15 for flow of supplied air therethrough to the passageway *a* or to the plurality of such passageways, as the case may be. In addition, a second disk 16 is disposed against or adjacent to one face of the disk 14 and is provided with segmental slots or openings 17 preferably corresponding in number and size to the slots or openings 15 in the disk 14 and is mounted in any suitable manner for rotatable adjustment relative to the disk 14. Accordingly, by rotatably adjusting the disk 16 its slots or openings 17 may be completely or partially alined with or disalined from the slots or openings 15 in the disk 14 to regulate the amount of air flowing from the air supply duct to the pasageway or passageways *a*.

In the embodiment of the invention illustrated in Figs. 1 and 2 the disk 14 is formed as an in-

tegral part of the neck 12 and the disk 16 is disposed forwardly of the disk 14. Moreover, the disk 14 has formed therein a marginal, annular, downwardly opening channel 18 in which is disposed a ring 19 of felt or other suitable material against which the marginal portion of the disk 16 bears, whereby an air seal is provided between said disks and the disk 16 is rendered easily and noiselessly rotatable relative to the disk 14.

Further in accordance with the embodiment of the invention illustrated in Figs. 1 and 2, the disk 16 is mounted for rotation relative to the disk 14 through the instrumentality of a shaft 20 which is employed for rotatably adjusting said disk 16. The shaft 20 is disposed coaxially of the device and at its upper end is of reduced diameter and thereby is shouldered. Its reduced end extends through a central opening in the disk 16 and its shoulder abuts the bottom face of said disk. Its reduced end also extends through a central bearing opening in the disk 14 and is provided, above said disk 14, with any suitable stop means engaging the top face of said disk 14. Accordingly, the shaft is held against downward movement because of its said stop means engaging the top face of the disk 14, and the disk 16 is held against downward movement relative to said disk 14 because of the shoulder on said shaft engaging the lower face of said disk 16.

The stop means referred to comprises in the present instance a washer 21 engaged on the reduced end of the shaft 20 and engaging the top face of the disk 14, and a cotter pin 22 extending through a transverse opening in the reduced end of said shaft above said washer and holding said washer against upward movement relative to said shaft, as well as holding said shaft against downward movement relative to the disk 14. Equivalently, a nut may be threaded on the reduced end of the shaft 20. In any event, the shaft 20 is pinned to the disk 16 or otherwise is suitably engaged therewith so that when said shaft is rotated said disk 16 is required to rotate therewith. In this connection and as illustrated by way of example in the present instance, the shaft 20, directly above its aforesaid shoulder, is of polygonal shape in cross section and is engaged in a central opening of corresponding polygonal shape in the disk 16. Thus, when the shaft 20 is rotated, the disk 16 is required to rotate therewith.

The shaft 20 extends from the disks 14, 16 downwardly through bearing openings in strut or cross members 23 which are employed to mount the flaring member or members 11 in the flaring member 10, and thereby said shaft is effectively restrained against sidewise movement. Moreover, said shaft 20 preferably is provided with a shoulder 24 which bears against the upper face of the uppermost of the strut or cross members 23 whereby it is held against downward movement independently of being held against such movement by the disk 14. In addition, said shaft is provided at its lower end with a knob 25 which is exposed at the bottom of the device for finger manipulation to rotate said shaft and thereby rotate the disk 16, and said knob engages the lower face of the lowermost of the struts or cross members 23 whereby said shaft is held against upward movement. Accordingly, by means of the knob 25 the shaft 20 and the disk 16 are freely rotatable to rotate the disk 16 and thus aline and disaline the slots or openings 17 in said disk with and from the slots or openings 15 in the disk 14 to regulate flow of supplied air to the flaring passageway or passageways a. In this connection, suitable stop means preferably is provided to limit rotation of the disk 16 beyond an amount sufficient to completely aline or disaline its slots or openings with and from the slots or openings of the disk 14. Such stop means may be of any desired form and is illustrated in the present instance by way of example as comprising a stop lug 26 extending from the disk 16 into one of the slots or openings 15 in the disk 14 to abut the edges of the disk 14 at the sides of said slot or opening 15 therein.

Referring now particularly to the embodiment of the invention illustrated in Fig. 3 of the drawings, it will be observed that the device comprises, in addition to a larger or outermost open-ended, hollow, flaring member, designated as 10^a, a second open-ended, hollow, flaring member, designated as 27, closely nested in said member 10^a and mounted for rotation with respect thereto by having its marginal portion 28 disposed within an inwardly opening marginal channel 29 of the member 10^a formed for example by suitably fastening to the marginal portion of said member 10^a at the lower side thereof a ring 30 having a flange 31 offset downwardly from said member 10^a. To render the member 27 freely and noiselessly rotatable relative to the member 10^a, rings 30' of felt or the like may be provided in the channel 29 above and below the marginal portion 28 of said member 27.

At the upper ends of the members 10^a and 27 are necks 32 and 33, respectively, the latter of which fits closely within the former, while extending across said necks are disks 34 and 35, respectively, which may be formed either as integral parts of said necks or as parts separate therefrom and fastened thereto in any suitable manner.

In the disk 34 is any desired number of segmental slots or openings 36, while in the disk 35 are slots or openings 37 which preferably are equal in number to and of the same size and shape as the slots or openings 36. Thus, by rotating the member 27, the slots or openings 37 in the disk 35 may be partly or completely alined with or disalined from the slots or openings 36 in the disk 34 to regulate the amount of air flowing to and through the device from an air supply duct with which the neck 32 of the member 10^a may be connected in any suitable manner, either directly or through the instrumentality of an auxiliary neck 13^a fastened to the neck 32 as in the case of the Figs. 1 and 2 embodiment of the invention.

Carried by the member 27 and spaced inwardly therefrom is one or more flaring members 11^a providing within said member 27 one or more flaring passageways a^2 as and for the same purpose as the one or more flaring passageways a of the Figs. 1 and 2 embodiment of the invention.

The member 27 may be directly grasped to effect its rotation or it may be provided with any suitable knob or handle means to facilitate its rotation. Moreover, instead of the member 27 being non-apertured as shown, it may be apertured or in the form of a spider to conserve weight and metal.

Referring now particularly to the embodiment of the invention illustrated in Fig. 4 of the drawings, it will be observed that the device comprises a larger or outermost open-ended, hollow, flaring member 10^b; a disk 38 of conical shape attached

at its upper or larger end to the member 10b at the smaller or open upper end thereof, and a rotatable disk 39, also of conical shape, disposed within and against the disk 38.

In the disk 38 is any desired number of segmental slots or openings 40, while in the disk 39 are slots or openings 41 which preferably are equal in number to and of the same size and shape as the slots or openings in the disk 38. Thus, by rotating the disk 39 the slots or openings 41 therein may be partly or completely alined with or disalined from the slots or openings 40 in the disk 38 to regulate the amount of air flowing to and through the device from an air supply duct with which the smaller or upper open end of the member 10b may be connected in any suitable manner.

Suitably mounted below the disk 38 is one or more flaring members 11b providing one or more flaring passageways a^3 as and for the same purpose as the one or more flaring passageways a or a^2 of the Figs. 1 and 2 and the Fig. 3 embodiments of the invention.

The disk 39 may be rotatably mounted within the disk 38 in any suitable manner and any suitable means may be provided for rotating said disk 39. In this connection and as illustrated by way of example in the drawings, the disk 39 has a short neck 42 at its lower end journaled in a short neck 43 at the lower end of the disk 38, and a knob or handle 44 is fastened to the neck 42 and is disposed below the disk 38 and has a shoulder underlying the neck 43. Thus, the disk 39 is retained within the disk 38 and is readily rotatable by the knob or handle 44 which is exposed at the bottom of the device for convenient finger manipulation. If desired, the disk 38 may be provided with pins 45 or, equivalently, with a rib or the like overlying the upper edge of the disk 39 to retain or to assist in retaining said disk 39 within said disk 38.

The flaring member, or members, 11b may be attached either to the disk 38, as shown, or to the flaring member 10b by means of struts in the manner illustrated in Figs. 1 to 3 or in any other suitable or desired manner.

A special advantage of disks of conical form as compared with disks of flat form is that for any given disk diameter the disks of conical form permit larger slots or openings to be provided therein for flow of supplied air to and through the device.

Referring now particularly to the embodiment of the invention illustrated in Figs. 5 and 6 of the drawings, it will be observed that the construction is generally the same as the Fig. 4 construction except that the conical, slotted disks, designated as 38a and 39a, respectively, extend upwardly instead of downwardly from the smaller or rear open end of the larger or outermost open-ended, hollow, flaring member designated as 10c. As is apparent, by virtue of this arrangement, space is afforded within the flaring member 10c to accommodate one or more flaring members 11c providing one or more open-ended flaring passageways a^3 for flow of supplied air through and from the device, and thereby the flaring member or members 11c may be disposed entirely, or substantially entirely, above the plane of the bottom of the member 10c, which is of importance in instances where it is desired not to have the device extend appreciably below a ceiling or equivalent wall upon which the device is mounted.

According to the Figs. 5 and 6 embodiment of the invention, the disk 39a may be mounted within the disk 38a in the same manner as described in connection with the Fig. 4 embodiment of the invention or in any other suitable manner, and the operating knob or handle 44a for the disk 39a may be connected with said disk by a shaft 46 which may extend through the smaller flaring member 11c and may be journaled in a suitable bearing member 47' carried by said smaller flaring member.

Reverting to the Fig. 3 embodiment of the invention, 47 designates a small housing mounted on the flaring member 10a at the upper side thereof and having a pin 48 slidably mounted therein and projecting through a hole in said flaring member 10a into engagement with the flaring member 27, while 49 designates a small spring in said housing 47 between the top thereof and said pin acting downwardly upon said pin and urging the same into engagement with said flaring member 27. In this way the flaring members 10a and 27 are held against chattering and, if desired, the flaring member 27 may have depressions to accommodate the pin 48 whereby the latter may serve to hold said flaring member 27 in different positions of rotative adjustment relative to said flaring member 10a.

Any desired number of pins 48 located at angularly spaced points may be employed for the purposes stated or said pins may be eliminated and dependence may be placed in a snug reception of the marginal portion of the flaring member 27 between the rings 30' to accomplish the purposes of said pins.

Obviously, according to any of the forms of the invention, the air flow regulating disks, instead of being of flat, conical or other straight wall form may be of spherical or other curved wall form.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

We claim:

1. An air outlet device comprising an open-ended hollow flaring member, means for connecting the rear or smaller end of said member to an air supply duct, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide within the device at least one open-ended flaring passageway for flow of supplied air through and from the device, a fixed slotted disk formed integrally with the rear end of said first mentioned flaring member and extending across the rear end of said passageway, and a cooperating slotted disk mounted for rotatable adjustment to aline and disaline its slots with and from the slots of said fixed disk, thereby to regulate flow of supplied air to said passageway.

2. An air outlet device as set forth in claim 1 in which the disks are of conical form.

3. An air outlet device comprising an open-ended hollow flaring member, means for connecting the rear or smaller open end of said member to an air supply duct, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide within the device at least one open-ended flaring passageway for flow of supplied air through and from the device, a fixed slotted disk extending across the rear end of said passageway, said disk having a

marginal forwardly opening channel, a sealing ring disposed in said channel, a second slotted disk disposed in front of said fixed disk and having its marginal portion disposed in sealing engagement with said sealing ring, and means mounting said second slotted disk for rotation to aline and disaline its slots with and from the slots of said fixed disk, thereby to regulate flow of supplied air to said passageway.

4. An air outlet device comprising an open-ended hollow flaring member, means for connecting the rear or smaller open end of said member to an air supply duct, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide within the device at least one open-ended flaring passageway for flow of supplied air through and from the device, a cross bar extending from side to side of said first mentioned flaring member through and across said smaller flaring member and fixedly connecting said flaring members together, a fixed slotted disk extending across the rear end of said passageway, a cooperating slotted disk mounted for rotatable adjustment to aline and disaline its slots with and from the slots of said fixed disk, thereby to regulate flow of supplied air to said passageway, an operating shaft for said rotatable disk disposed axially of the device and fixed at its rear end to said rotatable disk and journaled in said cross bar, and a handle on the front end of said shaft exposed at the front end of the device for manipulation to rotatably adjust said shaft and thereby rotatably adjust said rotatable disk.

5. An air outlet device comprising an open-ended hollow flaring member, means for connecting the rear or smaller end of said member to an air supply duct, a second hollow flaring member closely nested in said first mentioned member, at least one smaller flaring member fixed to and spaced inwardly from said second mentioned flaring member to provide within the latter member at least one open-ended flaring passageway for flow of supplied air through and from the device, a disk extending across the rear end of said first mentioned flaring member and having slots therein for flow of supplied air to said passageway, a disk carried by and extending across the rear end of said second mentioned hollow member and also having slots therein for flow of supplied air to said passageway, and means mounting said second mentioned flaring member for rotation relative to said first mentioned flaring member relative to said first mentioned disk to aline and disaline the slots of the respective disks and thus regulate flow of supplied air to said passageway.

6. An air outlet device as set forth in claim 5 in which the first mentioned flaring member is provided with a marginal channel accommodating the marginal portion of the second mentioned disk whereby the second mentioned disk is retained in assembly with the first mentioned disk and is mounted for rotation with respect thereto.

7. An air outlet device comprising an open-ended hollow flaring member including a cylindrical neck integral therewith and extending rearwardly from the rear or smaller end thereof, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide at least one open-ended flaring passageway for flow of supplied air through and from the device, a slotted disk at the rear end of said neck integral therewith and extending across the rear end of said passageway, and a cooperating slotted disk mounted for rotatable adjustment to aline and disaline its slots with and from the slots of said fixed disk, thereby to regulate flow of supplied air through said passageway.

8. An air outlet device comprising an open-ended hollow flaring member including a cylindrical neck integral therewith and extending rearwardly from the rear or smaller end thereof, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide at least one open-ended flaring passageway for flow of supplied air through and from the device, a slotted disk at the rear end of said neck integral therewith and extending across the rear end of said passageway, said disk having a marginal forwardly opening channel, a sealing ring disposed in said channel, a second slotted disk disposed in front of said fixed disk and having its marginal portion engaged with said sealing ring, and means mounting said second slotted disk for rotation to aline and disaline its slots with and from the slots of said fixed disk, thereby to regulate flow of supplied air to said passageway.

9. An air outlet device as set forth in claim 7 in which the slotted disks are of conical form.

10. An air outlet device comprising an open-ended hollow flaring member including a cylindrical neck integral therewith and extending rearwardly from the rear end thereof, a second cylindrical neck within and closely fitting said first mentioned neck, a slotted disk integral with and extending across the rear end of said first mentioned neck, a second slotted disk integral with and extending across the rear end of said second mentioned neck and disposed closely adjacent to said first mentioned neck, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide at least one open-ended flaring passageway for flow of supplied air through and from the device, and means mounting said second mentioned neck and disk for rotation to aline and disaline the slots of said second mentioned disk with and from the slots of said first mentioned disk to regulate flow of supplied air through said passageway.

11. An air outlet device comprising an open-ended hollow flaring member including a cylindrical neck integral therewith and extending rearwardly from the rear end thereof, a second cylindrical neck within and closely fitting said first mentioned neck, a slotted disk fixed with respect to and extending across the rear end of said first mentioned neck, a second slotted disk fixed with respect to and extending across the rear end of said second mentioned neck and disposed closely adjacent to said first mentioned neck, at least one smaller flaring member spaced inwardly from said first mentioned flaring member to provide at least one open-ended flaring passageway for flow of supplied air through and from the device, and means extending outwardly from the front end of said second mentioned neck in underlying closely adjacent relationship to and rotatably mounted upon said first mentioned flaring member to support said second mentioned neck and disk for rotation to aline and disaline the slots of the disk thereof with and from the slots of said first mentioned disk, thereby to regulate flow of supplied air through and from said passageway.

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