

[54] **AIR DISTRIBUTOR**
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[51] Int. Cl. **F24f 13/06, F24f 13/08**
[58] Field of Search **98/40 V, 40 VM, 103, 98/108, 110-113, 121 A, 121 R**

2,864,301 12/1958 Katz 98/40 V
2,853,935 9/1958 Crowle et al. 98/40 V
2,790,371 5/1957 Wheeler 98/40 VM

FOREIGN PATENTS OR APPLICATIONS

847,843 9/1960 Great Britain 98/40 V

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Assistant Examiner—Paul Devinsky
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[56] **References Cited**
UNITED STATES PATENTS

3,683,787 8/1972 Cary 98/40 V
3,253,531 5/1966 Eberhart 98/40 V
3,252,398 5/1966 First 98/40 V
3,242,846 3/1966 Bunn 98/40 V

[57] **ABSTRACT**
An air distributor for controlling the direction of air flow out of a passageway whereby the air exiting the passageway is controllably deflected by a combination of axially spaced transverse vanes and angularly spaced radial vanes mounted on a rotor extending across the outlet of the passageway.

4 Claims, 3 Drawing Figures

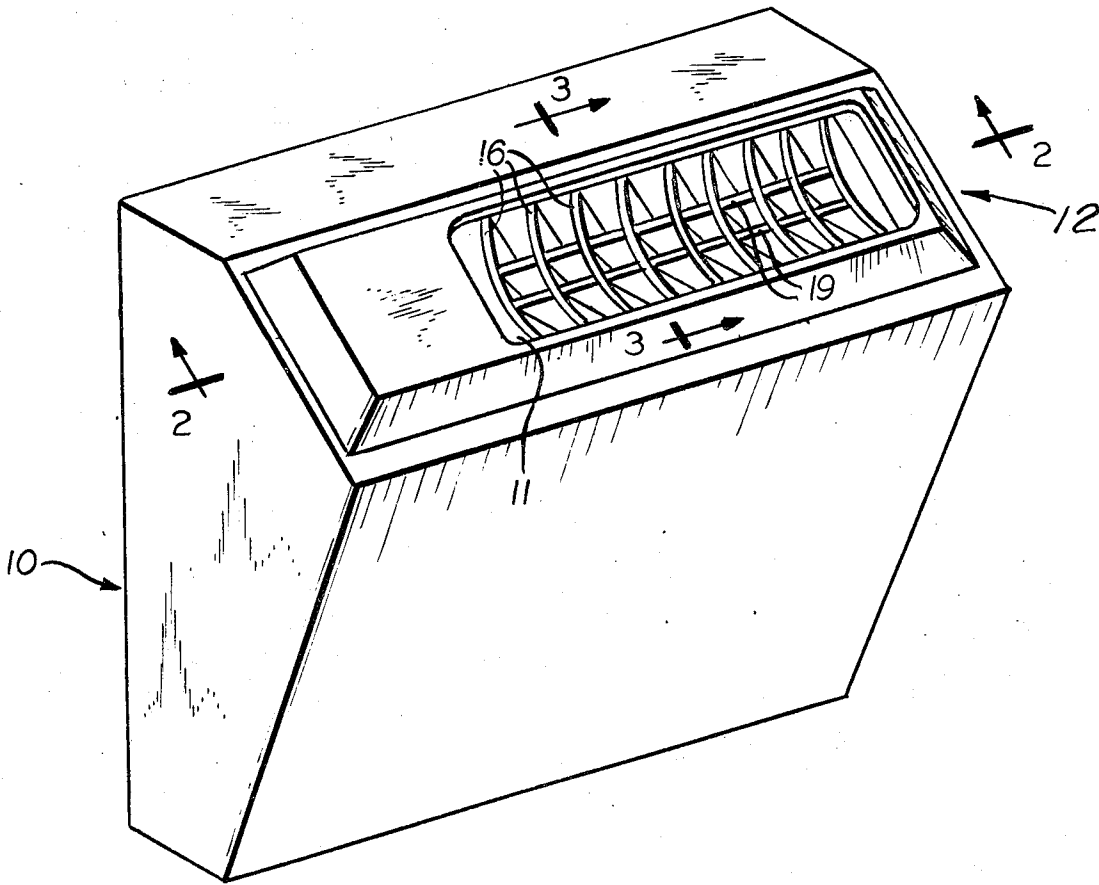


FIG. 1.

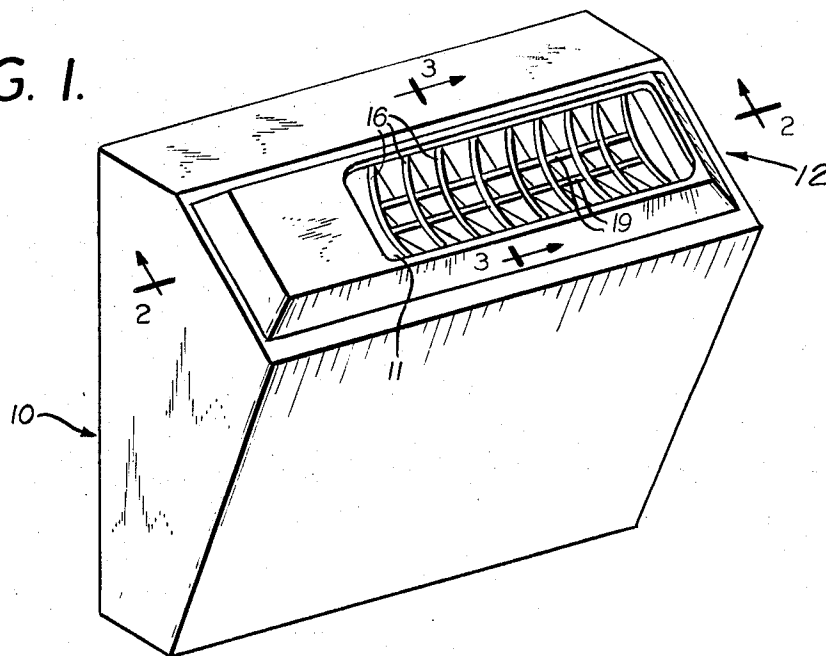


FIG. 2.

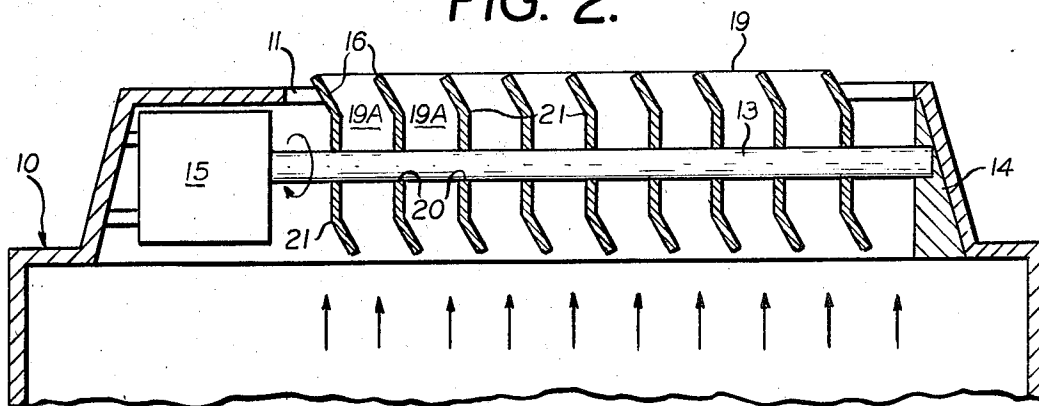
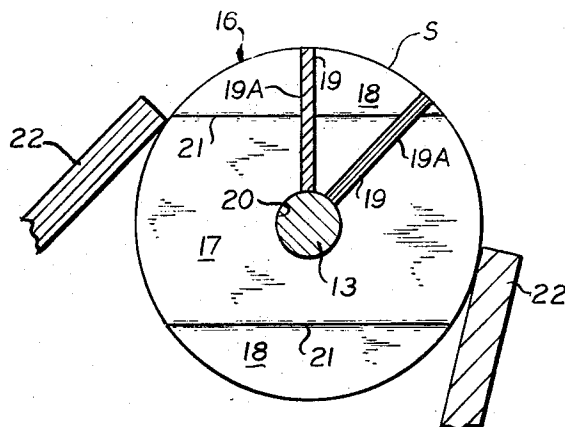


FIG. 3.



AIR DISTRIBUTOR

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to an air distributor for controlling the direction of air flow from an opening of a passageway, such as may be used in connection with air conditioning and heating installations.

In the prior art, there are a variety of air deflector type distributors which use fins or vanes to control the direction of an outflowing air current. One type of air distributor which uses a rotor with parallel, spaced transverse vanes is exemplified by U. S. Pat. No. 2,853,935 issued Sept. 30, 1958 to W. G. Crowle et al. With that particular design, flat vanes are mounted obliquely upon a rotor rod of circular cross section and therefore each vane must be provided with a properly cut elliptical hole in order to have a snug fit upon the rotor, a feature which tends to complicate fabrication.

It has been found that a rotor equipped with only axially spaced transverse vanes does not give a suitably uniform distribution of air. For a more uniform distribution of air, the invention provides an air distributor whereby the air exiting the passageway is controllably deflected by a combination of axially spaced transverse vanes and angularly spaced radial vanes mounted on a rotor extending across the outlet of the passageway.

The transverse vanes are made from flat elliptical disc stock that is bent so that each vane has a central portion and a pair of opposite outer portions extending from the central portion and inclined at equal angles with respect thereto. The central portion is disposed generally perpendicular to the rotor axis when the vane is mounted on the rotor, and the several vanes are oriented in generally parallel relation to one another so that their peripheral edges lie upon a theoretical circular cylinder boundary surface. By having a central portion perpendicular to the rotor, the vane mounting hold can be circular instead of elliptical for vanes that are for most of their area oblique to the rotor. The dimensions of the vanes are chosen such that the diameter of the cylindrical boundary surface is matched in size to the outlet to assure that substantially all of the air flow will pass between the vanes before entering the space around the outlet.

The radial vanes extend longitudinally for approximately the entire length of the rotor and are made with aligned sections that fit between the transverse vanes. According to a preferred embodiment of the invention, there are mounted on the rotor a pair of full-length radial vanes angularly spaced apart at an acute angle relative to each other.

Motor means are provided for rotatably driving the rotor and vanes at a suitable slow speed whereby the transverse vanes operate to distribute air along a sweep path parallel to the rotor axis, and the radial vanes concurrently distribute air along a sweep path perpendicular to the rotor axis.

For a better understanding of the invention and its several advantages, reference should be had to the following detailed description and accompanying drawings which exemplify a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a perspective view of an air distributor constructed in accordance with a preferred embodiment of the invention shown as installed in the discharge outlet of a typical air conditioning duct.

FIG. 2 is a sectional view of the air distributor and duct shown in FIG. 1 as taken along line 2—2 therein.

FIG. 3 is a sectional view of the air distributor and duct of FIG. 1 as taken along line 3—3 therein.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

In FIGS. 1-3 there is illustrated a typical air conditioning duct 10 having an outlet 11 through which the current of air flowing in duct 10 exits. The air distributor of this invention, generally designated by the numeral 12, is mounted within the outlet 11 for controlling the direction of flow of the exiting air current to effect a substantially uniform distribution of conditioned air in the room area to be served.

Distributor 12 has a rotor 13 that is supported at one end in a journal 14 for rotation relative to outlet 11, and connected at the opposite end to an electric motor 15 for rotation thereby at a selected slow speed.

On rotor 13 are mounted a plurality of transverse vanes 16 disposed in parallel, axially spaced apart relation to one another. Each vane 16 has a central portion 17 which is connected to rotor 13 and disposed generally perpendicular thereto, and a pair of opposite outer portions 18 extending from central portion 17 and inclined at an acute angle with respect to the longitudinal axis of the rotor 13.

In addition to the vanes 16, there are mounted upon rotor 13 a plurality, but preferably a pair, of angularly spaced apart vanes 19 that extend radially with respect to the axis of rotor 13 for approximately the full exposed length thereof. As better seen in FIG. 3, the vanes 19 are disposed at an acute angle relative to each other and are connected to rotor 13 edgewise. A variety of options are available in the fabrication of the radial vanes 19. If desired, the vanes 19 can each be made as a single piece, in which case suitable interlocking slots are provided in both sets of vanes 16 and 19 at their intersections so that the portions 19A of each vane 19 can fit between corresponding transverse vanes 16 as shown in FIGS. 2 and 3. Alternatively, the vane portions 19A can be made as separate sections that are joined to rotor 13 in tandem alignment with one another to define essentially the same type air deflector structure as provided by single-piece vanes 19.

Because the central portion 17 of each Z-shaped transverse vane 16 is perpendicular to the rotor 13, a snug fit can be achieved with a vane mounting hole 20 having the same circular configuration as the rotor 13 cross section.

The vanes 16 are expediently made from flat sheet stock that is cut to an approximate elliptical shape and bent along the parallel lines 21 to form the inclined outer portions 18.

Air distributor 12 is arranged whereby substantially all of the exiting air flow must pass between vanes 16 and around vanes 19. Accordingly, the vanes 16 are contoured such that when mounted on rotor 13, their peripheral edges will coincide with a theoretical circular cylinder boundary surface S of a diameter that fits closely between the walls 22 defining outlet 11. With this arrangement, no significant amount of air can pass outside the controlling influence of vanes 16 and 19.

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As rotor 13 is turned by motor 15, the transverse vanes 16 distribute air along an alternating sweep path parallel to the rotor 13 axis, and the radial vanes simultaneously distribute air along an alternating sweep path perpendicular to the axis of rotor 13.

It should be understood that while the invention contemplates the use of a motor 15 that drives rotor 13, a motor driven air distributor 12 need not be provided in all cases. If desired, the motor 15 can be eliminated and rotor 13 can be turned manually, as by an affixed wheel (not shown), to position the array of vanes 16 and 19 in a selected rotary attitude for concentrating the flow of air along a corresponding direction.

From the foregoing, the artisan will realize that the invention is susceptible to many variations and modifications to meet the needs of a particular situation, and that such changes as become obvious from the requirements of a given application can be made without departing from the scope of the invention.

What is claimed is:

1. In a device wherein a current of air flows through a passageway and exits at an outlet thereof, an air distributor mounted in said outlet for controlling the direction of flow of the air current, said distributor com-

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prising a rotor element extending across said passageway outlet and disposed for rotation relative thereto about a longitudinal axis, a plurality of axially spaced apart vanes mounted on said rotor element in transverse relation to the longitudinal axis thereof, and a plurality of angularly spaced apart vanes mounted on said rotor element in radially extending relation to said longitudinal axis, said axially spaced transverse vanes each having a central portion connected to the rotor element and disposed generally perpendicular thereto, and a pair of opposite outer portions extending from said central portion and inclined at an acute angle with respect to the rotor element.

2. An air distributor according to claim 1 wherein said angularly spaced radial vanes are disposed at an acute angle relative to each other.

3. An air distributor according to claim 1 including motor means connected to said rotor element to rotatably drive same.

4. An air distributor according to claim 1 wherein the peripheral edges of said axially spaced transverse vanes generally coincide with a given common cylindrical boundary surface.

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