Aug. 26, 1958 V. F. VALLERO 2,848,936

DIFFUSER

Filed Sept. 4, 1956 2 Sheets-Sheet 1

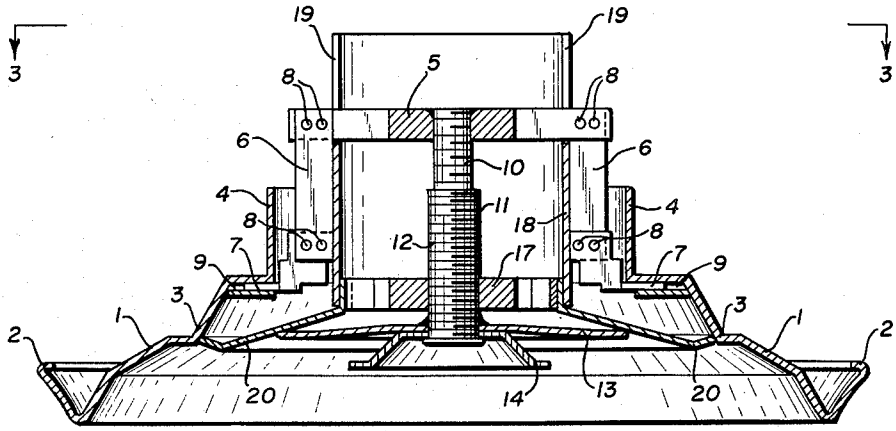


Fig. - 1

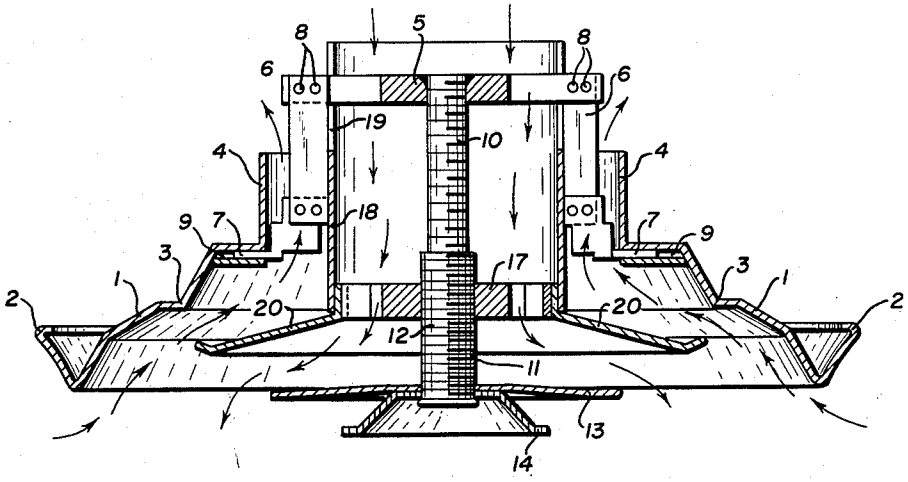


Fig. - 2

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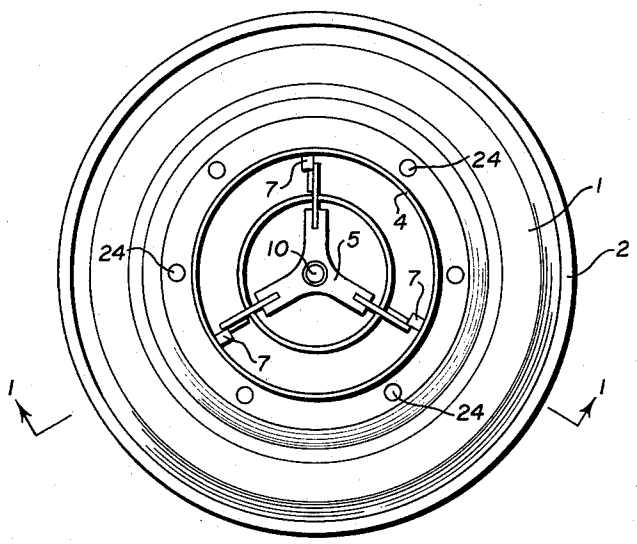


Fig. - 3

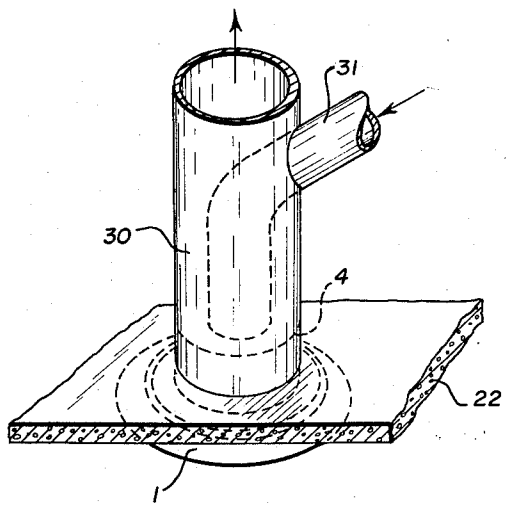


Fig. - 5

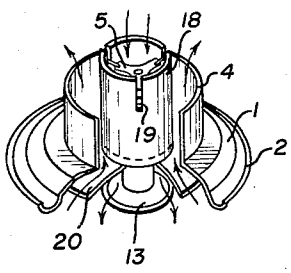


Fig. - 4

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2,848,936

DIFFUSER

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Application September 4, 1956, Serial No. 607,700

6 Claims. (Cl. 98—40)

This invention relates to diffusers and more particularly to ceiling mounted ventilating diffusers which have arrangements for dual air circulating systems.

Included among the objects and advantages of the present invention is the provision of a dual air circulating ventilating diffuser which is adapted to be ceiling mounted. A pair of integrated diffusing vanes are provided for the diffuser for directing movement of air through the diffuser when in open position and to completely close the passages through the diffuser when closed. The two vanes of the diffuser are interconnected through a drive mechanism which is arranged to simultaneously open one of the vanes when the other vane is opened. The vanes are interconnected to the drive mechanism and normally are arranged so that one vane opens at a faster rate than the other vane, and the vanes are arranged for simultaneous opening and closing movements. The diffuser is arranged with concentric passages and concentric vanes to open and close the passages.

These and other objects and advantages of the invention may be readily ascertained by referring to the following description and appended drawings in which:

Fig. 1 is a side elevational view of a diffuser according to the invention showing its vanes or baffles in closed position;

Fig. 2 is a side elevational cross sectional view of a diffuser according to the invention illustrating the vanes in open position;

Fig. 3 is a top plan view of the baffle according to the invention;

Fig. 4 is a cut away perspective view of the diffuser illustrating the air flow through the diffuser; and

Fig. 5 is a detailed view of one particular installation of the diffuser of the invention.

In the device illustrated in the drawings, a diffuser bell **1** is provided with an outer lip **2** which is arranged to seat against the building partition through which the device is extended. In normal use the diffuser is mounted through the ceiling of a room and the lip **2** of the bell seats against the ceiling. The bell body extends upwardly through the ceiling. An internal shoulder **3** is provided between the extremities of the bell **1**. The inner extremity of the bell is interconnected with a tubular conduit **4** which extends upwardly through the partition on which the bell is mounted and provides a passage through the partition. A spider **5** having three extending arms is mounted in the conduit **4**. Each of the outwardly extending arms is provided with a downward extension **6** attached thereto by means of rivets **8** or other suitable means. The lower end of the extensions **6** are provided with outwardly extending lock prongs **7** secured as by means of rivets **8** or other suitable means to the extension **6**. The prongs **7** are arranged to fit in lock slots **9** in the bell **1** so that the spider **5** is substantially stationary in the conduit **4**. The slots **9** are arranged to permit the entry of the prongs **7** and by rotating the spider **5** it is locked in position in the bell.

A double lead right hand threaded stud **10** is secured

into the spider **5** and extends downwardly substantially centrally of the conduit **4**. An elongated double nut or nipple **11** is threadedly mounted on the stud **10**, and the nut is provided, also, with external threads **12** on the exterior thereof. The exterior threads **12** are preferably a single lead right handed outside thread. A diffuser vane **13** is secured to the lower end of the elongated nut **11**, and a small, cup-shaped vane **14** is provided extending therebelow. A stationary spider **17** is threadedly mounted on the double nut **11** and the spider is threaded to accommodate the exterior threads **12** of the nut **11**. A conduit **18** is mounted over the spider **17** and slots **19** permit movement of the conduit **18** reciprocally of the arms of the spider **5**. A larger diffuser vane **20** is secured to the tube **18** and the periphery extends outwardly in such a manner as to contact the internal shoulder **3** of the main diffuser bell **1**.

The main bell **1** is inserted into a proper size hole in the ceiling of the structure, for operable installation of the diffuser. The conduit **4** may be interconnected to a ventilating conduit **30**, indicated in Fig. 5, and a laterally projecting conduit **31** may be interconnected with the inner conduit **18** in such a manner to extend through the wall of conduit **30**. The vane **13** is turned to move the same from closed to open position as indicated in Fig. 2. On turning the vane **13**, the nut **11** turns moving the spider **17** away from the spider **5** and simultaneously moving the vane **20** away from the shoulder **3**. The vane **13** is unscrewed to provide an opening between the vane **13** and the vane **20**, and, also, between the vane **20** and the shoulder **3** for ventilating purposes.

In certain installations it may be desirable to have both an inlet and exhaust connected to the same diffuser, in which case an assembly similar to that shown in Fig. 5 is utilized. In this case entering air is ejected through conduit **31** which passes down the conduit **18** past the spider **17** and over the diffuser vane **13**, indicated by the arrows in Fig. 2. An exhaust fan is interconnected with the conduit **30** and air from the room passes upwardly between the vane **20** and the shoulder **3** through the conduit **4**. By properly adjusting the size of the openings between the two vanes correct circulation for the particular installation may be obtained.

During certain seasons of the year such ventilating diffusers are not required, in which case the vane **13** is screwed tight into the spider **17** so as to close the space between the vane **13** and the vane **20** forming an effective closure thereto. Simultaneously with closing the vane **13** on the vane **20**, the drive mechanism of the diffuser pulls the vane **20** onto the shoulder **3** effectively closing the space therebetween. With the drive of the device, a single operation opens both diffuser vanes providing a simplified means for controlling the diffuser.

When the device is used both as an inlet and an outlet ventilating diffuser, the space between the tube **4** and the inner conduit **18** is utilized for the exhaust conduit since it draws the hot air from adjacent the ceiling while incoming air in the inner conduit is directed downwardly and outwardly by means of the diffuser vane **20**. Where the device is utilized only for an exhaust or only for an inlet the adjustable vanes provide means for positive control of the incoming or outgoing air. The drive mechanism provides a single control for controlling the position of the vanes and provides means for completely closing the diffuser when the device is not in use.

While the drive mechanism is shown as having a 2 to 1 ratio between the two thread systems, it may be, of course, variable to meet the particular purposes of the installation.

The construction of the diffuser of the present invention utilizes a single bracing system, that is, the spider **5**

with extending arms **6** and attaching means **7** so that it is easily installed without additional bracing to the structure. This means that there are fewer parts to the device, thereby making it more desirable from the construction standpoint. Also, the removable feature of the vanes makes installation easier. The device, furthermore, provides means for the use of standardized parts, for example, the drive mechanism may be standardized and by merely extending the arms of the spider **6** and by increasing the diameter of the vanes **20** and **13** larger sizes of diffuser utilize the same parts. This avoids a multiplicity of parts to cover a substantial range of sizes of diffusers.

While the device has been illustrated with the spider **5** and depending arms **6** holding the removable fastening means **7**, it is obvious that the arms **6** may be shortened or dispensed with by changing the size of the threaded members of the drive. As illustrated, the device is arranged to fit standard diffuser parts with a minimum of redesign. The drive mechanism may, obviously, be changed to fit various diffusers without departing from the concept and spirit of the invention.

While the device has been illustrated by reference to a particular embodiment there is no intent to limit the scope or the concept of the invention to the precise details so set forth except insofar as defined in the following claims.

I claim:

1. A diffuser of the class described comprising a tubular conduit arranged to provide a passage through a building partition, a flared outlet secured to said tubular conduit and providing an outlet on one side of said partition, a rigid spider mounted in said tubular conduit, a double lead right hand stud mounted on said spider and extending substantially centerwise of said tubular conduit, an elongated nut having a double lead right hand inside thread and a single lead right hand outside thread mounted on said stud, a disc-shaped vane mounted on one end of said elongated nut and disposed internally of said flared outlet, a second spider threadedly engaging the external threads of said elongated nut and providing extending arms internally of said tubular conduit, a concentric tubular member secured to said second spider and arranged to reciprocally move therewith and providing an internal passage of said tubular conduit, an annular vane interconnected with and extending laterally from an end of said tubular member and disposed internally of said outlet and arranged to sealingly engage the opening between said conduit and said tubular member and to extend transversely therefrom, and means arranged to prevent rotation of said tubular member and permit reciprocal movement thereof, whereby rotation of said disc-shaped vane moves the same toward and away from said annular vane to open and close a space therebetween and to simultaneously move said annular vane toward and away from said flared outlet so as to open and close a passage therebetween.

2. A diffuser of the class described comprising a body having a flared annular outlet at one end of a tubular section and arranged for mounting through a building portion to provide a passage therethrough, a tubular conduit reciprocally telescoped in said tubular section, an annular vane mounted on said tubular conduit and

disposed in said outlet, a disc-like vane reciprocally disposed in said outlet and arranged to move toward and away from said annular vane for closing and opening said tubular conduit, mounting means inclusive of a spider mounted on said tubular conduit and an interconnected stud mounted on said disc-like vane interconnecting said disc-like vane and said tubular conduit, and means for releasably mounting said tubular conduit internally of said tubular section interconnected with said mounting means whereby reciprocal movement of said tubular conduit moves said annular vane into and out of engagement with said flared outlet, said mounting means including an interconnected drive for simultaneously moving said annular vane toward and away from said outlet as said disc-like vane is moved toward and away from said annular vane.

3. A diffuser according to claim 2 in which said tubular conduit is substantially smaller than said tubular section and said annular vane has a maximum diameter intermediate the diameter of said annular outlet, and said mounting means includes a spider mount attached to said tubular section and a linking means interconnected with the spider mounted on said tubular conduit.

4. A diffuser according to claim 2 in which said disc-like vane is mounted on a stationary stud threadedly engaging the spider in said tubular conduit and a threaded stud mounted on the spider in said tubular section engaging said stationary stud and arranged for simultaneously moving said tubular conduit on movement of said disc-like vane.

5. A diffuser of the class described comprising a body having a flared, annular outlet at one end of a tubular section and arranged for mounting through a building partition to provide a passage therethrough, a spider mount removably secured to said body, a stud suspended from said spider centerwise of said tubular section, a double threaded nipple revolvably mounted on said stud, a nut having extending arms revolvably mounted on said nipple, a tubular conduit telescopically disposed in said tubular section interconnected with the arms on said nut and arranged for reciprocal movement in said tubular section, there being an annular opening between said tubular section and said conduit, an annular flange mounted on said tubular conduit arranged to open and close the annular opening between said tubular section and said tubular conduit, a disc-like vane secured to said nipple and arranged to move therewith toward and away from said tubular conduit so as to close and open the same, and means for preventing rotation of said tubular conduit.

6. A diffuser according to claim 5 in which the means preventing rotation of said tubular conduit includes a plurality of slits therein with the walls of said slits bearing against said spider when said disc-like vane is rotated.

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