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S. LYTTLE ETAL

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AIR CONDITIONING DIFFUSERS

Filed Dec. 28, 1959

Fig. 1.

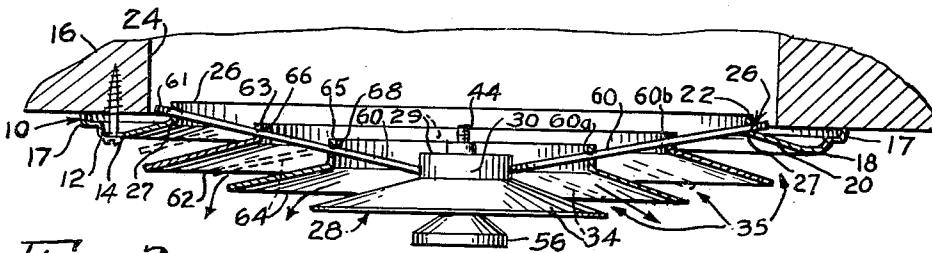


Fig. 2.

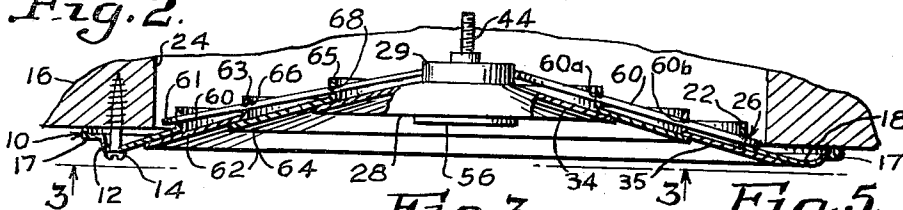


Fig. 3.

Fig. 5.

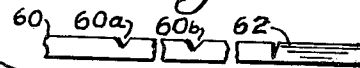
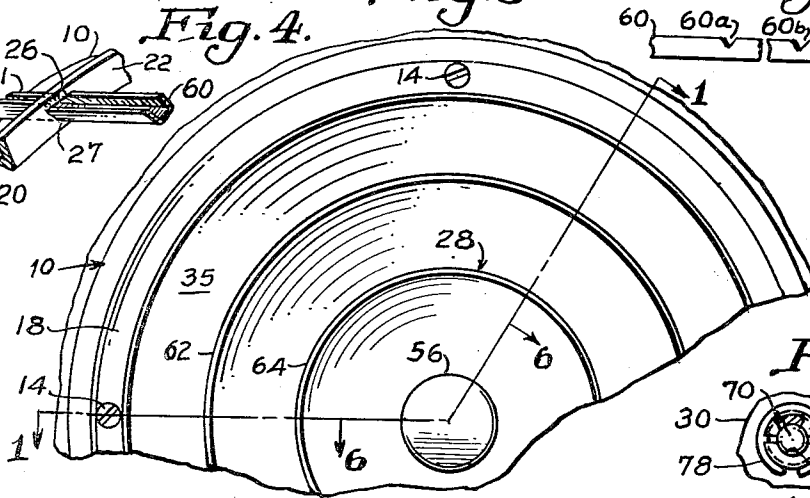
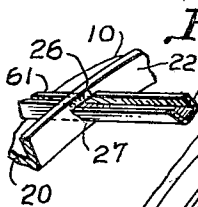


Fig. 6.

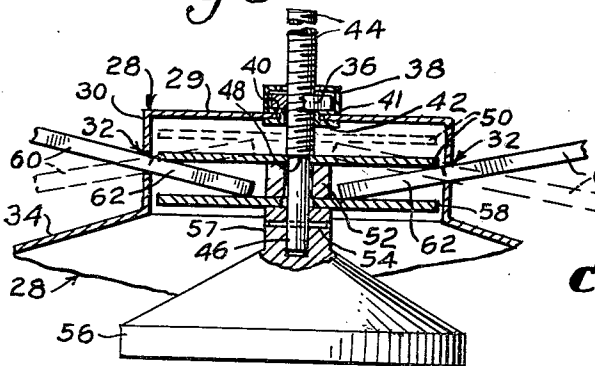


Fig. 8.

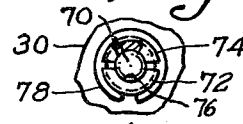
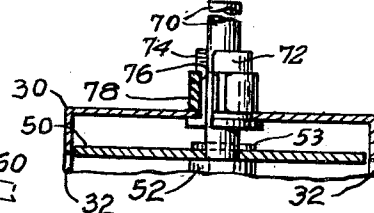


Fig. 7.



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AIR CONDITIONING DIFFUSERS

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This invention relates to new and useful improvements in air conditioning systems and more particularly it relates to a device for diffusing heated or cool air.

Heretofore it has been customary to control the directional and volume outlet of an air conditioning system with a damper, but it has been found that dampers are noisy in operation and do not provide the efficient control that is necessary in modern air conditioning systems.

A basic object of our invention is to provide an outlet control or diffuser that will eliminate the damper and the mounting ring that is usually placed adjacent thereto to provide support for said diffuser.

An important object of our invention is the provision of a simple and practical form of diffuser that has a fully open and a fully closed position and also has a great number of adjustments between said positions.

Another object of our invention is to provide a practical diffuser of the disc type that may be connected directly to the ceiling, said diffuser being adjustable to cover a small or wide area.

For air conditioning purposes, our invention also has for one of its objects the provision of a novel device that is positive in operation, convenient in use, economical of manufacture, easily installed in a working position and easily disconnected therefrom.

The invention also resides in the novel combinations, arrangements and functional relationships of elements as set forth in the following specification and particularly pointed out in the following claims. It is understood that the drawing merely shows one or more preferred embodiments of our invention, which are given by way of illustration only.

In the drawing, like numerals designate similar parts in the several views.

FIG. 1 is a vertical section taken on the line 1—1 of FIG. 3 showing the fully open position of the diffusing discs, and in dotted lines an intermediate position thereof.

FIG. 2 shows the fully closed position of the device.

FIG. 3 is a partial, bottom plan view taken on the line 3—3 of FIG. 2.

FIG. 4 is a partial detail, perspective view showing one of the control spokes connected to the fastening frame ring.

FIG. 5 is a detail view of one of the spokes showing the disc locating notches.

FIG. 6 is a vertical section, on an enlarged scale, taken on the line 6—6 of FIG. 3 showing the knob used for adjusting the position of the diffusing discs.

FIG. 7 is a partial section similar to FIG. 6 showing a modified form of adjustment and FIG. 8 is a partial plan view of FIG. 7.

The numeral 10 designates a fastening or mounting frame member for a round diffuser, which is shown by way of example, the frame having equally spaced apertures 12 for the reception of fastening screws 14 which are fixed to a ceiling or other support 16. Frame 10, which is preferably metal, has a circular outer flange 17, which makes airtight contact with ceiling 16, said flange merging with rounded portion 18, which in turn merges with a flat, inwardly sloping portion 20 that terminates in a reduced, upright concentric rim 22, said rim being spaced from aperture 24 in ceiling 16, and being provided with equally spaced openings 26.

Centrally located in the diffuser is a frusto-conical disc

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or circular center piece 28, formed preferably of metal and having an apertured top wall 29, and cylindrical side walls 30. The side walls having openings 32, similar to openings 26, and in register therewith. Walls 30 merge into a downwardly sloping disc-like portion 34 having the same slope as portion 20, which in this instance is 15° (fifteen degrees).

The aperture in top wall 29 is provided with a conventional spring type nut 36, said nut being housed in a flat spring member 38, having a recessed portion 40 and annular clamping flanges 41 and 42. A threaded bolt 44, threadedly engages nut 40 and has a reduced, smooth portion 46, forming a shoulder 48. A washer 50 engages shoulder 48, and abuts spacer 52. The portion 46 is apertured for the reception of pin 54 which fastens it to the reduced, apertured portion 57 of a control knob 56. A washer 58 rests upon the inner face of reduced portion 57 of knob 56, engaging spacer 52.

The space between washers 50 and 58 permits the same to alternately engage spokes or levers 60, the same being spaced to register with openings 26 and 32 and being channel shaped as shown in FIG. 4. End portions 61 and 62 of levers 60 are crimped or pinched. The levers 60, see FIG. 5, are notched at 60a and b to automatically located conical diffuser discs 62 and 64, said discs having the same slope as portions 20 and 34, and forming equal air channels 35.

Rims 63 and 65 of discs 62 and 64 are provided with openings 66 and 68 which register with openings 26 and 32. As shown in FIG. 1, the levers, in this instance three in number, placed 120° apart, extend through openings 26, 66, 68 and 32. The crimped portions 61 and 62 of levers 60 extend beyond openings 26 and 32 to prevent displacement of said levers.

The openings 26 in rim 22 have fixed edges which are engaged by spokes 60 to form a fulcrum or pivot 27.

FIG. 8 shows a modification wherein rod 70 is provided with partly circular, preferably nylon, gripping members 72 and 74 having a recess 76 for the reception of a spring clamp 78. The position of FIG. 1 may be regarded as normal, since the discs are fully open, thereby permitting conditioned air to enter through aperture 24 in ceiling 16 and channels 35, to diffuse by contact with discs 62 and 64 and center piece 28 over a limited area of space close to the diffuser.

When it is desired to air condition a larger room area, see dotted line position of the discs of FIG. 1, the knob 56 of FIG. 6 is turned to feed bolt 44 up through nut 36 to move levers 60 toward the position of FIG. 2. The fulcrums or pivots 27 permit the levers 60 to gradually adjust the flow or diffusion of air to cover any desired area, under control of knob 56.

FIG. 8 shows a rod 70 which may be moved in a manner similar to bolt 44 and held in adjusted position by grippers 72 and 74 and friction clamp 78.

While the foregoing has shown and described what is now thought to be the best means of carrying out our invention, it is understood that the right is reserved to make numerous changes in the size, shape, materials and arrangement of the parts within the purview of the appended claims.

We claim:

1. A diffuser of the character described for use with an air duct in a ceiling and the like comprising a peripheral frame having a plurality of apertures therealong, said peripheral frame having a central opening, levers diverging outward from said central opening, said levers having their outer ends pivotally mounted in said peripheral frame apertures, a center piece container within said central opening, said center piece container having a plurality of spaced apertures for slidably receiving the inner converging ends of said levers with said container apertures

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acting as a sliding fulcrum for said levers, and movable means within said center piece container movable relative thereto engaging the inner ends of said levers to pivot said levers about the sliding fulcrums provided by said container apertures and thereby pivot said levers about their pivotal mounting in said peripheral frame apertures to thereby raise and lower said levers about their mounting in said frame apertures, and radially spaced air diffusing means carried by said levers, in which said movable means within said center piece container comprises spaced apart washers disposed on opposite sides of the inner ends of said levers, and means to raise and lower said washers within said center piece container and thereby pivot said levers about said fulcrums provided by said container apertures to thereby raise and lower said levers about their mounting in said peripheral frame apertures.

2. A diffuser in accordance with claim 1, wherein said spaced apart washers of said movable means are provided with apertures, and said means to raise and lower said

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washers comprises a threaded bolt extending axially through said center piece container, with said bolt having a reduced portion projecting through the apertures of said spaced washers, said bolt including a shoulder engaging one of said washers with said washers having a spacing member therebetween, said bolt having an adjustment knob mounted at its reduced end with a nut fixed on said bolt whereby said knob may be rotated to threadedly move said bolt and washers relative to said center piece container to raise and lower said levers.

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