Oct. 4, 1966

E. H. PERSON

3,276,349

AIR DIFFUSER

Filed Aug. 27, 1964

3 Sheets-Sheet 1

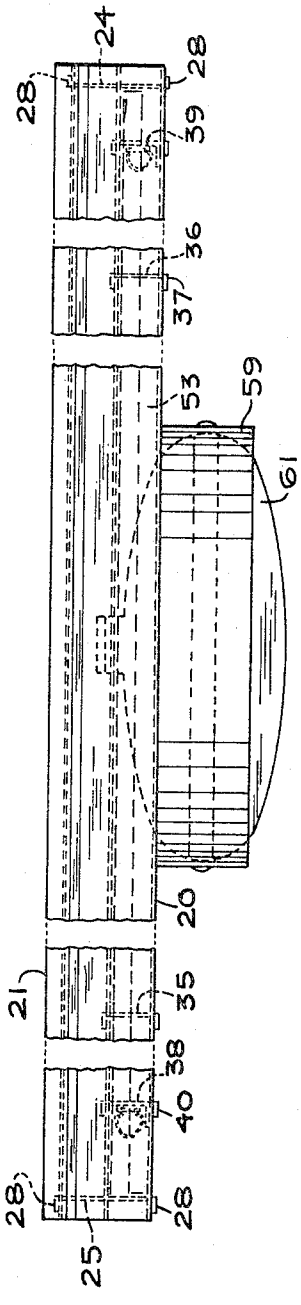

FIG. 1

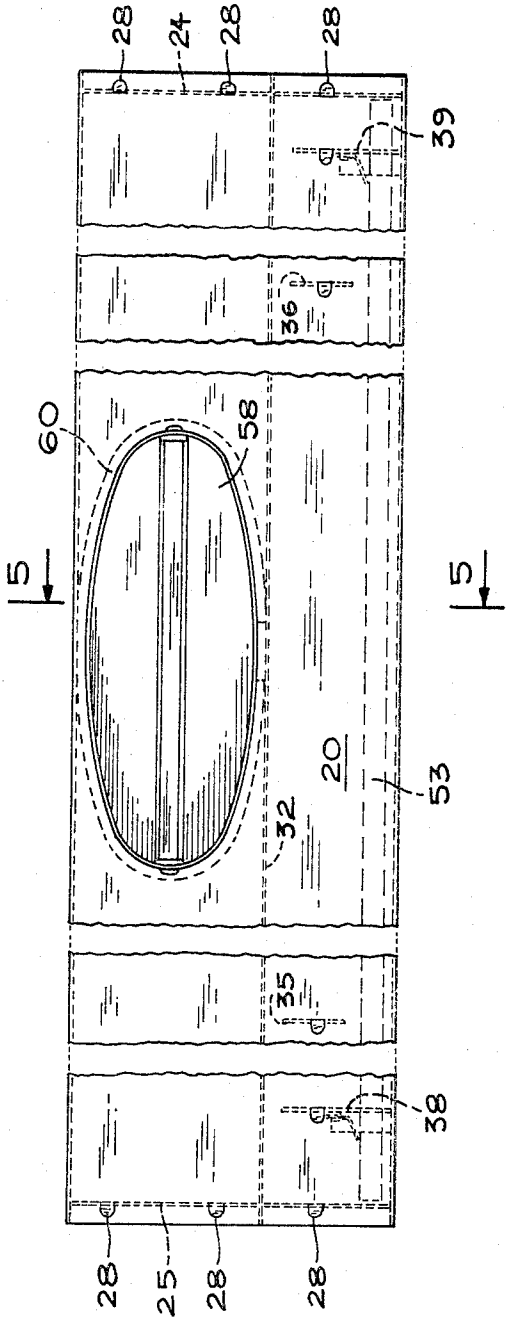

FIG. 2

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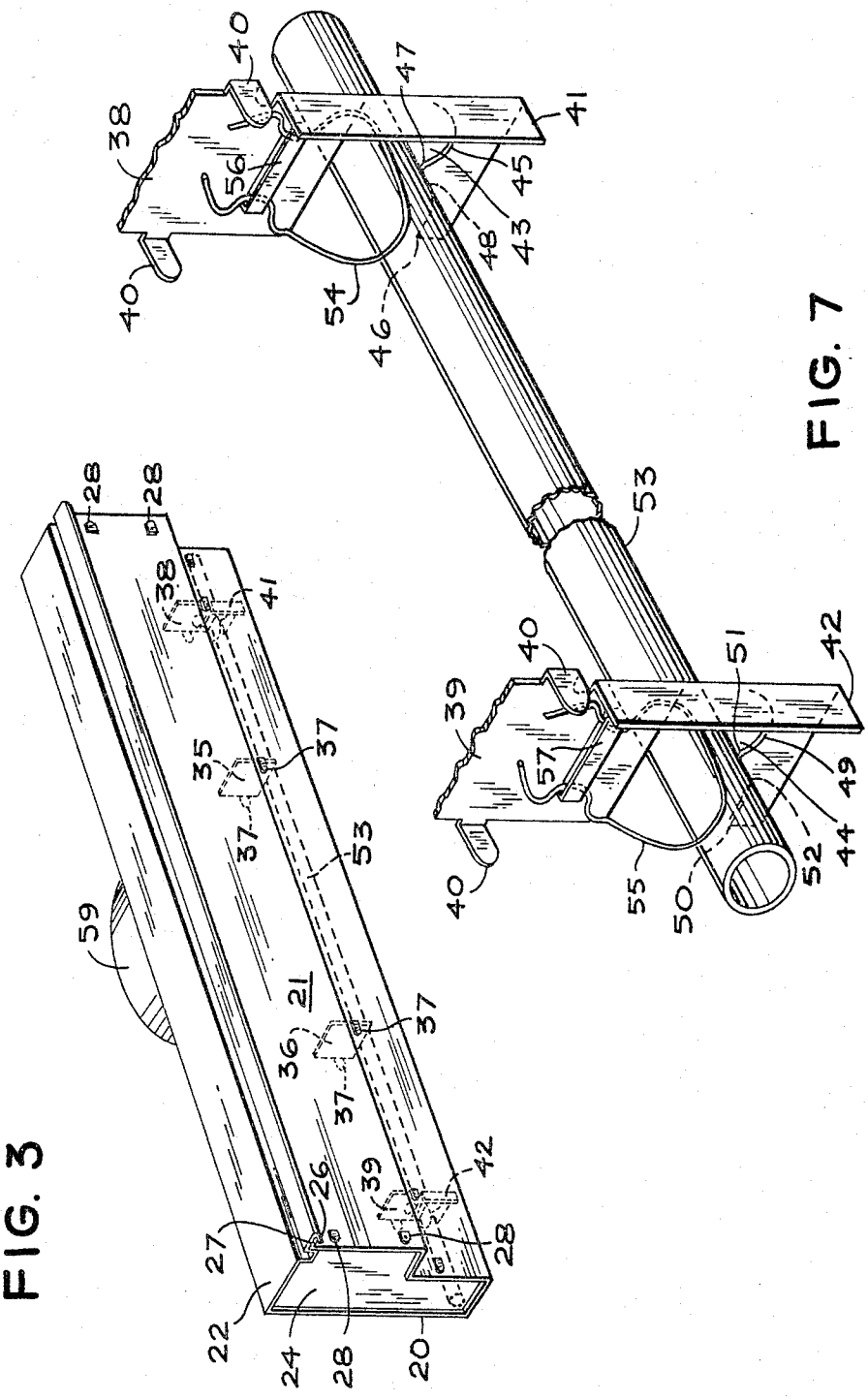

FIG. 7

FIG. 3

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FIG. 6

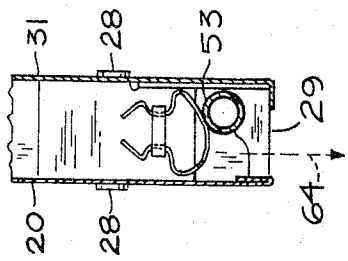


FIG. 5

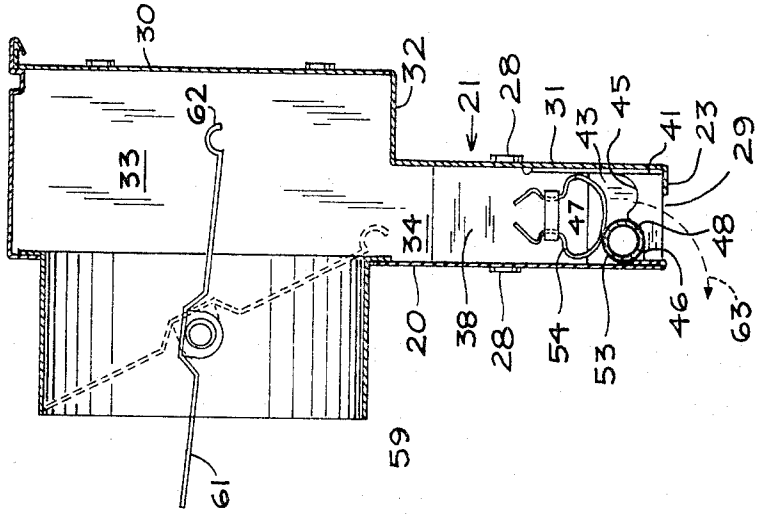
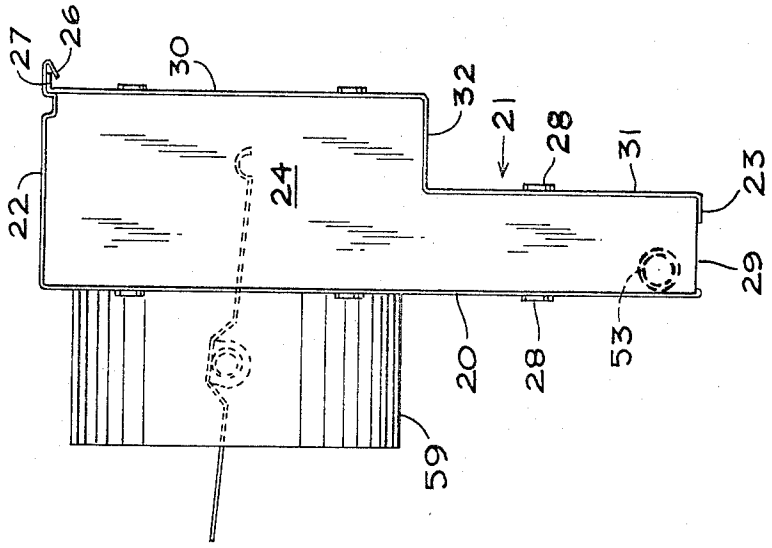


FIG. 4



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3,276,349

AIR DIFFUSER

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Filed Aug. 27, 1964, Ser. No. 392,463
2 Claims. (Cl. 98—40)

This is a continuation-in-part of copending application Serial No. 372,776 filed June 5, 1964.

The present invention relates to air diffusers, and more particularly to air diffusers of the slot type in which the air outlet is in the form of an elongated slot.

Many forms of air diffusing devices have been used to supply air from a heating or cooling system to a room. Slot-type diffusers in which the air emitting opening is an elongated slot have been found particularly desirable for certain types of installations, especially where the air outlet is to be flush with a ceiling surface or in association with a conventional troffer light fixture for diffusing air along the lateral edge of the fixture.

The principal object of the present invention has been the provision of a novel and improved slot-type air diffuser.

Another object of the invention has been the provision of a novel and improved slot-type air diffuser adapted for mounting with the air outlet flush or substantially flush with a ceiling or other wall surface and which permits convenient adjustment of the direction of air flow.

A further object of the invention has been the provision of such a diffuser which is especially adapted for use with a troffer lighting fixture.

Other and further objects, features and advantages of the invention will appear more fully from the following description taken in connection with the appended drawings, in which:

FIG. 1 is a top plan view of one form of slot-type air diffuser embodying the present invention;

FIG. 2 is a front elevational view of the diffuser of FIG. 1;

FIG. 3 is a perspective view, taken from the rear, of the diffuser of FIG. 1;

FIG. 4 is a right-side elevational view of the diffuser of FIG. 1;

FIG. 5 is a cross-sectional view taken along the line 5—5 of FIG. 2;

FIG. 6 is a fragmentary sectional view corresponding to a portion of FIG. 5 and showing the air pattern directing element in a different position from that shown in FIG. 5; and

FIG. 7 is a fragmentary perspective view illustrating the air pattern directing unit and its mounting brackets.

Referring now to the drawings, the air diffuser illustrated is of a type suitable for attachment to the side of a troffer lighting fixture or for independent mounting in the space above a false or suspended ceiling.

The diffuser has an elongated hollow housing or body, preferably made of sheet metal, and comprising a front wall **20**, a rear wall **21**, a top wall **22**, a bottom wall **23**, and a pair of end walls **24** and **25**. The front and rear walls **20** and **21** may be considered as relatively long side walls joined by relatively short end walls **24** and **25**. The walls **20–23** may be formed from a single strip of sheet metal or from two or more strips suitably joined. The walls **20–23** are formed by suitably bending the sheet metal, the free ends being locked together by means of an inturned flange **26** on top wall **22** bent over a rearwardly projecting flange **27** of rear wall **21**. The walls **20–23** may be of any desired length, but typically will be from 2 to 4 feet in length.

The end walls **24** and **25** are recessed slightly into the housing and are held in place in the housing by means of

projecting tabs **28** which extend through corresponding holes in the housing and which are bent over, as best shown in FIGS. 2 and 3.

An elongated rectangular slot **29** is provided in bottom wall **23**. The slot **29** preferably extends continuously from end wall **24** to end wall **25**. The slot **29** serves to discharge air from the diffuser and hence the diffuser is preferably mounted so that slot **29** is substantially flush with the ceiling surface of the room being ventilated. Of course, there may be a minor spacing between slot **29** and the ceiling, e.g., the thickness of the side flange of a troffer housing. Typically, the slot **29** might have a width of $\frac{7}{16}$", while the bottom wall **23** from the adjacent edge of slot **29** to rear wall **21** might have a width of $\frac{1}{4}$". The foregoing and other dimensions set forth herein are given only by way of example and should not be taken as limiting the invention.

Rear wall **21** is divided into an upper portion **30** and a lower portion **31** by a horizontal shoulder **32**, affording an upper chamber **33** and a lower chamber **34**. Typically, the upper chamber **33** might have a width (front to back) of $1\frac{5}{8}$", while the lower chamber **34** might have a width of $\frac{3}{4}$". Typically, the overall height of the housing might be $7\frac{7}{8}$", while the height of the chamber **34** might be $4\frac{3}{8}$".

A pair of flat spacer plates **35** and **36**, best shown in FIG. 3, are mounted between front wall **20** and rear wall **21** at intermediate points along the length of the housing. The plates **35** and **36** are held in place by projecting tabs **37**, which extend through holes in the front and rear walls and are bent over. The spacer plates **35** and **36** are located substantially above bottom wall **23** but beneath shoulder **32**.

A second pair of flat spacer plates **38** and **39**, best shown in FIG. 7, are mounted between front wall **20** and rear wall **21** adjacent the end walls **24** and **25**, respectively. The plates **38** and **39** are held in place by projecting tabs **40**, which extend through holes in the front and rear walls and are bent over. The plates **38** and **39** extend from bottom wall **23** to a point slightly below shoulder **32**, as is best shown in FIG. 5. Spacers **38** and **39** have axially extending vertical flange extensions **41** and **42**, respectively, which lie along lower portion **31** of rear wall **21** from bottom wall **23** to a point just beneath the adjacent tab **40**.

Spacers **38** and **39** are provided with laterally extending slots **43** and **44**, respectively, which extend completely across the spacers except for narrow webs lying along rear wall **21**. The flanges **41** and **42** serve to strengthen the spacers **38** and **39** in the region of the slots **43** and **44**.

The bottom of slot **43** is defined by a semi-circular wall **45** and a generally horizontal wall **46** joined by a peak **47** and an arcuate segment **48**. The bottom of slot **44** likewise is defined by a semi-circular wall **49** and a generally horizontal wall **50** joined by a peak **51** and an arcuate segment **52**. The corresponding parts of the slots **43** and **44** are in axial alignment. Walls **46** and **50** are preferably slightly lower than the lowest points of walls **45** and **49**. This difference in elevation might be $\frac{1}{32}$". Walls **46** and **50** might be located $\frac{5}{32}$" above the plane of the top surface of bottom wall **32**.

A hollow deflector tube **53** extends substantially from end wall **24** to end wall **25**. The deflector tube **53** extends through slots **43** and **44** and is adapted to be supported on aligned surfaces **46**, **48** and **50**, **52**, as shown in FIG. 5, or on aligned surfaces **45** and **49**, as shown in FIG. 6. When in the FIG. 5 position, the tube **53** preferably contacts, or substantially contacts, front wall **20**. When in the FIG. 6 position, the tube **53** preferably contacts, or substantially contacts, the rear wall lower portion **31**.

Tube **53** is held in the FIG. 5 and FIG. 6 positions thereof, respectively, by a pair of deformable springs

54 and 55. The springs 54 and 55, which are preferably made of spring wire, are held, respectively, in brackets 56 and 57 provided in the faces of plates 38 and 39, respectively. The brackets 38 and 39 may conveniently be struck out of the surfaces of the plates 38 and 39. Adjacent the free ends of the springs 54 and 55 there are provided bends to retain the springs in the brackets, as best shown in FIG. 7. The lower portions of the springs are generally U-shaped and extend downwardly and axially to contact the tube 53 and restrain the latter against movement. By insertion of a screwdriver or similar tool through slot 29 and exerting force on the side of tube 53, the tube 53 may be moved from the FIG. 5 to the FIG. 6 positions and vice versa. The center of the U-shaped portion of each of the springs 54 and 55 is located above the corresponding one of peaks 47 and 49. As a result, the inclined portions of the springs urge the tube 53 both downwardly and toward the adjacent housing wall, 20 in FIG. 5 and 31 in FIG. 6. The tube 53 preferably has a diameter slightly less than one-half the spacing between front wall 20 and rear wall lower portion 31; typically, the diameter of tube 53 might be 5/16".

Front wall 20 is provided with a centrally located oval opening 58 in which is mounted an oval air inlet tube or duct 59. The duct 59 has a radially extending flange 60 which may be welded or otherwise affixed to front wall 20. The duct 59 is intended to communicate with a supply of conditioned air, e.g., a main or branch duct, by any suitable coupling (not shown). An adjustable damper 61 is pivotally mounted in duct 59 and may be shifted to any position between the open position shown in full lines in FIG. 5 and the closed position shown in dotted lines in FIG. 5. A hook formation 62 at one end of damper 61 facilitates adjustment of damper 61 by means of a tool inserted through slot 29. The damper 61 is retained tightly in duct 59 so that the damper will stay in whatever positioned it is placed.

Air entering the housing through duct 59 passes through chambers 33 and 34 and leaves the housing through slot 29. With deflector tube 53 in the position shown in FIG. 5, the air stream will contact deflector tube 53 and be deflected into contact with bottom wall 23, and the resultant flow will be toward the left and generally along the room ceiling, as shown by arrow 63 in FIG. 5. With the deflector tube 53 in the position shown in FIG. 6, the air flow through slot 29 will be directly downwards, as shown by arrow 64 in FIG. 6, since tube 53 will prevent substantial contact of air with wall 23.

It is desirable that the tube 53 lie closely adjacent the housing front and rear walls in the respective positions thereof to prevent substantial passage of air between the deflector tube and the adjacent housing front or rear wall. Such passage of air will tend to disrupt the desired air pattern which should be either horizontal, as in FIG. 5, or vertical, as in FIG. 6.

If desired, two or more axially arranged tubes 53 may be provided in the housing to separately control

air passage through axially spaced sections of the housing.

If desired, the lower chamber 34 may be connected directly to an air duct or other source of air, thus eliminating the chamber 33 and associated parts.

While the invention has beeen described in connection with a specific embodiment thereof and in a specific use, various modifications thereof will occur to those skilled in the art without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. An air diffuser, comprising a housing having a pair of relatively long side walls, a pair of relatively short end walls connecting said side walls and a bottom wall, said bottom wall having an elongated rectangular slot extending substantially from one end wall to the other end wall and from one of said side walls toward the other of said side walls, the portion of said bottom wall between the other of said side walls and said slot forming an elongated air-deflecting lip, means in said housing for admitting conditioned air under pressure into said housing whereby air will be discharged from said housing through said slot in said bottom wall, and means selectively to alter the pattern of air discharged through said slot comprising an elongated cylindrical deflector element having a diameter greater than the width of said lip, a pair of axially spaced support elements interconnecting said side walls and each having an opening extending substantially from one side wall to the other adjacent to but above said bottom wall, said openings freely accommodating said deflector element and having bottom configurations arranged to support said deflector element selectively in first and second positions thereof, said deflector element in said first position thereof overlying said slot and being substantially in contact with said one side wall whereby air passing through said housing toward said slot will be deflected by contact with said deflector element onto said lip and will exit from said slot substantially in a horizontal direction, said deflector element in said second position thereof overlying said lip and being substantially in contact with said other side wall whereby air passing through said housing toward said slot will not come into substantial contact with said lip and will exit from said slot substantially in a vertical direction, and resilient means releasably to retain said deflector element in said respective positions thereof.

2. An air diffuser as set forth in claim 1 in which said resilient means comprises a pair of spring wires each attached to a respective one of said support elements and contacting said deflector element to urge the latter toward the bottom of said opening and toward the adjacent side wall.

No references cited.

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