Aug. 27, 1963 C. N. O'DAY ETAL 3,101,690

AIR DIFFUSERS AND METHODS OF MAKING THE SAME

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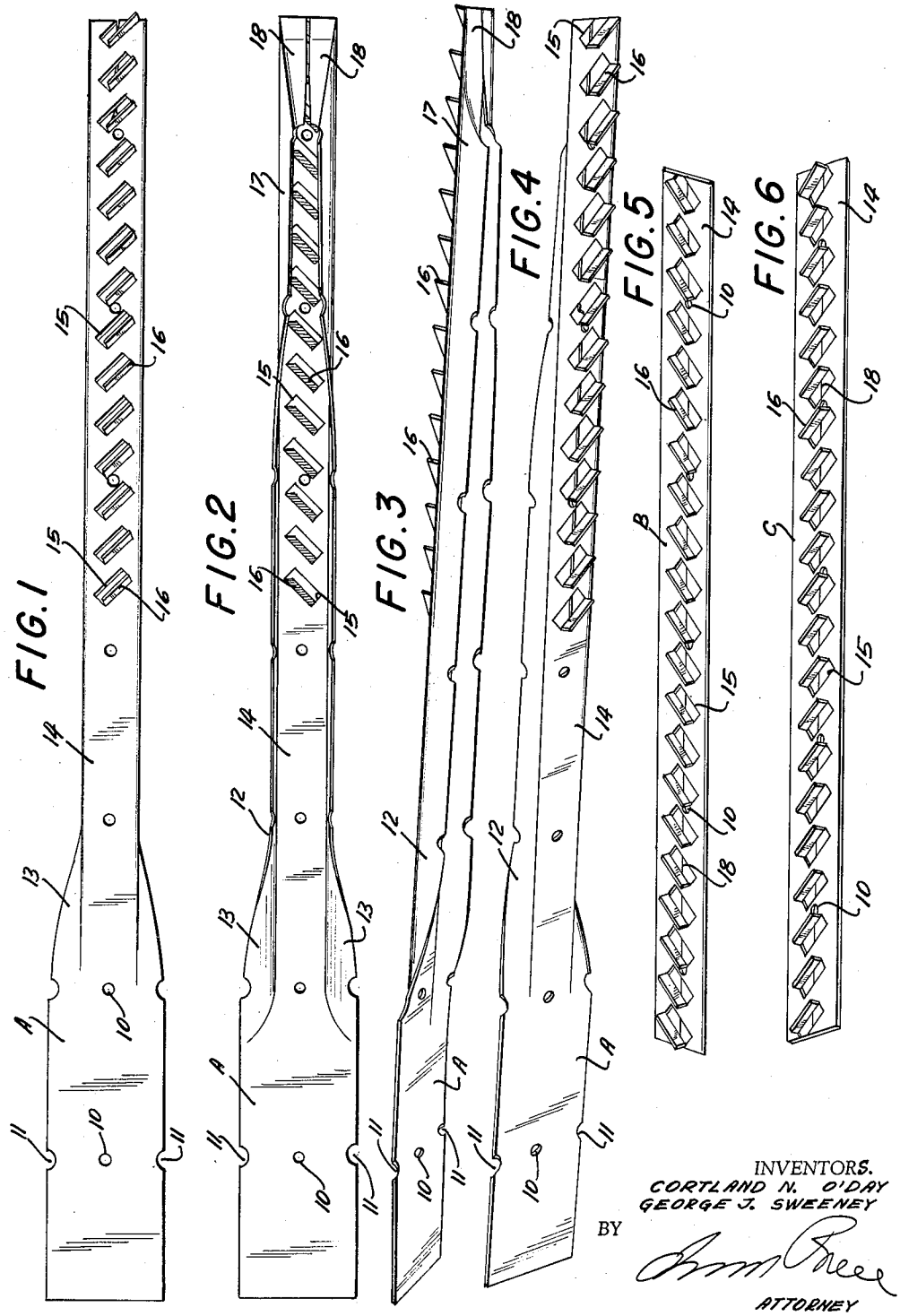

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FIG. 7

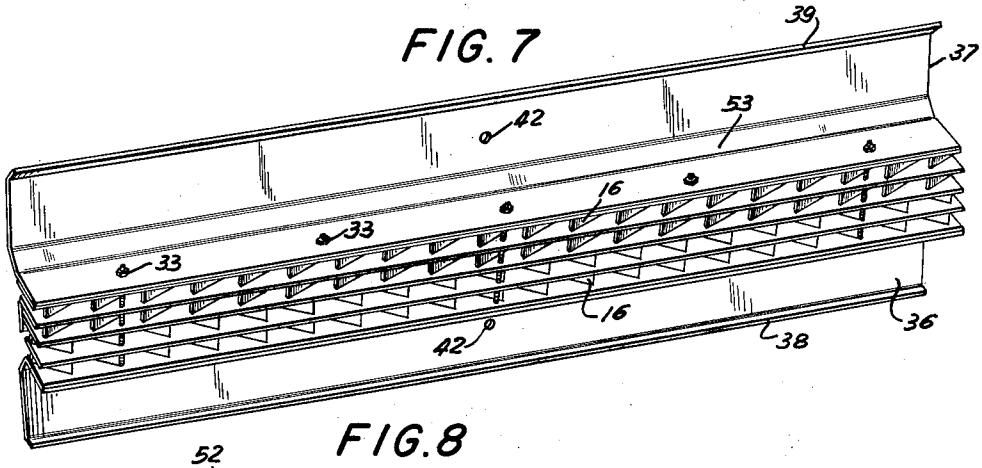


FIG. 8

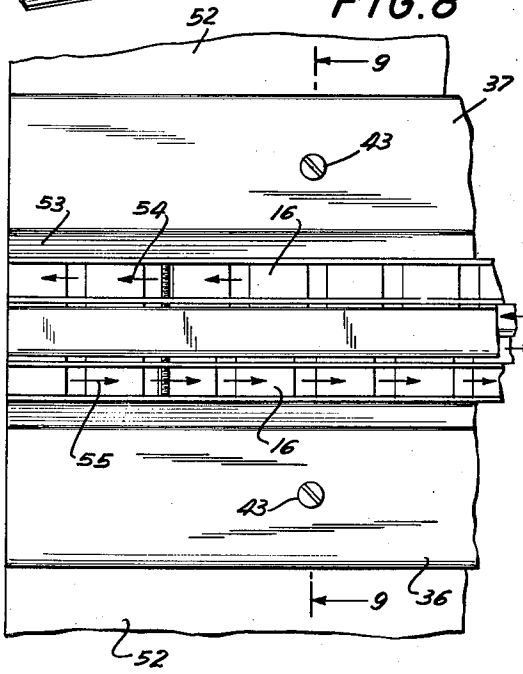
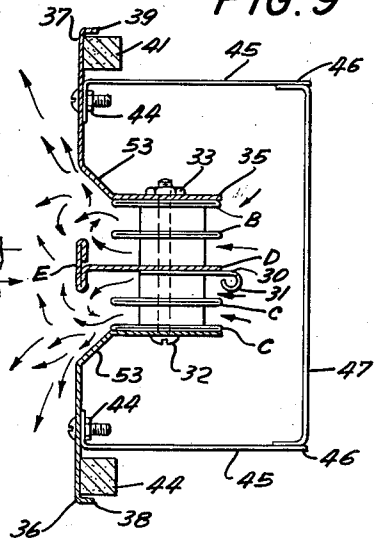


FIG. 9



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AIR DIFFUSERS AND METHODS OF MAKING THE SAME

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3 Claims. (Cl. 113—116)

The present invention relates to an air diffuser and it particularly relates to a method of making and assembling air diffusers.

It is among the objects of the present invention to provide a novel method of assembling elongated air diffusers, and particularly the vane elements thereof, so that they may be readily mounted into a diffuser construction with a minimum of labor and at low cost, with a superior construction.

Another object is to form a novel elongated air diffuser construction in which the vane units will be unitarily assembled by a substantially continuous operation and then may be associated with one another to form the final diffuser construction.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, the oblique internal vanes of the diffuser are first die-cut and then turned upwardly from a strip of metal and then the edges of the strip are folded inwardly to close the back of the strip of metal and form a platelike construction with upturned oblique vanes, a plurality of which may be assembled together to form a final diffuser construction.

These elements, after they have been cut in lengths, then are provided with bolt openings and they may be conveniently assembled together with the vanes themselves acting as spacers and defining the width of the transverse passageways and serving to correct and space the channels or paths through which the air must pass while being subjected to the short oblique internal deflectors.

In the preferred form of the invention there is provided an even number of equal number of solid passageways on each side of a central element in which the air will be oppositely directed on opposite sides of the central partition and with said partition having a transverse baffle or element at the end thereof, substantially extending across the two innermost slots or elongated passageways.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is an elongated front plan view of a vane construction, showing the manner in which it is formed.

FIG. 2 is a reverse plan view, showing the back of the element of FIG. 1.

FIG. 3 is a side elevational view in perspective, showing the elements of FIGS. 1 and 2 from the bottom side.

FIG. 4 is a reverse perspective view, showing the elements of FIGS. 1 to 3 in perspective from the up-turned vane side.

FIG. 5 is a top perspective view of the vane construction of FIGS. 1 to 4 when it is finally assembled and cut to length.

FIG. 6 is a top perspective view of the opposite arrangement of vanes, as compared to FIG. 5 in which the vanes are oppositely inclined.

FIG. 7 is a rear perspective view of the finally assembled diffuser construction.

FIG. 8 is a fragmentary front elevational view.

FIG. 9 is a transverse sectional view taken upon the line 9—9 of FIG. 8.

Referring to the assembled units of FIGS. 7, 8 and 9, these of course may be of any length and may be closed off at their ends so as to form a complete diffuser construction, or they may be extended from wall to wall, there being shown continuous sections thereof and the manner in which they are assembled.

End plates may be placed upon the units of FIGS. 7 to 9, or they may be continued with connecting flanges or plates to form as long a unit as desired.

Referring to FIGS. 1 to 4, there is shown a strip of metal A which may be of stainless steel, sheet aluminum or ordinary steel, which is suitably painted or finished to prevent rust or discoloration.

The strip A is first formed with the central bolt openings 10 and the half bolt openings 11, which will coincide with the openings 10 when the strip has been folded in final position as indicated in FIGS. 5 and 6.

After the holes 10 and 11 have been punched in position, the side portions 13 are folded at an angle of 90°, as indicated at 12, so that these side flanges will project at right angles from the central strip portion indicated at 14 (see FIGS. 1 to 4).

At this stage there are a series of oblique die-cuts made as indicated at 15, with the die-cut portions 16 being turned upwardly at right angles from the base portions 14.

Finally the flanges 12 are then folded inwardly, as indicated at 17, so that they will finally come together as indicated at 18 and cover the openings 15 from which the vanes 16 have been struck upwardly.

In FIGS. 5 and 6 are shown the final units B and C, having the vanes in opposite directions, with the overlapping completed openings 10 for the assembled bolts and with all of the die-cut openings 15 being covered by the underfolded side edges of the strip and with the opposite vanes 16 extending at right angles upwardly from the final folded strip, having the vane portion 14 and the underfolded side edges 18.

As shown in FIGS. 5 and 6, these strips are shown of predetermined length so that they may be assembled into a final diffuser, and, if desired, these lengths may be continued by overlapping plates so as to extend from wall to wall or for the full length of the diffuser construction.

It will be noted that in the final assembly of FIGS. 5 and 6 the half holes 11 will match the single holes 10 and form a unitary bolt hole, and that recesses, as indicated at 15, will be covered by the underfolded side edges 13.

In assembly, as shown in FIG. 9, two of these units B are shown assembled with two units C and with a central portion D having a T-head E.

A central plate member 30 may also be provided with an eyelet 31 to attach a damper construction. These units B and C are then assembled together by means of the bolts 32 with the nuts 33 on the in-turned plates 34 and 35, which form part of the face flanges 36 and 37.

These face flanges have the outside in-turned flange members 38 and 39, inside of which may be mounted the rubber gaskets 40 and 41 to be pressed against a wall or

ceiling element indicated diagrammatically at **52** in FIG. 8.

The in-turned flanges **38** and **39** will limit the compression of the side ceiling or top and bottom ceiling or wall gaskets **40** and **41**.

The bolt openings **42** (see FIG. 7) are designed to receive the bolts **43**, which, by the interior nuts **44** (see FIG. 9) engage the side elements **46** of the internal mounting frame member **45**.

The elements **46** may be welded to the U-members **47**, which will reenforce and hold in position the front flanges **36** and **37**. The internal members **46** are spaced at intervals, as indicated by the bolts **43**, with one being positioned for every length of a unit, as indicated in FIG. 7.

The slot in the wall may be as wide as the two side elements **46**, with the gasket elements **40** and **41** sealing the sides of the wall adjacent said slot.

It will be noted that the side plates **34** and **35** are connected by means of the oblique portions **53** to the face flanges **36** and **37** so that a recess will be formed below the T-shaped head E, substantially extending across the inside slots.

Four slots are shown in FIGS. 7, 8 and 9, with the oppositely turned vanes **16**, so that on each side of the T-head E air will be differently directed, as indicated by the arrows **54** and **55** in FIG. 8.

The units B and C will all be positioned at the bottom of the wall formed by the oblique sides **53**, well below the T-head E which is flush with the side flanges or face flange members **36** and **37**.

In the forming operation, as shown in FIGS. 1 to 6, in one form of the invention, the operation is started with the base strip A, 1.562 inches, then the central holes **10**, 0.140 inch and the half holes **11**, 0.070 inch, are punched therein so that there will be a half hole **11** on each edge opposite the central hole **10**.

The strip A is continuously advanced in the forming operation to fold the side edges **13** down to form the sides flanges, as indicated at **12**, with the vanes **16** then being die-cut and punched out so that they will be obliquely set at a 45° or 60° angle, as indicated in the middle of FIGS. 1 to 4.

The part folding of the side edges **13** to form the 90° side flanges **12** will give the strip strength while it is being die-cut at **15** to form the oblique vanes **16**.

Normally, the rectangular die-cut portions at **15** are punched two or four at a time, with the cut being made on three sides as indicated at **15** and the vanes **16** being turned upwardly at a right angle of 90° to the base portion **14**.

The right angle flanges **12** are folded inwardly as a final operation, as indicated at **18**, and the final strips, as indicated in FIGS. 5 and 6, may be cut off in six foot lengths, if this is the preferred diameter. The vanes **16** themselves act as spacer elements and will correctly fix the spacing and the elongated slots in which the vanes **16** are positioned.

As many changes could be made in the above air diffusers and methods of making the same, and many widely different embodiments of this invention could be made without departure from the scope of the claims, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A method of making elongated air diffuser elements which comprises providing a strip of metal, punch central bolt holes and edge half holes to be folded inwardly to match the central holes, folding the side edges at right angles to central portion of the strip, die-cutting rectangular openings in the center of the strip and folding up the die-cut portions to form oblique vanes at right angles to the central portion of the strip but extending obliquely across the strip and then finally folding in the side edges to meet at the center of the strip and cover the openings.

2. A method of making elongated air diffuser elements which comprises providing a strip of metal, punch central bolt holes and edge half holes to be folded inwardly to match the central holes, folding the side edges at right angles to central portion of the strip, die-cutting rectangular openings in the center of the strip and folding up the die-cut portions to form oblique vanes at right angles to the central portion of the strip but extending obliquely across the strip and then finally folding in the side edges to meet at the center of the strip and cover the openings, cutting the strips to length and then assembling them together to form a diffuser construction.

3. A method of making elongated air diffuser elements which comprises providing a strip of metal, punch central bolt holes and edge half holes to be folded inwardly to match the central holes, folding the side edges at right angles to central portion of the strip, die-cutting rectangular openings in the center of the strip and folding up the die-cut portions to form oblique vanes at right angles to the central portion of the strip but extending obliquely across the strip and then finally folding in the side edges to meet at the center of the strip and cover the openings, cutting the strips to length and then assembling them together to form a diffuser construction, said assembly being made inside of side flanges having outwardly extending face flanges for mounting upon a wall or ceiling structure.

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