

April 4, 1961

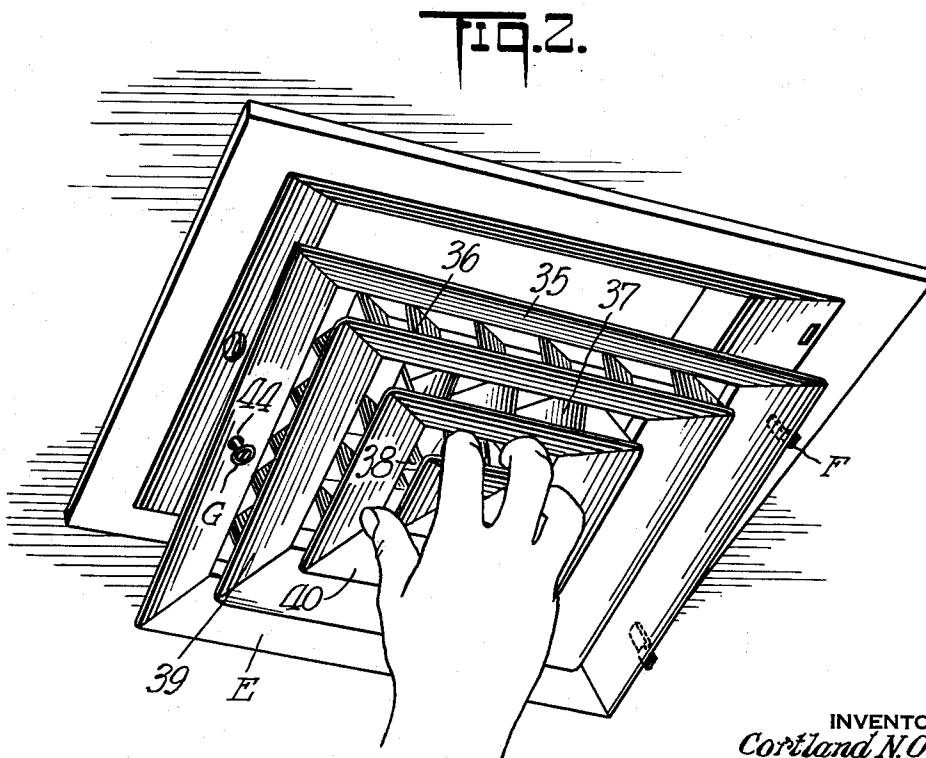
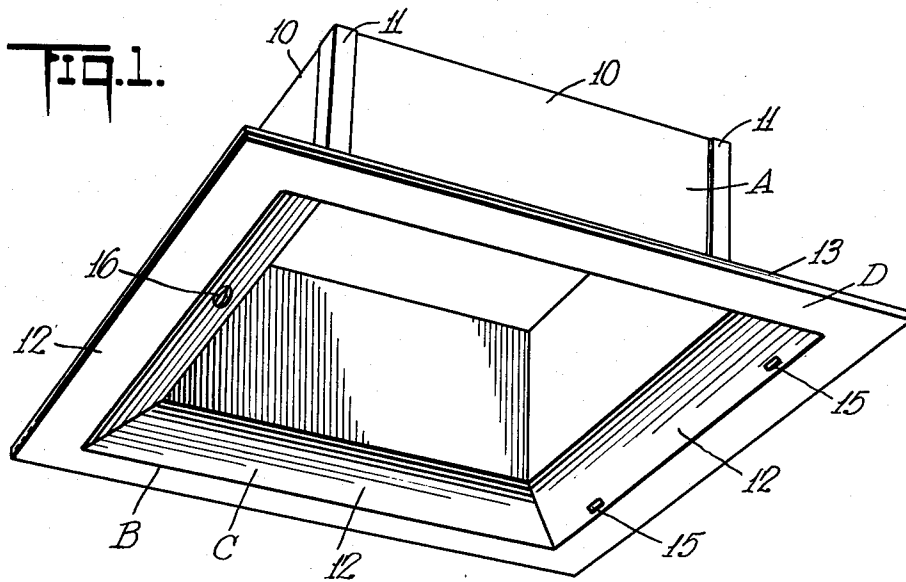
C. N. O'DAY

2,977,869

REMOVABLE CORE AIR DIFFUSERS

Filed Sept. 21, 1953

4 Sheets-Sheet 1



INVENTOR
Cortland N. O'Day
BY *Chas. E. Lee*
ATTORNEY

April 4, 1961

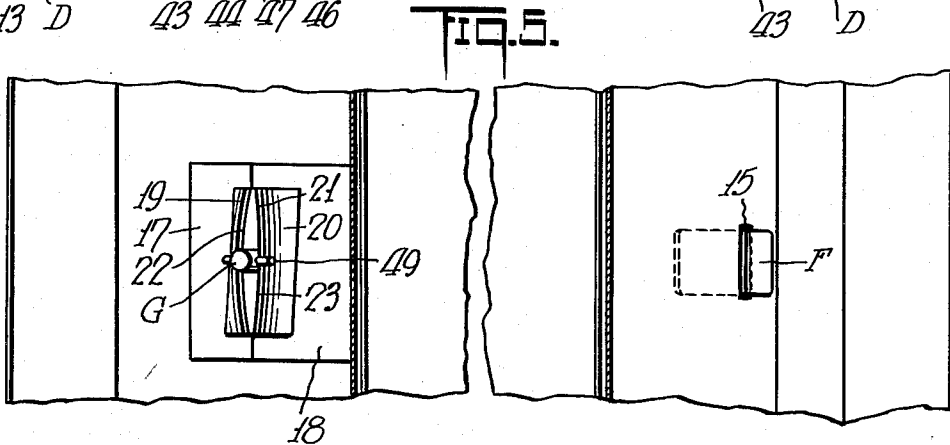
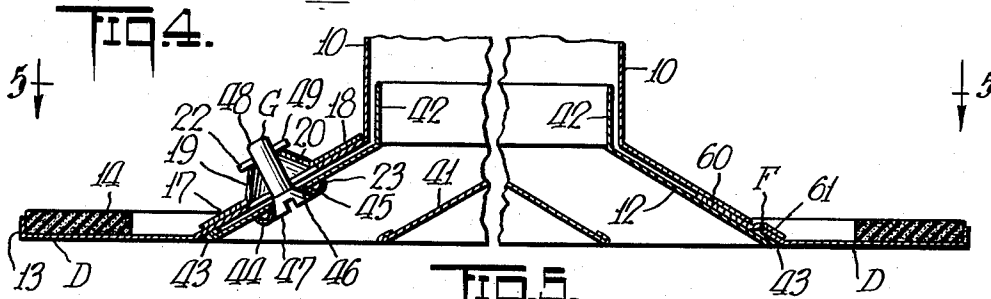
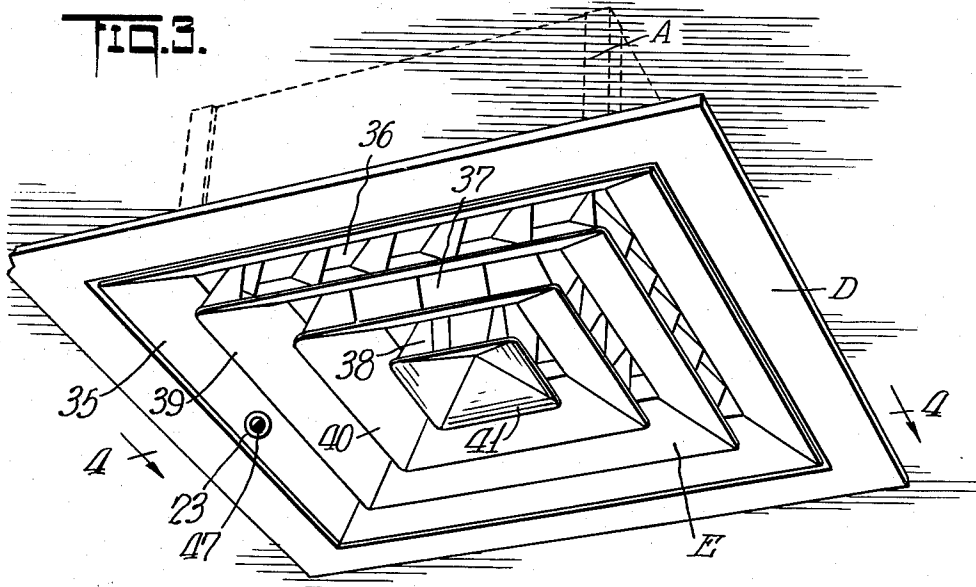
C. N. O'DAY

2,977,869

REMOVABLE CORE AIR DIFFUSERS

Filed Sept. 21, 1953

4 Sheets-Sheet 2



INVENTOR
Cortland N. O'Day
BY *Chas. Rice*
ATTORNEY

April 4, 1961

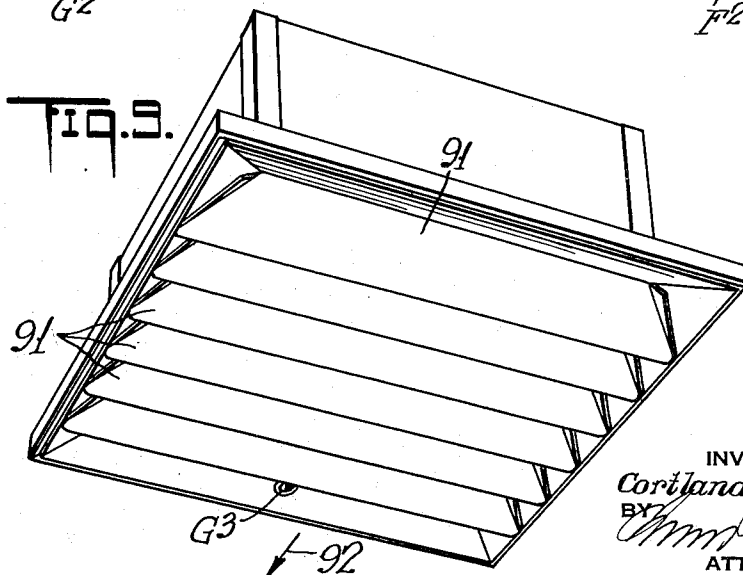
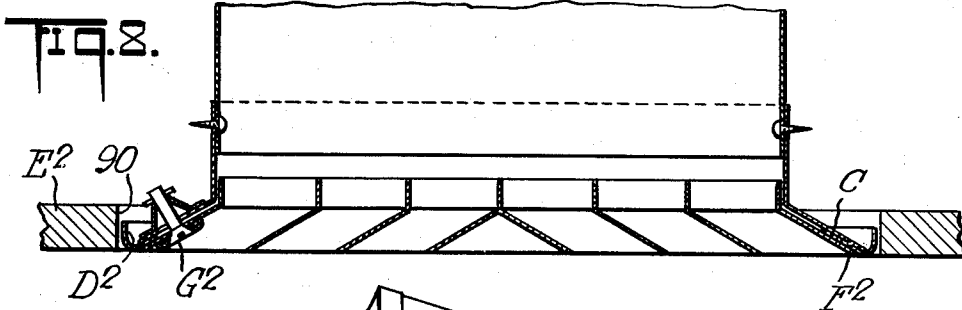
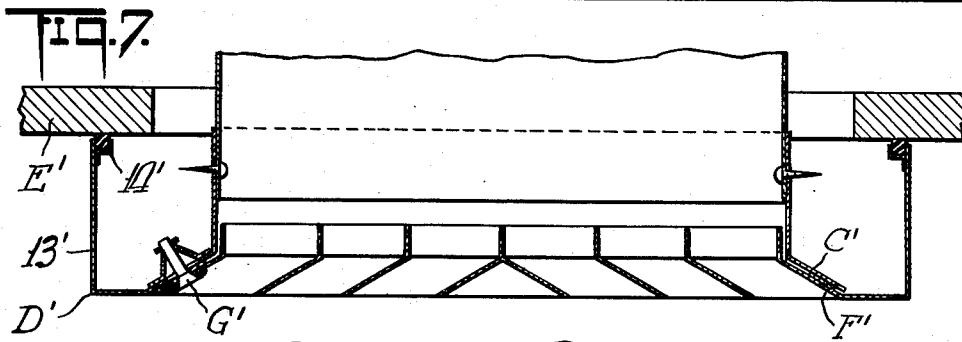
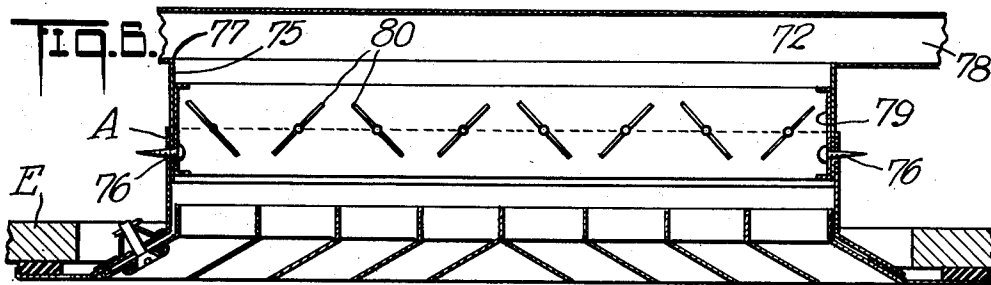
C. N. O'DAY

2,977,869

REMOVABLE CORE AIR DIFFUSERS

Filed Sept. 21, 1953

4 Sheets-Sheet 3



INVENTOR
Coriland N. O'Day
BY *Wm. H. Beece*
ATTORNEY

April 4, 1961

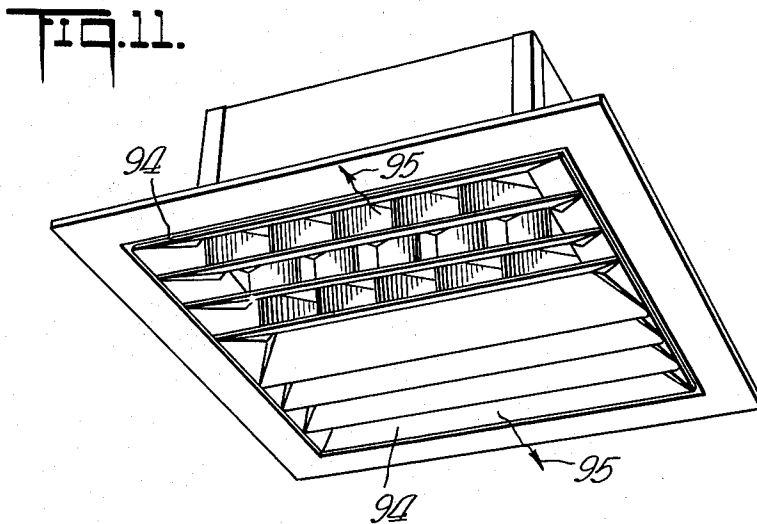
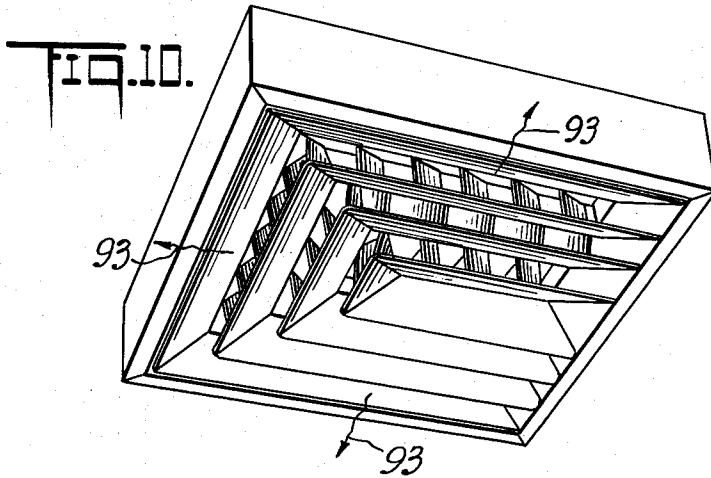
C. N. O'DAY

2,977,869

REMOVABLE CORE AIR DIFFUSERS

Filed Sept. 21, 1953

4 Sheets-Sheet 4



INVENTOR
Cortland N. O'Day
BY *Ames*
ATTORNEY

1

2,977,869

REMOVABLE CORE AIR DIFFUSERS

Cortland N. O'Day, Port Washington, N.Y.
(% Air Devices, Inc., 17 E. 42nd St., New York, N.Y.)

Filed Sept. 21, 1953, Ser. No. 381,235

1 Claim. (Cl. 98—40)

The present invention relates to removable core air diffusers and it particularly relates to a device in which the core of a diffuser may be readily replaced so as to give a desired directional distribution of the flow of air.

In the installation of air distribution or air conditioning systems, normally for each number of square feet of ceiling or for each desired ceiling space, an air outlet is provided to assure uniform or desired distribution for ventilating or air conditioning purposes.

It, however, has been found that with varying location and positioning of walls and partitions, this frequently results in an undesired distribution of the air, with the result that air frequently will be blown in large quantity against the wall instead of being distributed into the working space or over the desired area in the room which is to be ventilated.

It is among the objects of the present invention to provide an air diffusion outlet which may be readily adjusted with a minimum of labor and without reconstruction of either the ceiling or the air conditioning or ventilating system, and which at the same time will permit a desired distribution of the air stream passing into the room.

A further object is to provide a novel air diffusing outlet which may be readily adjusted, modified or altered, to give one, two, three or four-way distribution or flow of air to achieve a desired ventilation or distribution of conditioned air within the room or space.

A further object of the present invention is to provide an air distribution system which will be readily adaptable to changing office requirements and which may be readily accommodated without reconstruction of the outlets or change in the ceiling to accommodate different sizes of rooms and different locations of partitions within the space occupied.

A further object is to provide a removable core air diffuser which will permit the core of the diffuser and the air direction unit thereof to be removed, replaced, adjusted or otherwise serviced without ceiling reconstruction and by relatively simple manipulation of a building attendant.

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.

According to the preferred embodiment of the present invention, the duct collars are permanently mounted either by recessing in the ceiling or by mounting upon the ceiling and depending therefrom. These duct collars are desirably associated with an internal air distribution system.

The duct collars are desirably of rectangular or square cross section, although they may also be of other types of cross section and even may be circular.

These duct collars are permanently connected to the

2

internal air conduit system within and above the ceiling line, and they are provided with outlets either mounted directly in recesses of the ceiling or depending from the ceiling line, as may be desired.

The removable core then may be placed in or readily removed from the outlet of the duct collar.

Preferably the duct collar is provided with an outwardly beveled or divergent mouth, and the removable core is provided with a conforming frusto-pyramidal or frustro-conical conforming structure, and the two will be held together either by readily removable mounting locks or hinge connections of a type which will permit ready insertion of a core or a multiple of cores in position by a single tool, such as a screw driver, without difficulty in matching connections on the part of the service man or building attendant who is to make a suitable adjustment of the core structure.

The cores are desirably of square or rectangular shape to match the duct outlet in shape and size and they have built-in diffusing vanes, giving one, two or three-way diffusion or diffusion in any number of directions as may be desired to obtain proper distribution of air into the interior space within the room.

By changing the distribution pattern, it is possible to accommodate different sizes and shapes which result from varying building construction floor space, and which also result from varying location of partitions within the building interior, particularly where the diffuser outlet duct collars have been positioned in a modular basis with one provided for every so many square feet of ceiling space.

Although the present invention is particularly designed for ceiling, it also has further application to wall diffusers to give a desired up, down and side distribution of air.

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 claim hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views: Fig. 1 is a bottom perspective view of one form of duct outlet or air outlet with the core removed according to the present invention.

Fig. 2 is a bottom perspective view similar to Fig. 1, showing the method of inserting the removable core into the mouth of the duct outlet of Fig. 1.

Fig. 3 is a bottom perspective view similar to Figs. 1 and 2, showing the removable core in position in the duct outlet.

Fig. 4 is a transverse sectional view upon the line 4—4 of Fig. 1, with the core in position in the duct outlet but in inverted position.

Fig. 5 is a fragmentary plan view upon the line 5—5 of Fig. 4 and upon an enlarged scale as compared to Fig. 4.

Fig. 6 is a transverse sectional view of an alternative form of duct outlet, with a removable core in position therein.

Fig. 7 is still another side sectional view of another form of duct outlet with a removable core in position therein.

Fig. 8 is a side sectional view of a further embodiment with a removable core in position in a frame with the frame being mounted flush with the ceiling or wall and received in an opening in said ceiling or wall.

Fig. 9 is a bottom perspective view showing the insertion of a one-way core in a duct outlet of the type of Fig. 7.

Fig. 10 is a bottom perspective view showing the position of a three-way outlet in the duct outlet of Fig. 6.

Fig. 11 is a bottom perspective view showing a two-way core inserted in the outlet of the type as shown in Fig. 4.

Referring to Figs. 1 to 5, there is shown a vertical duct which may project through or into a ceiling or wall and which is connected to an internal duct system through which air is being distributed to the interior space in a building, boat or other structure.

The duct A has an outlet B with a frustro-pyramidal section C. The outlet B has an outwardly extending flange D, which forms a seal against the ceiling line E. To be inserted within the pyramidal mouth or opening C of the duct A is a removable core E, shown as having four-way diffusing vanes, which will distribute the air in at least four directions on each side. The removable core E is shown as having a detachable slip hinge F at one side and a rotatable mounting lock G at the other side, but if desired all of the connections may be of the bayonet type G, or other types of readily attached connections may be utilized for holding the removable core E in position.

Referring particularly to Fig. 1, the duct A has the side walls 10, which are connected by means of the corner strips 11. The upper end of the duct A is connected to an internal conduit system not shown. The end of the walls 10 extend outwardly and obliquely, as indicated at 12, to the flange D, which has an upturned or reversely turned peripheral edge 13 for holding the annular or peripheral sealing gasket 14 against the ceiling E.

In the form shown, at one side of the mouth C there are provided the slots 15 for receiving the hinge connections F of the removable core E. The other side of the mouth C is provided with an opening 16 to receive the rotatable mounting lock G. The inside of the mouth C in back of the opening 16 has two parallel plates 17 and 18, which may be spot welded to the mouth C. These plates have upturned portions 19 and 20, which form a double convergent slot 21 and the camming edges 22 and 23 for cooperation with the rotatable mounting lock G.

The removable core is best shown in Figs. 2, 3, 4 and 5. It consists of an outside flange portion 35, which conforms in obliqueness and shape to the mouth C, and it also is provided with a series of rows of vanes 36, 37 and 38 separated by the outwardly extending flanges 39, 40 and 41 to give the desired distribution of air.

The particular core E shown in Figs. 2 to 5 is a four-way distribution core, which will give a flow of air in four directions, but it may be readily replaced by one, two, three or other diffusion cores giving a desired pattern of air distribution.

The upper portion of the removable core E has a projection 42 which will fit within the duct portion 10 and locate the core correctly in respect to the mouth C. However, this projection 42 may be omitted since the hinges F and the rotatable mounting lock G will be sufficient to locate and mount the removable core E in position.

As is best shown in Figs. 2, 4 and 5, the edges of the core are turned inwardly, as indicated at 43, to give a finished edge and also to form a bearing against the mouth C.

At the same time there is provided an opening 44, with an outturned and downturned lip 45 (see Fig. 4), which will form a bearing surface for the conical side 46 of the fillister slotted head 47. The head 47 will bear upon the lip 45 as it is rotated. The head has a depending shank 48, with a cross pin 49 (see Fig. 4), which will bear upon the cam edges 22 and 23 of the slot 21.

The rotatable locking member G will be held in position and will not fall out of position because the head 47 and the pin 49 are larger than the opening 44. This is particularly convenient when the removable core E is

inserted into the mouth C in the position, as indicated in Fig. 2, and it is not necessary for the maintenance man to carry the rotatable locking members 48 separately.

Moreover, as the removable core is inserted in position, the oblique sides 19 and 20 of the slot 21 will automatically turn the rotatable member G so that the cross pin 49 will pass through the slot 21, and then by a 90° turn with a screw driver, the mounting lock may be applied to permanently mount the removable core E in position, as indicated in Figs. 3, 4 and 5.

Before the connection by the rotatable locking member G, however, in the form shown in Figs. 1 to 5, the detachable slide hinges F are inserted in position in the slots 15.

These slide hinges consist of the space plates 60, which may be spot-welded to the back face of the outside oblique flange 35 of the core E. The end portions are extended outwardly, as indicated at 61, to project through the slots 15 and engage the mouth C.

The slip hinge F may be omitted and a series of rotatable mounting locks G may be utilized around the periphery of the mouth C and the outside flange 35 of the removable core E. For example, one or two, or even more, of said rotatable locks G may be used on each side or changes on opposite sides to the exclusion of the slip hinges F.

It is apparent in the structure shown in Figs. 1 to 5 that the central section 41 of the removable core E may be readily grasped by a service man or mechanic standing on the ladder and the slip hinges F may be inserted in the slots 15, and the rotatable mounting lock G will automatically position itself in the slot 21, so that the pin 49 will extend through and be ready to be locked against the camming edges 22 and 23.

Where a rotatable lock G is positioned on each side, it will not be necessary for the mechanic or service man to insert the slip hinges F into the slots 15. By this arrangement it is possible to readily change, renew or service the removable core E, and different types of removable cores E may be inserted, depending upon the distribution of air that is desired.

As is shown in Fig. 6, the duct A may be assembled with a duct collar 75 by the screws 76. The duct collar 75, at its upper end 77, may then be directly connected to the ceiling conduit 78 which leads from a separate air inlet source or air conditioning device. The conduit system 78 is positioned behind the ceiling or wall and leads air throughout the building or ship structure to feed the various duct outlets A throughout the building structure or space.

The duct collar 75 may be provided with a damper 79, removably inserted therein, having a plurality of adjustable vanes 80 which may be set to control the flow of air to the removable core E. The rubber seal 14 will provide an air-tight connection in respect to the ceiling E and will prevent streaking of dirt upon the plaster wall of the ceiling.

In the device shown in Fig. 7, similarly functioning parts are indicated by the same letters and numerals as in Figs. 1 to 5, with similar parts, however, being primed.

In this device the mouth C' is substantially below the ceiling E', and the flange D' has an upwardly extending side portion 13', which is sealed to the ceiling by the rubber peripheral seal 14'. It will be noted that the diffuser in Fig. 7 hangs substantially below the ceiling line E'.

In the alternative device shown in Fig. 8, similarly functioning parts are indicated by the same letters and numerals as in Figs. 1 to 5, with similar parts, however, being provided with a superior "2."

In this device the flange D² around the side of the mouth C² projects within the recess 90 in the ceiling and above the ceiling line structure E². The rotatable

5

mounting lock G² and slip hinge F² may be the same as shown in Figs. 1 to 5.

In the device shown in Fig. 9, similarly functioning parts are indicated by the same letters and numerals as in Figs. 1 to 5, with similar parts, however, being provided with a superior "3."

In Fig. 9 is shown an outlet of the type shown in Fig. 8 but with a removable core having a one-way air direction. This core is provided with the oblique outside vanes 91, and the air is emitted in the direction 92. A single rotatable mounting lock G³ may be provided at one side of the arrangement.

In the device shown in Fig. 9, similarly functioning parts are indicated by the same letters and numerals as in Figs. 1 to 5, with similar parts, however, being provided with a superior "4."

In Fig. 10 an outlet of the type shown in Fig. 6 is provided with a three-way core, the three-way directional flow being indicated by the arrows 93.

In the device shown in Fig. 11, similarly functioning parts are indicated by the same letters and numerals as in Figs. 1 to 5, with similar parts, however, being provided with a superior "5."

In Fig. 11, there is a two-way removable core, with the oblique outside vanes 94 in opposite directions, and with the air being distributed, as indicated by the arrows 95.

While there has been herein described a preferred form of the invention, it should be understood that the same may be altered in details and in relative arrangement of parts within the scope of the appended claim.

Having now particularly described and ascertained the

6

nature of the invention, and in what manner the same is to be performed, what is claimed is:

A removable and replaceable core ceiling air diffuser having a square frame to contact and rest against the ceiling, said frame having a square opening with an inwardly converging frustro pyramidal throat serving as a nest-like receptacle, an inwardly directed conduit connected to the most inward narrowest portion of said throat, a removable core having a frustro pyramidal outer shell closely fitting into and clamped against the interior of said receptacle, said core having a plurality of outer inclined louver plates and closely spaced rows of obliquely and oppositely directed inclined vanes inside of and extending parallelly to said louver plates, and slot and fin connections between the outer shell and throat at one side thereof and a rotatable bayonet connection at the other side thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,643,863	Truax	Sept. 27, 1927
1,711,458	Hart	Apr. 30, 1929
2,229,747	Kurth	Jan. 28, 1941
2,240,617	Harrigan	May 6, 1941
2,376,705	Kurth et al.	May 22, 1945
2,403,291	Kurth	July 2, 1946
2,577,771	Kennedy	Dec. 11, 1951
2,607,282	Gilbert	Aug. 19, 1952
2,621,579	Person et al.	Dec. 16, 1952
2,671,394	Kurth	Mar. 9, 1954