

July 13, 1954

S. W. BROWN ET AL
CONDITIONED AIR DISTRIBUTION
SYSTEM FOR SHIP CONSTRUCTION
Filed March 18, 1949

2,683,408

FIG. 1

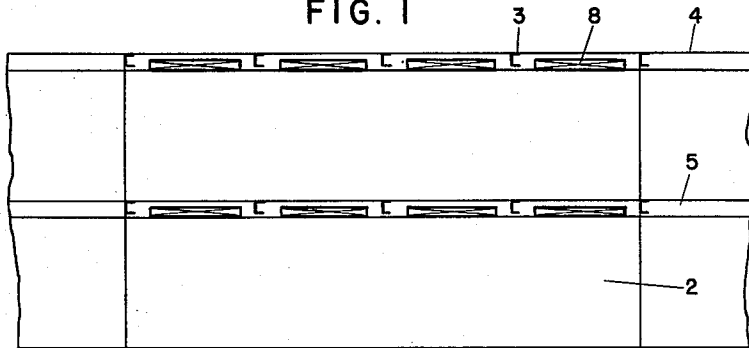


FIG. 3

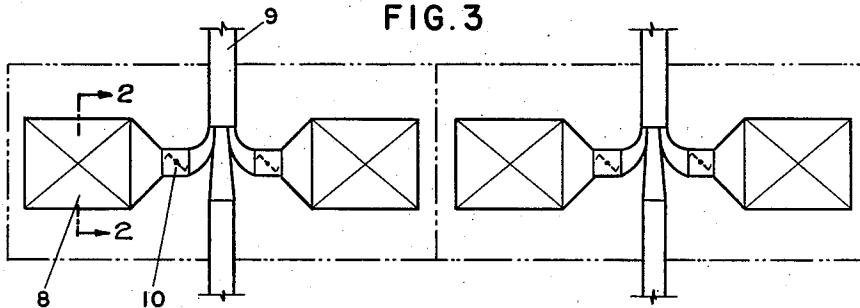
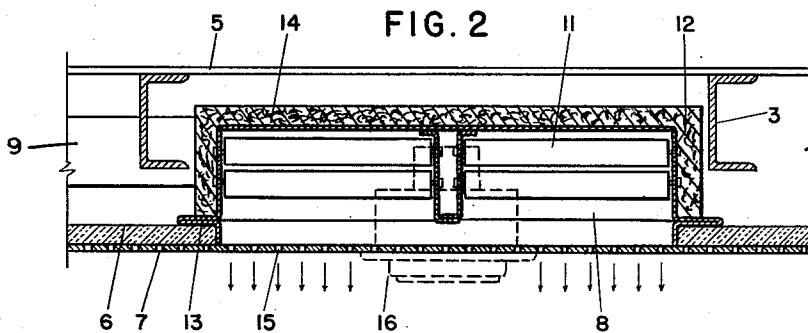


FIG. 2



INVENTOR.

BY *Seymour W. Brown*
and
Robert Tate
Henrich

UNITED STATES PATENT OFFICE

2,683,408

CONDITIONED AIR DISTRIBUTION SYSTEM
FOR SHIP CONSTRUCTION

Seymour W. Brown, New York, N. Y., and Robert
Tate, Millbrae, Calif.; said Brown assignor to
Carrier Corporation, Syracuse, N. Y., a corpo-
ration of Delaware

Application March 18, 1949, Serial No. 82,242

6 Claims. (Cl. 98—40)

1

This invention relates to conditioned air distribution systems for ship construction and more particularly to a system for distributing conditioned air in the public spaces of passenger vessels.

The chief object of the present invention is to provide a conditioned air distribution system for ship constructions in which the plenums of the distribution system are so formed as to fit between the frames of the ship, thereby avoiding a decrease in ceiling heights.

An object of the present invention is to provide a conditioned air distributing system for ship construction, so designed as to permit conditioned air to be distributed to the areas to be conditioned at relatively low velocities thus eliminating drafts and uncomfortable conditions in the areas being conditioned.

A further object is to provide a conditioned air distribution system for ship construction in which the plenums are sized to fit between adjacent frames of the ship, each plenum being insulated to render the same fire resistant as well as to retard leakage and to prevent condensation on the plenums.

A still further object is to provide an air conditioning system for ship construction in which the air distributing members are combined with an acoustical ceiling, the perforated covering material of the acoustical ceiling being employed to conceal the plenum while permitting distribution of conditioned air therethrough. Other objects of my invention will be readily perceived from the following description.

This invention relates to a system for distributing conditioned air to a plurality of areas of a ship to be conditioned and includes in combination frames extending horizontally of the ship, a plenum disposed between adjacent frames adapted to discharge conditioned air into an area to be conditioned, a duct connecting the plenum with a source of supply of conditioned air, acoustical material adjacent the plenum forming a ceiling for the area to be conditioned, a perforated covering concealing the plenum and the acoustical material, said covering permitting penetration of sound waves to the acoustical material, said plenum discharging conditioned air downwardly through the perforated covering into the area to be conditioned and means for controlling the quantity of air in each plenum. Preferably, deflector blades are provided in each plenum to distribute air in the plenum chamber.

The attached drawing illustrates a preferred embodiment of our invention in which

2

Figure 1 is a diagrammatic view of a ship illustrating the manner in which the plenums are disposed in the areas to be conditioned;

Figure 2 is a sectional view through a plenum disposed in position in an area to be conditioned; and

Figure 3 is a fragmentary plan view illustrating plenums disposed in areas to be conditioned.

Referring to the attached drawing, there is shown a fragmentary portion of a ship designated at 2 provided with the distribution system of the present invention for distributing conditioned air to public spaces of the ship. Ship 2 includes frames 3 extending horizontally thereof serving to support the various decks, for example, decks designated 4 and 5. Preferably such areas are provided with an acoustical ceiling composed of suitable sound absorbing or sound dissipating material 6 and a perforated veneer covering 7 which permits sound waves to penetrate into the sound absorbing material 6 and to be dissipated therein.

Plenums 8 of the distributing system are disposed between adjacent frames 3 and receive conditioned air at low velocity from duct 9 connected to a suitable source of supply. Ducts 9 may pass below structural members, or the structural members may be so disposed as to permit the ducts to pass therebetween. A volume damper 10 is provided at each plenum as shown in Figure 3 to regulate the quantity of conditioned air in each plenum chamber. Deflector blades 11 are provided in each plenum chamber to control the distribution or direction of air therein.

Each plenum 8 is disposed between adjacent frames 3 of the ship 2, as shown in Figure 2; so placing the plenum 8 prevents any decrease in ceiling height and eliminates the necessity of providing a false beam or soffit to distribute the air in the area to be conditioned. Preferably each plenum 8 is composed of suitable metal; the sidewalls 12 of each plenum extend outwardly in a horizontal direction as shown at 13 to form a flange or seat for insulating material 14, as hereinafter described. Each plenum chamber 8 is insulated with material 14. Material 14 preferably is fire resistant to permit the distribution system to meet the requirements of regulatory bodies. Material 14 also serves to retard heat leakage from the plenum and to prevent condensation of moisture on the exterior of the plenum.

As pointed out above, air is supplied to plenum 8; such air is distributed through the plenum

3

by blades 11 and is discharged downwardly at relatively low velocities, for example, approximately 75 feet per minute, through the perforations 15 in covering 7. So distributing the air eliminates drafts and uncomfortable conditions in the areas being conditioned.

If desired as indicated in dotted outline in Figure 2, each plenum may be provided with a suitable light fixture 16.

Preferably, the plenum chamber covering and the acoustical material covering is combined as disclosed above in a single perforated sheet. By so arranging the distribution of conditioned air within the space to be conditioned any interference of the distribution system with the architectural details of the ship is eliminated. The distribution system provided permits high temperature differential without discomfort to the occupant and with very low ceiling height. In addition, the structure is fire resistant and complies with Coast Guard requirements. Preferably, the fire resistant material is mounted on the plenum before the plenum is disposed in position in the distribution system thereby decreasing the labor costs and expense of erection of the system.

While we have described the present invention with particular reference to ship construction it will be appreciated the invention may be utilized successfully in other applications.

The distribution system so provided permits disposition of other architectural and utility features such as lighting, fire detection, alarm apparatus or the like without interference therewith and permits such equipment to be located in the design of the structure without regard to the ventilation arrangement.

Our invention provides a satisfactory system for distributing conditioned air to public spaces of passenger vessels, the system being so designed as to permit its utilization without any decrease in ceiling height or provision of a false ceiling which would decrease the cubic space of the area.

We have found that an important advantage of the present invention resides in the elimination of streaking of the ceiling during use. In many types of installations, dirt, lint and the like are entrained from air in the room being conditioned resulting in the ceiling adjacent conventional outlets being streaked with dirt and deposit. The present invention maintains ceilings of the areas being conditioned in vastly better condition from the standpoint of cleanliness than conventional outlets heretofore used.

While we have described a preferred embodiment of our invention it will be understood that our invention is not so limited since it may be otherwise embodied within the scope of the following claims.

We claim:

1. In a ship construction including a system for distributing conditioned air to areas of the ship to be conditioned, the combination of frames extending horizontally of the ship, enclosed metallic casings, each having an inlet and an outlet, disposed between adjacent frames, and adapted to receive conditioned air through the inlet thereof, from a source of supply, a fire-resistant insulating material covering each metallic casing except for the inlet and outlet, acoustical material adjacent the ceiling of each area to be conditioned, said material being coplanar with the outlet of said metallic casing, a perforated covering extending over the outlet of said metallic

4

casing and below said acoustical material, so as to define a plenum chamber with said casing, said covering concealing the acoustical material and the metallic casing so as to permit penetration of sound waves to the acoustical material, said plenum chamber discharging conditioned air at desired velocity downwardly through the perforated covering into the area to be conditioned, and means for controlling the quantity of air in each plenum chamber.

2. In a system for distributing conditioned air to public spaces of passenger vessels, the combination of frames extending horizontally of the ship, an enclosed metallic casing having an inlet and an outlet, disposed between adjacent frames, and adapted to discharge conditioned air, through the outlet thereof, in a public space of the vessel, a duct connecting the inlet with a source of supply of conditioned air, acoustical material forming the ceiling for the space to be conditioned, a perforated covering extending over the outlet of said metallic casing and below said acoustical material so as to define a plenum chamber with said casing, said covering permitting penetration of sound waves to the acoustical material, said plenum chamber discharging conditioned air downwardly through the perforated covering into the space to be conditioned, and means for controlling the quantity of air in the plenum chamber.

3. A system according to claim 2 in which deflector blades are provided in each plenum chamber to control distribution of air in the plenum chamber.

4. A system according to claim 2 in which fire-resistant insulating material covers the metallic casing, except for the inlet and outlet thereof.

5. In a system for distributing conditioned air to a plurality of spaces of passenger vessels, the combination of frames extending horizontally of the ship, enclosed metallic casings, each having an inlet and an outlet, disposed between adjacent frames, ducts connecting the inlets of said casings with a source of supply of conditioned air, fire-resistant material covering each metallic casing except for the inlet and outlet, acoustical material in each space disposed adjacent the metal casings therein, and forming a ceiling for the space to be conditioned, perforated coverings extending over the outlets of said metallic casings and below said acoustical material so as to define plenum chambers with said casing, said covering concealing the acoustical material, and permitting penetration of sound waves to the acoustical material, said plenum chambers discharging conditioned air downwardly through the perforated coverings into the areas to be conditioned and volume dampers for regulating the quantity of air in the plenum chambers.

6. In an air conditioned system for distributing conditioned air to a plurality of areas to be conditioned, the combination of enclosed metallic casings, each having an inlet and an outlet, adapted to discharge conditioned air into the areas being conditioned, ducts connecting the inlets of said metallic casings with a source of supply of conditioned air, fire-resistant material covering each metallic casing except for the inlet and outlet, acoustical material in each area disposed adjacent the metallic casing therein and forming a ceiling for the area to be conditioned, means comprising a perforated covering extending over the outlet of said metallic casing and below said acoustical material so as to de-

5

fine plenum chambers therewith, said coverings permitting penetration of sound waves to the acoustical material, said plenum chambers discharging conditioned air downwardly through the perforated coverings into the areas to be conditioned and volume dampers for regulating the quantity of air in the plenum chambers.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
136,393	Thompson	Mar. 4, 1873

Number

674,915
1,299,659
1,982,125
2,172,771
2,172,944
2,217,472
2,221,001
2,291,220

5

10

6

Name	Date
Giarth	May 28, 1901
Barrs	Apr. 8, 1919
Stacey, Jr., et al.	Nov. 27, 1934
Norris	Sept. 12, 1939
Norris	Sept. 12, 1939
Cosowsky	Oct. 8, 1940
Lucius	Nov. 12, 1940
Germonprez	July 28, 1942