Sept. 17, 1940. W. I. LUCIUS 2,214,821

VENTILATING PARTITION STRUCTURE

Filed June 21, 1937

Fig. 1.

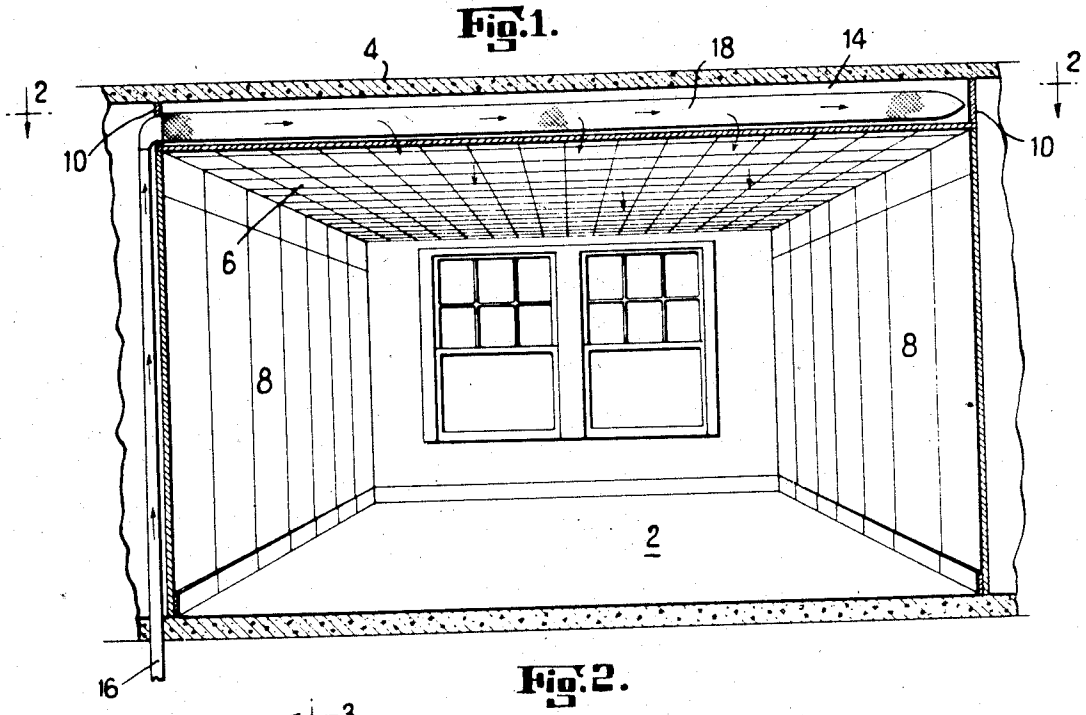


Fig. 2.

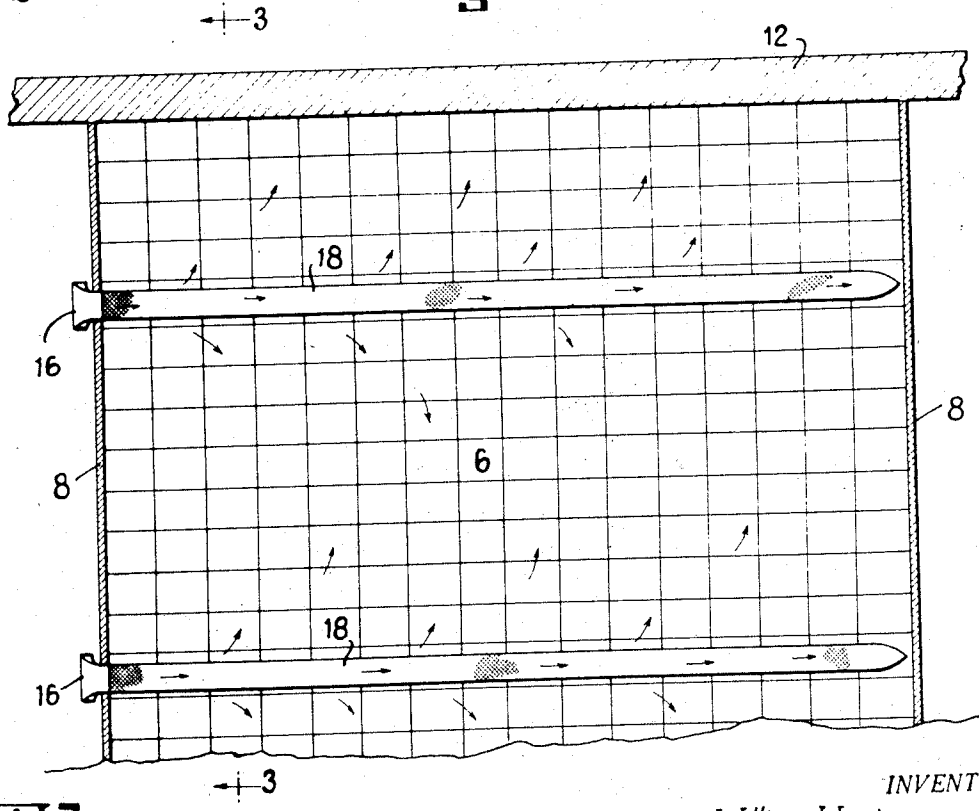
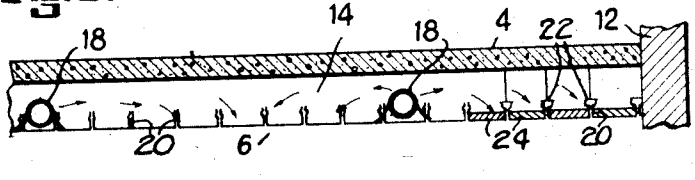


Fig. 3.



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VENTILATING PARTITION STRUCTURE

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Application June 21, 1937, Serial No. 149,301

5 Claims. (Cl. 98—40)

This invention relates to partition structures. More particularly it relates to a partition structure including a fluid distribution system, and which is capable of supplying ventilating fluid to a room or other space and at the same time providing acoustical correction or treatment for the room.

It is an object of this invention to provide a partition structure which will supply ventilating fluid substantially uniformly throughout a room which is formed at least in part by the partition.

It is a further object of this invention to provide a partition structure which is capable of supplying ventilating fluid substantially uniformly throughout a room, and at the same time absorb or modify sounds occurring within the room and prevent the entrance of sounds into the room through the partition.

It is another object of this invention to provide a fluid distribution system which will uniformly supply fluid over a definite area.

Other objects and advantages, if not specifically pointed out, will be apparent to those skilled in the art from the following detailed description of what is now considered the preferred embodiment of the present invention.

In the drawing:

Fig. 1 is a perspective view, partly in section, of a room provided with the partition structure of the present invention:

Fig. 2 is a horizontal sectional view taken substantially on the plane indicated by line 2—2 of Fig. 1 and looking in the direction of the arrows, and

Fig. 3 is a fragmentary, sectional, elevational view taken substantially on the plane indicated by line 3—3 of Fig. 2 and looking in the direction of the arrows.

Referring to Fig. 1, there is shown a room indicated generally at 2 which is similar to any conventional room, with the exception of the partition, which in this instance, forms the ceiling. The partition structure forming the ceiling provides a supply of ventilating fluid and at the same time provides an acoustical correction for the room. The ventilating and acoustical partition has been illustrated and will be described as a ceiling because the ceiling partition of a room is usually the one which most readily admits of being formed in accordance with the present invention, but any of the other partitions, such as the side walls or floor, might be so formed, if such is desired.

The partition structure comprises a backing member 4, which in this instance is formed by the floor slab of the floor above the room 2, but may be formed by a sub-ceiling, or any other type of construction desired. The only requirement for the backing member 4 is that it be substantially impervious to air.

A facing member 6 is spaced from the backing member 4. The facing member 6 may be formed in a number of ways, but a preferred construction is disclosed in my co-pending patent application Serial No. 107,756, filed October 27, 1936. In any event, the facing member 6 should comprise a porous air and sound transmitting member, which may be formed of porous cloth or composition material, or perforated metal, and serves as a decorative treatment for the partition structure. The porous material may be normally porous or perforated so as to cause it to be porous. The porous facing member will usually be formed in removable sections to provide rapid and facile installation, and to provide access to the space between the facing member 6 and the backing member 4. Such removability of the facing member sections is preferably achieved by employing the construction of my said co-pending application which is diagrammatically indicated in Fig. 3. Thus, the porous facing member may be made up of perforated metal pans having flanges 20 insertable for frictional engagement with supporting members, such as T-bars 22 suspended in any suitable manner from the backing member or floor slab above the partition.

The facing member 6 will usually include sound-absorbing material, arranged so as to intercept and absorb sounds transmitted through the porous facing member from the room below, and at the same time permit transmission of fluid from the space above the facing member 6 into the room below. Sound-absorbing material may be disposed at any place within or adjacent to the space between the backing member 4 and the facing member 6, the only requirement being that it be exposed to the sound originating within the room 2. This sound-absorbing material will also tend to absorb sounds originating without the room and prevent their transmission into the room through the partition. For purposes of illustration, the sound-absorbing material has been shown in Fig. 3 as comprising pads 24 supported by the supporting members or T-bars 22 in substantial accordance with the disclosures of my said co-pending application. However, it will be understood that other suitable types of facing member and sound absorber constructions may be employed.

If the side walls 8 of the room 2 do not extend

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upwardly as far as the backing member 4, panels 10 may be placed above the side walls 8, or elsewhere within the space between the backing member 4 and the facing member 6, to cooperate with the backing and facing members, and the bearing or other walls 12 of the building of which the room 2 forms a part, to form a plenum chamber 14.

Fluid supply ducts 16 convey ventilating fluid from any suitable source, such as a conventional conditioning system (not shown), to the plenum chamber 14. It has been found that if fluid is permitted to pass directly from the discharge ends of the ducts 16 into the plenum chamber and through the fluid and sound transmitting facing member 6 into the room, the fine particles of dust which remain in the conditioned fluid, even after passage of the same through the average conditioning system, are deposited on the facing member 6 and tend to discolor it. Also, unless the effective porosity of the facing member 6 is accurately controlled, the fluid will not be distributed throughout the chamber 14 and consequently will not be uniformly supplied throughout the room 2 through the facing member 6.

In order to overcome the two above mentioned problems, an air filter and distributor 18 is connected to the discharge end of each of the supply ducts 16, either directly or by means of any suitable extension.

The fluid filter and distributor 18 is formed of material having very fine pores, or of initially imperforate material which has been provided with very fine perforations. The fluid in passing through the fine openings in the member 18 has practically all of the foreign matter removed therefrom. In addition, the resistance to the passage of the fluid through the walls of the member 18, due to the fineness of the openings therein, causes the fluid to be distributed uniformly throughout the extent of the member 18 and to be discharged uniformly throughout the chamber 14, and, consequently, uniformly distributed to the room 2.

The number of ducts 16 and fluid filters and distributors 18 provided will depend upon the size of the plenum chamber 14 and the magnitude of the conditioned space in the room 2. As many or as few of the ducts 16 and members 18 may be provided as desired.

It is advantageous to form the air filters and distributors 18 from porous flexible material and to make them in the shape of elongated bags or tubes. When such a construction is used, a filter and distributor 18 may be originally installed, or removed for cleaning and replaced, by removing only one, or, at the most, only a few of the sections, such as the removable sections 20 (see Fig. 3), of which the facing portion of the facing member 6 is formed in the vicinity of the connection of the fluid filter and distributor 18 to a fluid supply duct 16. When a filter and distributor 18 is so installed, it may be extended over the chamber 14 to any desired extent, depending upon the length of the distributor 18, by means of any siutable instrument passed up through the opening formed by the removed sections, or the pressure of the air within the filter and distributor 18 may be depended upon to inflate the filter and distributor and automatically properly position it within the chamber 14.

A partition structure such as that previously described provides a uniform distribution of clean ventilating fluid to the room space adjacent thereto, without interfering with the sound-absorbing or modifying, or other acoustical function, of the acoustical treatment also provided by the partition structure.

The foregoing details have been given for the purpose of description and not limitation, since many change sand modifications may be made in the structure disclosed without departing from the spirit of the invention.

Having described my invention, I claim:

1. A building partition structure comprising a substantially air-impermeable backing member, a sound-absorbing and fluid transmitting facing member spaced therefrom, panels extending between said members and defining a plenum chamber therewith, a fluid supply duct, and an elongated tubular fluid filter and distributor in communication with said duct and within said chamber and extending substantially thereacross for delivering fluid into and substantially uniformly throughout the extent of said plenum chamber.

2. A partition structure comprising a substantially air-impermeable backing member, a porous facing member spaced from said backing member and forming a plenum space therewith, sound-absorbing material within said space, a fluid supply duct, and a flexible, substantially tubular, fluid filter and distributor, in communication with said duct and extending within and substantially across said space.

3. A room partition structure comprising a substantially air-impermeable backing member, a porous facing member spaced therefrom, panels extending between said members and defining therewith a plenum chamber, sound-absorbing material within said chamber, a plurality of fluid supply ducts, and a flexible, elongated fluid filter and distributor in communication with each of said ducts and extending within said chamber and substantially thereacross to deliver filtered fluid substantially uniformly throughout said chamber for transmission by said porous member generally throughout its area to the room without.

4. A room partition structure comprising a substantially air-impermeable backing member, a porous facing member spaced therefrom, said facing member including a removable section, sound-absorbing material within said space between said members, a fluid supply duct, and a flexible, elongated fluid filter and distributor removably connected with said duct near said section and extending between said members and substantially across said space and arranged to distribute fluid substantially uniformly throughout said space.

5. A partition structure comprising a substantially air-impermeable backing member, a porous facing member spaced therefrom, said facing member comprising a removable section, a sound-absorbing material within the space between said members and adjacent said facing member, a fluid supply duct, and a flexible tubular fluid filter and distributor removably connected with said duct adjacent said section and extending freely within and substantially across said space behind said sound-absorbing material, said distributor being arranged to deliver fluid substantially uniformly throughout said space.

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