July 1, 1969 M. H. COLEMAN ET AL 3,452,667

AIR DISTRIBUTION TERMINAL

Filed June 29, 1967

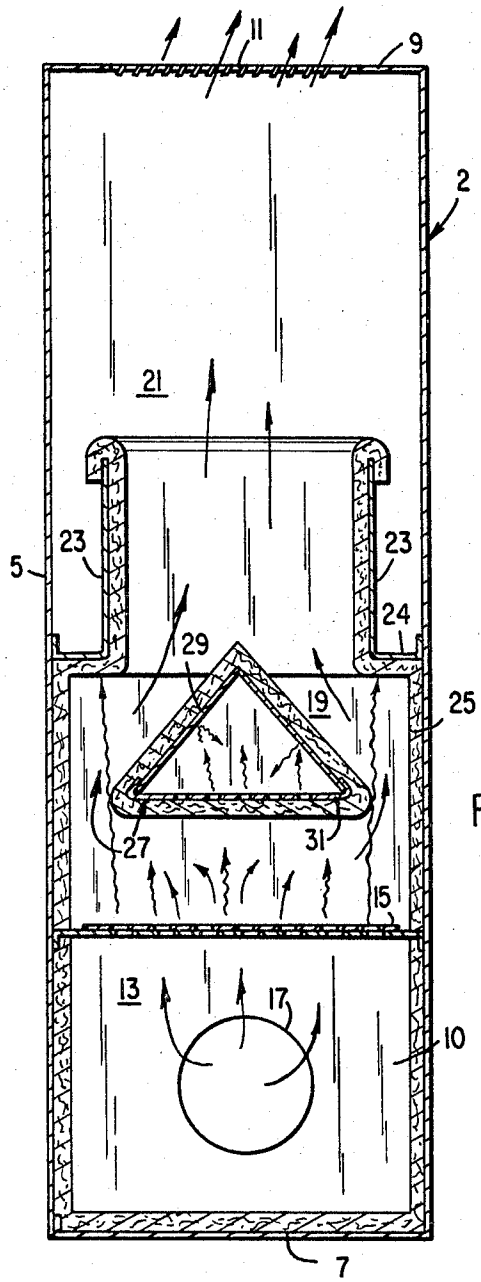


FIG. 2

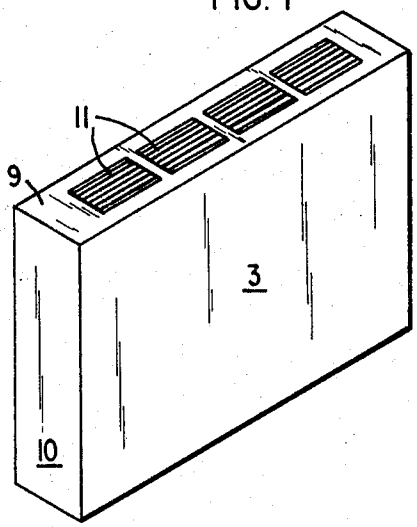


FIG. 1

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AIR DISTRIBUTION TERMINAL

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3 Claims

ABSTRACT OF THE DISCLOSURE

A room terminal for use in an air conditioning system to discharge air into the space being conditioned employing a sound attenuating chamber having a perforate section for entrance of sound waves therein to minimize noise produced by air flow through the unit.

Background of the invention

This invention relates to air conditioning terminals and more particularly to air conditioning terminals for discharging conditioned air from a central source into the area to be conditioned. In many air conditioning applications, it is desirable to provide air to the room terminals from a central location to either supply the entire room heating or cooling requirements or to act as primary air for inducing room air through the terminal into contact with heat exchange means therein to meet room heating and cooling requirements. In either type of installation, the room terminals are normally provided with a damper for balancing each room terminal so as to apportion the required amount of air through the terminal from the central source to meet the requirements of the area served thereby. One of the problems encountered with terminals of this type is that the dampers generate high frequency sound as the air passes therethrough which is objectionable in the area being conditioned.

Summary of the invention

In accordance with the preferred embodiment of the invention, a room terminal is provided having a novel internal configuration including a sound baffle constructed so as to form a chamber for the admission of sound waves therein to minimize the sound transmitted from the unit into the area.

Brief description of the drawing

FIGURE 1 is a perspective view of an all-air type air conditioning terminal; and

FIGURE 2 is a sectional end view of the terminal of FIGURE 1.

Description of the preferred embodiment

Referring to the drawing, there is illustrated a room terminal **2** having a front panel **3**, a rear panel **5**, a bottom panel **7**, a top panel **9** and end panels **10** so as to provide a box-like enclosure for passage of air therethrough as evidenced by the arrows having non-wavy shafts. A grille **11** is disposed in top panel **9** for discharge of air into the area being conditioned. A first plenum **13** defined by rear panel **5**, bottom panel **7**, front panel **3**, end panels **10** and a sliding plate damper **15** is supplied with conditioned air from a central source (not shown) through opening **17** formed in one of the terminal end panels **10**. A second plenum **19**, defined by front panel **3**, rear panel **5**, end panels **10** and sliding plate damper **15** overlies first plenum **13** and communicates with air discharge stack **21**. Stack **21** is defined by generally L-

shaped walls **23** and end panels **10**, the bottom legs of the walls **23** defining a portion of the top of plenum **19**. Suitable sound attenuating material **25**, such as glass fiber blanket, is provided for lining the sides, ends, and bottom of plenum **13**, the sides, ends, and top sections of plenum **19** and the walls and ends of discharge stack **21**. A sound attenuating baffle **27** having imperforate walls **29** and a perforate base panel **31** is disposed in plenum **19**. Sound attenuating material **25** is also utilized to completely cover the exterior of sound baffle **27**. The baffle **27** is suitably sized and located to minimize the sound level of the terminal.

Since a major source of objectionable noise in the terminal results from high frequency sound waves, shown in the drawing by arrows having wavy shafts, produced by the throttling of air through the damper, the baffle **27** must be located so as to block this sound. Care must be taken in the placement of the baffle however, so as to avoid the generation of further sound waves by the impingement of air on the baffle. The base of baffle **27** must therefore be located in relation to the velocity of air discharged from the damper so that the velocity of the air impinging on the baffle is insufficient to create additional unwanted noise. Base **31** of the baffle is sized in relation to legs **24** of L-shaped walls **23** so as to provide line-of-sight blocking of the high frequency sound waves produced by damper **15**.

The perforations in base plate **31** provide a path for sound waves into the center of the baffle. The sound waves that are deflected therein so as to pass outwardly through the perforations in the plate must therefore travel through the sound attenuating material **25** twice, which results in a double dissipation of the acoustic energy. To further aid in reducing the noise level of the terminal, the baffle is provided with as great a depth in the direction of air flow as possible in relation to the sound wave length. To provide a sufficiently large passage for air between the baffle **27** and walls **23** while providing the greatest depth for sound wave penetration into the baffle, the triangular shape illustrated in the drawing is preferred. However, any configuration which provides a sufficiently large air passage between the baffle and the unit walls while providing sufficient baffle depth for penetration of sound therein is deemed to be within the scope of our invention.

While we have described a preferred embodiment of our invention, it is to be understood the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

We claim:

1. A room terminal for use in an air conditioning system comprising:

means defining a first enclosure adapted for connection to a course of conditioned air;

means defining a second enclosure in communication with said first enclosure;

a damper disposed between the first and second enclosures for regulating air flow from the first to the second enclosure;

means associated with the second enclosure for discharge of air therethrough; and

a sound attenuation chamber disposed between said damper and said air discharge means, said attenuation chamber including a perforate base section having a layer of sound attenuation material covering the external surface thereof for impingement of air thereon from said damper and an imperforate top section, said perforate base section being arranged for passage of sound energy directly from said damper through said layer of sound attenuation ma-

terial into the interior of said chamber for dissipation of the sound energy waves therein.

2. A room terminal according to claim 1 wherein the base section of said attenuating means is comprised of flat perforate plate disposed parallel to said damper, the top section of said sound attenuating means comprising an inverted V-shaped imperforate plate so as to form a triangular shaped member.

3. A room terminal according to claim 2 wherein said air discharge means includes shoulder sections above said sound attenuating means to block line-of-sight sound waves passing alongside said sound attenuating means from the damper, and, sound attenuating material disposed on said shoulder sections for dissipating sound energy therein.

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WILLIAM E. WAYNER, *Primary Examiner.*

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98—40; 181—42

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(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,452,667 Dated July 1, 1969

Inventor(s) MILTON H. COLEMAN, ET AL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 55, for "course" read --source--.

SIGNED AND
SEALED
JAN 6 - 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents