

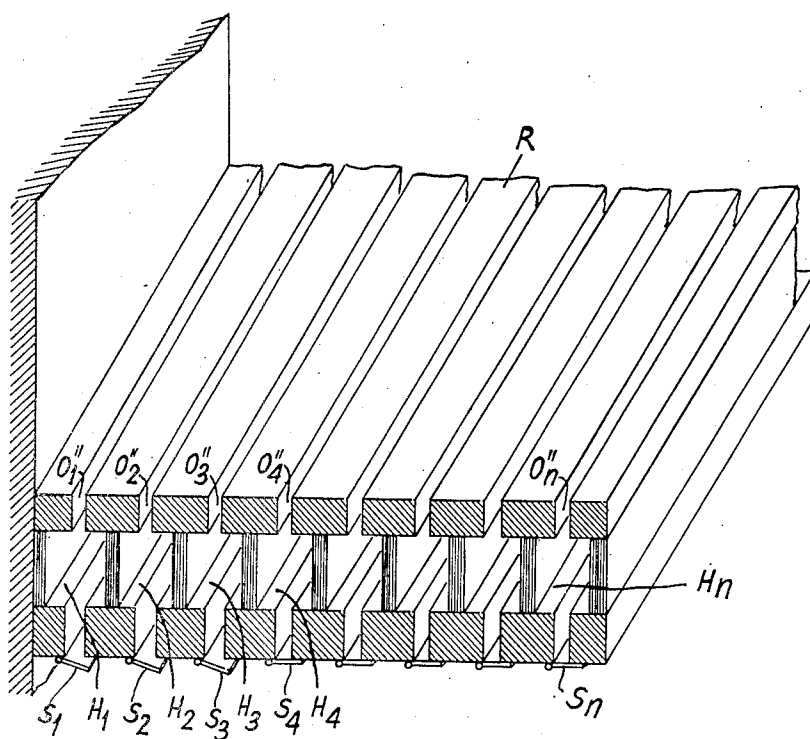
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SOUND ABSORBING OR ATTENUANT ARRANGEMENT FOR REVERBERANT ROOMS

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SOUND ABSORBING OR ATTENUANT ARRANGEMENT FOR REVERBERANT ROOMS

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8 Claims. (Cl. 20—6)

This specification relates to a new and useful system to deaden sound, especially sound in the bass range of frequencies in highly reverberant rooms.

An object of this invention is to improve the acoustic qualities of a room in a simple and efficient manner.

A feature of this invention is the arrangement of a plurality of longitudinal strips arranged in pairs, one above the other, and spaced apart therefrom, with a central web portion interposed between the strips, forming open cavities below the surface of the floor of a room.

Rooms or spaces which are non-absorbent for sound often offer the difficulty that such treatment of the surfaces and other parts of the room as is required for acoustic reasons conflicts with the demands concerning the arrangement of the interior of the room from an architectonic, illuminating and other angles. In fact, the architect or the illuminating engineer often refuses to permit the use of sound absorbent or attenuating bodies or materials for mechanical reasons on the ground that the architectonic impression of the room may be impaired.

In the majority of large spaces such as churches, congress halls, auditoria, etc., reverberation mostly in the lower frequency ranges is particularly long because the major part of the sound deadening or attenuation is caused by the persons present, the sound absorption increasing markedly in the direction towards higher frequencies.

It is known in the prior art to use air resonators for attenuation, especially inside the range of low frequencies. In arrangements known in the art, a perforated or apertured plate which may consist of wood, structural plates, apertured brick or the like, is placed anteriorly of a fixed and firm wall spaced a certain air distance apart therefrom. The natural period and the attenuation of such resonators must be so chosen that the desired attenuation in the base ranges is secured.

In numerous instances, however, it is not feasible to so design the walls of the room in a way as just outlined or to build in addition anteriorly of the wall as just stated. According to this invention the idea is to utilize the floor to a greater extent than has heretofore been usual for the purpose of insuring sound deadening. To be more precise, the floor according to the invention is arranged in the form of a grate system capable of carrying the desired load, the apertures in the flooring leading particularly to attenuated cavi-

ties or spaces so that as in the known arrangement an air resonator attenuation is produced. The under surface of these cavities is preferably hard and smooth in order to allow cleaning either from above after removal of the grating or from below by way of closable openings. The grates may be covered by carpeting inasmuch as such carpets practically represent no obstacle for sound in the lower range. In other words, the operation of air resonators would not be substantially impaired as a result. The dimensions of the resonators should suitably be made slightly different in order that a frequency band rather than any definite or select frequencies may be attenuated.

One appreciable advantage of the new arrangement is that the sound absorbent floor is particularly active when the room or auditorium is only partly filled, while when there is a full audience the effect is naturally diminished. The consequence is that the reverberation period is independent of the filling of the auditorium and is practically constant and stable, a fact which is of great importance for the mounting of loudspeaker equipment.

The single view of the drawing illustrates an exemplary embodiment of the invention. Provided in the floor are cavities $H_1, H_2 \dots H_n$ which communicate with the space or room through slots $O_1, O_2 \dots O_n$. The lower surface of the cavities is hard and smooth in order that cleaning may be facilitated. If desired, and as shown in the drawing, closable cleaning ports $S_1, S_2 \dots S_n$ can be provided. The grating containing openings $O_1, O_2 \dots O_n$ may be removable.

I claim:

1. A sound absorbing system for highly reverberant rooms comprising a floor capable of carrying the desired load composed of a plurality of longitudinal strips arranged in pairs, spaced apart one above the other, and spaced apart from adjacent pairs of strips, and a central connecting web portion for each of said pairs coextensive with the length thereof, said web portion and said strips forming open cavities below the surface of said floor.

2. A sound absorbing system for highly reverberant rooms comprising a floor capable of carrying the desired load composed of a plurality of longitudinal strips arranged in pairs, spaced apart one above the other, and spaced apart from adjacent pairs of strips, and a central connecting web portion for each of said pairs coextensive with the length thereof, said web portion and

said strips forming open cavities below the surface of said floor, the upper portion of the lower of the longitudinal strips of adjacent pairs presenting hard, smooth surfaces defining the bottom of the corresponding cavities.

3. A sound absorbing system for highly reverberant rooms comprising a floor capable of carrying the desired load, composed of a plurality of longitudinal strips arranged in pairs, spaced apart one above the other, and spaced apart from adjacent pairs of strips, and a central connecting web portion for each of said pairs coextensive with the length thereof, said web portion and said strips forming open cavities below the surface of said floor, said longitudinal strips and web portion being removably associated.

4. A sound absorbing system for highly reverberant rooms comprising a floor capable of carrying the desired load, composed of a plurality of longitudinal strips arranged in pairs, spaced apart one above the other, and spaced apart from adjacent pairs of strips, and a central connecting web portion for each of said pairs coextensive with the length thereof, said web portion and said strips forming open cavities below the surface of said floor, and openable bottom walls hinged to the lower of longitudinal strips and normally closing the bottom of said cavities.

5. A sound absorbing system for highly reverberant rooms comprising a floor capable of carrying the desired load, composed of a plurality of longitudinal strips arranged in pairs, spaced apart one above the other, and spaced apart from adjacent pairs of strips, and a central connecting web portion for each of said pairs coextensive with the length thereof, said web portion and said strips forming open cavities below the surface of said floor, the dimensions of said strips and web portion being proportioned to respond principally to sound vibrations of a predetermined frequency so as to afford the desired sound absorbing effect.

6. A sound absorbing system for a highly reverberant room or the like, comprising a floor capable of supporting the desired load, said floor comprising a grating consisting of upper strips arranged in laterally spaced relation and lower strips arranged beneath the upper strips, webs extending between each upper strip and its related lower strip, and means closing the spaces between adjacent ones of the lower strips, whereby said means and the adjacent lower strips and the adjacent upper strips and their webs define sound absorbing cavities.

7. A sound absorbing system for a highly reverberant room or the like, comprising a floor capable of supporting the desired load, said floor comprising a grating consisting of upper strips arranged in laterally spaced relation and lower strips arranged beneath the upper strips, webs extending between each upper strip and its related lower strip, and means closing the spaces between adjacent ones of the lower strips, whereby said means and the adjacent lower strips and the adjacent upper strips and their webs define sound absorbing cavities, said webs being substantially narrower than the upper and lower strips.

8. A sound absorbing system for a highly reverberant room or the like, comprising a floor capable of supporting the desired load, said floor comprising a grating consisting of upper strips arranged in laterally spaced relation and lower strips arranged beneath the upper strips, webs extending between each upper strip and its related lower strip, and means closing the spaces between adjacent ones of the lower strips, whereby said means and the adjacent lower strips and the adjacent upper strips and their webs define sound absorbing cavities, said webs being substantially taller and narrower than the upper and lower strips.

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