PATENT SPECIFICATION

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Complete Accepted: Jan. 12, 1928.

COMPLETE SPECIFICATION.

Improvements in or relating to Walls.

I, EMILE BERLINER, a citizen of the United States of America, of 1464, Columbia Road, Northwest, Washington, District of Columbia, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to walls and is particularly applicable to masonry walls, such as those of auditoriums, theatres, concert halls, churches and the like, where good acoustics is a prime consideration. In masonry walls as usually constructed the solidity of the structure promotes reverberation, and such walls are found to be almost entirely lacking in that resonant property so essential for the production of a good acoustic effect.

The padding of wall surfaces and the employment of hollow blocks or the like and of cellular structures is known but the object of using them is usually to deaden or absorb sound whereas the chief object of the present invention is to provide walls of good acoustic properties, and which while equal or superior in such properties to wood walls are permanent and non-inflammable.

In order to prevent reverberation and yet possess a resonant quality a wall should have a surface possessing a certain degree of elasticity. Where the wall presents a hard and unyielding surface, as when it is made of stone, marble, stucco or the like, sound waves will be reflected from it with reverberation. If, on the other hand, the surface of the wall is porous fibrous or the like the sound waves are damped or deadened and their proper reflection is prevented.

The wall of the present invention, while not absorbing sound, counteracts reverberation because it is formed with air spaces covered by portions of the wall surface so constituted as to act as vibratory diaphragms. The reflected sound has, therefore, a resonant quality, this resulting from the elastic or vibratory character of the wall surface against which the sound is directed, as in violins and similar musical instruments.

[Price 1/-]

For the above purpose the air spaces may be constituted by hollow cell members or depressions located within the wall surface and covered with resonant cementitious material serving as the vibratory diaphragms.

Other and further objects will be apparent from the following description with reference to the accompanying drawing, in which:

Fig. 1 is a view, partly in section, of a wall provided with the cell-like members comprising the present invention;

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is a perspective view of one of the cell-like members;

Fig. 4 is a perspective view of a modified form of cell-like member;

Fig. 5 is a plan view, partly in section, of a modified form of wall structure; and

Fig. 6 is a vertical section of the structure shown on Fig. 5.

Referring more particularly to the drawings:

The coarse plaster, or the like, base surface 1 has a plurality of members 2 attached thereto, as shown diagrammatically on Fig. 1. The members 2 each comprise a base portion and a rim 3 designed to space the base portion from the surface 1, and they are preferably of circular form as shown, for the purpose of anchoring them to the surface 1, as described hereinafter. I do not, however, restrict the invention to the use of circular members; those of any other suitable form and dimensions, for example, hexagonal, octagonal or the like, may be used with equally good results. The members 2 are preferably made of cardboard or the like, and are affixed to the surface 1 and to each other by means of nails or other suitable and convenient fastening means for holding them temporarily in position. These cell-like members may also be made of wire mesh fabric, as shown on Fig. 4, foraminous metal or other suitable material. When applied to the unfinished surface of a wall as set forth above, the cell molds 2 are covered with

a finishing coat 4 of so-called acoustic plaster, that is, a mixture of plaster, cement or the like, and a filler, such for example, as sawdust, etc., adapted to aid in producing the desired resonance. Ordinary plaster or cement may also be used as a finishing coating, but the acoustic plaster is preferable. This cementitious coating fills in the spaces between adjacent members 2, securely anchoring them to the surface 1, and at the same time completely covers the members 2, thus providing a finished and unbroken wall surface. The members 2 simply serve as molds or supports for the formation of the cellular spaces in the wall. Their removal, after the finishing cementitious coat has been applied, would be impractical, if not impossible without destroying the surface of the wall, and since their presence does not impair the acoustic properties of the finished wall, they are allowed to remain, serving to some degree as a reinforcement for the wall.

A modification of my invention is shown on Figs. 5 and 6, wherein depressions, the equivalents of the cellular spaces formed in the previously described embodiment, are made in the unfinished or base surface of a wall. These depressions 5 are shallow and are covered with a sheet of fabric of any kind, paper, cardboard, wire gauze or foraminous metal, etc., as indicated at 6 on the drawing. The whole is then covered with a layer of acoustic plaster or other cementitious coating, as described hereinbefore, and results in a resonant wall surface which, however, has a finished appearance.

From the foregoing it will be apparent that I have provided a wall structure which is permanent, fireproof and inexpensive, and which possesses the marked acoustic properties of wood walls.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A wall facing formed with air spaces covered by portions of the wall surface so constituted as to act as vibratory diaphragms.

2. A wall facing formed adjacent its surface with a plurality of depressions which are covered with resonant cementitious material acting as vibratory diaphragms.

3. A wall facing as claimed in Claim 1, comprising a layer of plaster, a plurality of hollow molds affixed thereto, and a finish layer of acoustic cement covering said molds and extending between them for securing them permanently to the wall.

4. A wall for an auditorium or the like covered with cells which are affixed thereon by a layer of cementitious material which covers said cells and forms vibratory diaphragms.

5. A wall for an auditorium or the like comprising a plurality of wire mesh cell-like members affixed thereto, said members being embedded in and affixed to the wall by a layer of cementitious material serving as a wall surface and vibratory diaphragms for said cell-like members.

6. A wall facing constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings and for the purpose specified.

Dated the 8th day of March, 1927.
For E. BERLINER,
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London, W.C. 2, and
177, William Street, New York, U.S.A.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig.1.

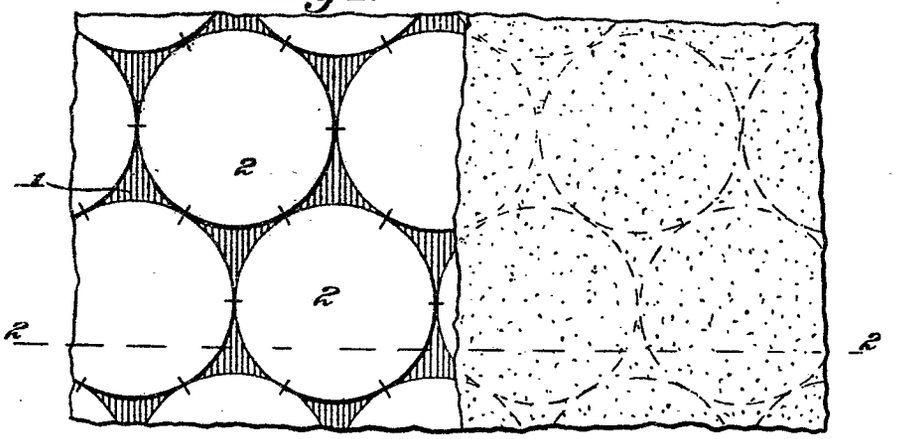


Fig.2.

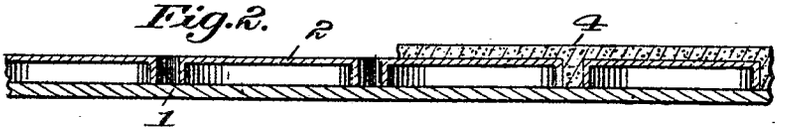


Fig.3.

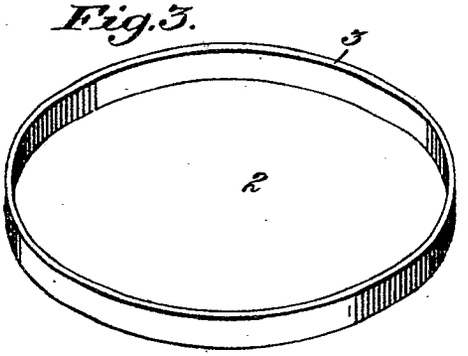


Fig.4.

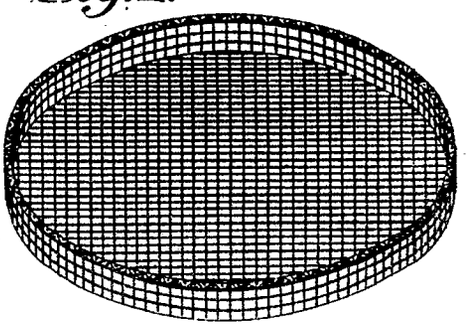


Fig.5.

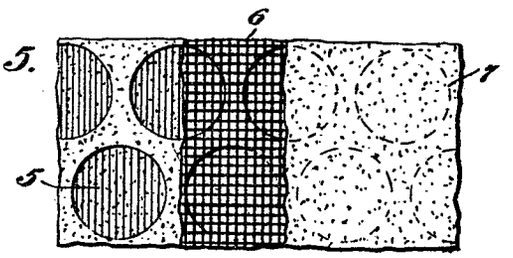
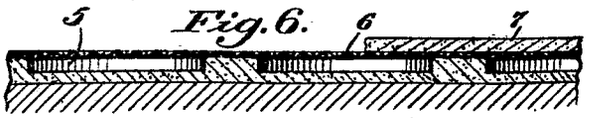


Fig.6.



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