April 19, 1960 B. O. STEWART ET AL 2,933,147

SOUND ABSORPTIVE STRUCTURE

Filed Feb. 20, 1957 2 Sheets-Sheet 1

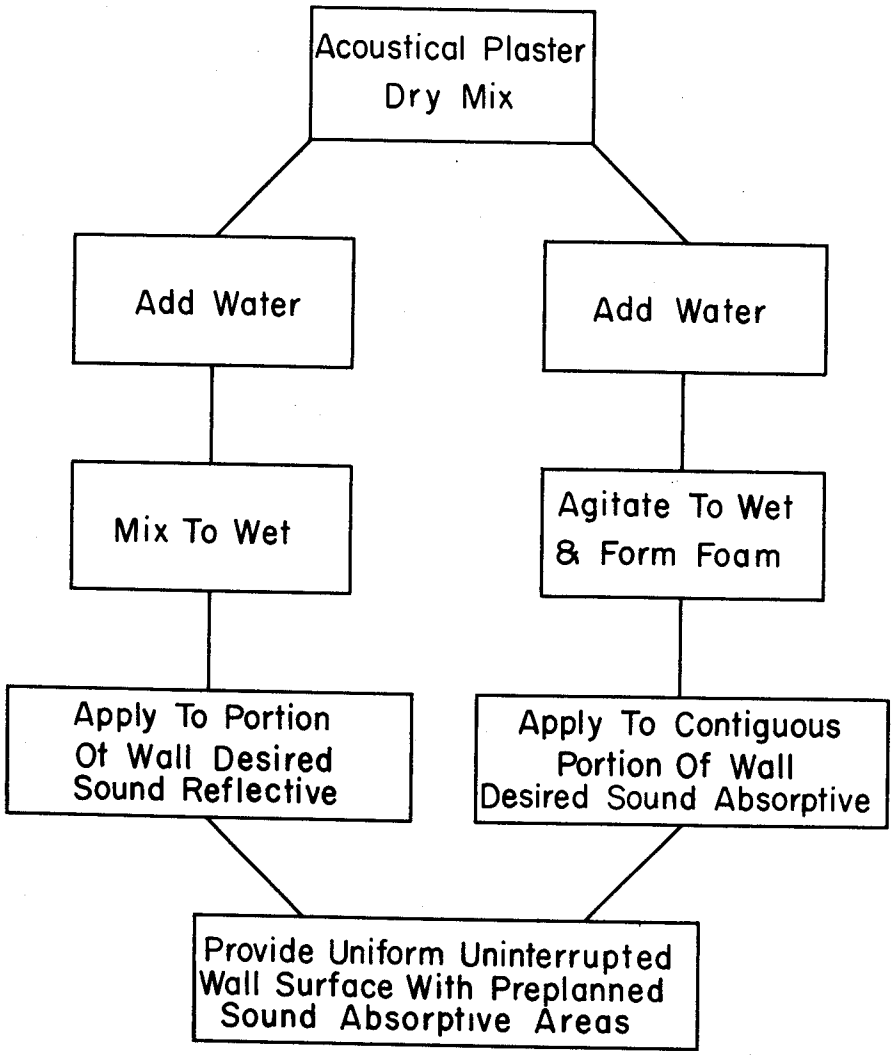


Fig. 1

INVENTORS
Basil O. Stewart &
BY Henry James Schneiter
Robert F. Hause
ATTORNEY

April 19, 1960 B. O. STEWART ET AL 2,933,147

SOUND ABSORPTIVE STRUCTURE

Filed Feb. 20, 1957 2 Sheets-Sheet 2

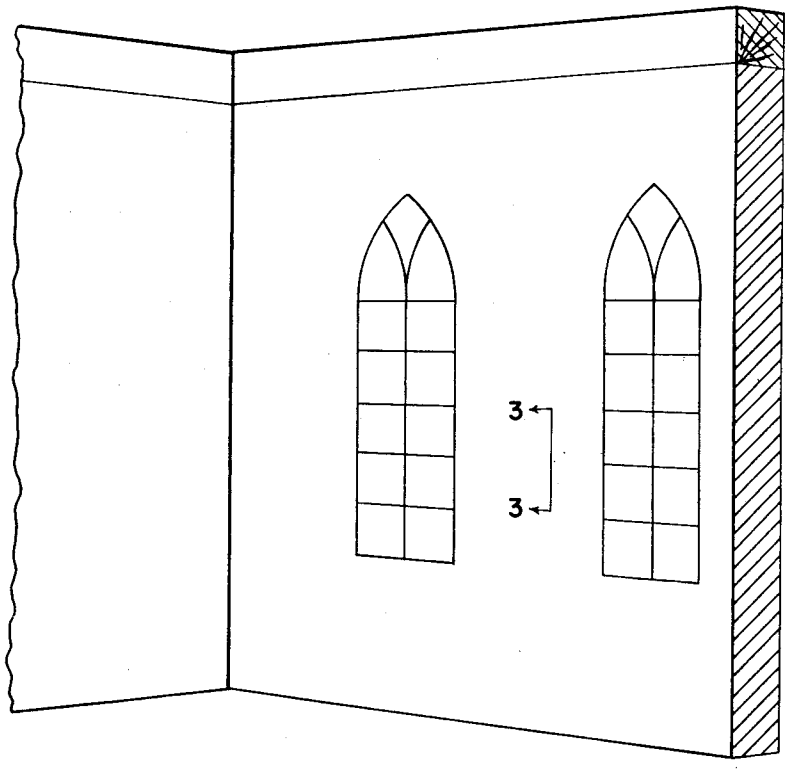


Fig. 2

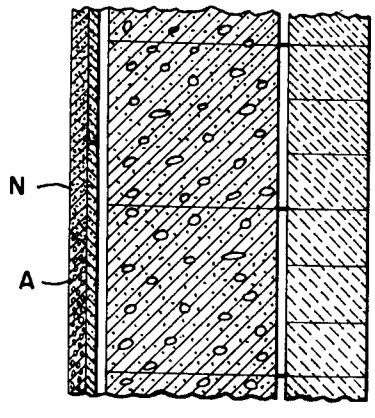


Fig. 3

INVENTOR.
Basil O. Stewart &
BY Henry James Schneiter
Robert F. Hause
ATTORNEY

Published by AsbestosClaims.Law
asbestosclaims.law/library/23690/2

United States Patent Office

2,933,147

Patented Apr. 19, 1960

2,933,147

SOUND ABSORPTIVE STRUCTURE

Basil O. Stewart, Kenmore, and Henry J. Schneiter, Grand Island, N.Y., assignors to National Gypsum Company, Buffalo, N.Y., a corporation of Delaware

Application February 20, 1957, Serial No. 641,243

2 Claims. (Cl. 181—33)

This invention is directed to an improved sound absorptive wall and particularly to an improved wall of acoustical plaster and to the method of making the same. The invention is especially applicable to large walls for structures where both sound absorption and sound reflection are of critical importance, such as auditoriums, broadcasting rooms, theatres and concert halls.

The use of patches of sound absorptive material interspersed throughout an otherwise generally non-absorptive wall, in order to attain highly controlled degrees of sound absorption, is well known. The science involved in the proper selection and placement of such patchwork is highly involved and since the techniques involved in their design and placement are not specifically necessary, for an understanding of the present invention, they will not herein be considered.

Attempts have been made on many occasions to provide this acoustical patchwork with materials closely similar in appearance to the appearance of the non-absorptive surroundings. Generally, however, the surface structure of acoustical building products is of such far more porous nature relative to the non-absorptive wall materials heretofore combined that the acoustical patchwork is clearly discernible in the completed wall. Although the patchwork designs employed ordinarily can have a pleasant aesthetic appearance, it is often desired to provide a relatively unbroken, or continuous wall surfacing, to more properly complement other features of the room design or architecture.

It is an object of the present invention to provide a method of making a monolithic wall surface incorporating therein, in a manner undetectable to the human eye, preplanned areas of relatively low density having relatively high sound absorbing properties.

It is a further object to provide a monolithic wall or wall section having areas of differing acoustical properties, which areas are not apparent to the human eye.

These and other objects and advantages of the invention will be more apparent when considered in connection with the following description of the invention and the preferred embodiments thereof, as set forth in the specification and shown in the drawings in which:

Fig. 1 is a flow diagram of the method of the invention.

Fig. 2 is a perspective view of a portion of an auditorium wall constructed in accordance with the invention.

Fig. 3 is an enlargement of a sectional view of the wall of Fig. 2 taken on line 3—3.

Acoustical plasters have been developed and manufactured for many years. A usual composition for acoustical plasters includes lime, fibers and foam generating ingredients. A typical formulation for an acoustical plaster adaptable to the present invention is as follows:

	Lbs.
Hydrated lime	89½
Asbestos fiber	10
Sodium sulfate of technical lauryl alcohol (foaming agent)	½
Water	140

The lime, fiber and foaming agent are mixed and packaged in a dry form. Prior to application, water is added and the ingredients are thoroughly agitated for complete wetting of the dry mix and for activating the foam generating agent.

It has now been found that variations in the resultant densities of acoustical plasters may be made and fairly accurately predicted by variation of the time of mixing or agitating immediately after the addition of the water. It will be apparent that acoustical properties to be obtained with various degrees of mixing will be dependent upon the formulation used, and the violence of the agitation employed, however, these acoustical properties can be readily predicted for any set of conditions by determination of the densities of the mix at progressive intervals throughout a prolonged mixing operation.

With a formulation as set forth hereabove, and employing a standard, mechanically-agitated, plaster mixing machine, it has been found that, with approximately 3 minutes or less of agitation, a dried or set wall material will be obtained of approximately 40 lbs./cu. ft., and that, with 10 or more minutes of agitation, a set wall material of approximately 20 lbs./cu. ft. is obtained. Essentially, the shorter period of agitation is determined as that sufficient only to completely wet all ingredients evenly. The longer period of agitation causes a foaming and entrapping of air, which in a completed wall coating results in the formation of a great number of interconnecting, sound-absorbing cells.

A variation in acoustical plasters, a portion being of 20 lbs./cu. ft. density and a portion being of 40 lbs./cu. ft. density, provides the two structural materials desired for walls having the above discussed spaced patches of absorptive material interspersed throughout an otherwise generally non-absorptive wall. Thus, in accordance with the above embodiment, sufficient acoustical plaster is prepared, incorporating 10 minutes of agitation in the preparation, for application to areas in which an architect specifies high sound absorptive material, the mixing of the otherwise similar acoustical material, to be applied throughout the balance of the wall or wall section, to be limited to approximately 3 minutes of agitation.

Referring to Fig. 1, a flow diagram indicates the above described method. Fig. 2 shows a typical auditorium wall with an uninterrupted surface appearance, having, as shown in the enlarged view of Fig. 3, a section of the exposed surface of cellular, sound absorptive structure A, and immediately adjacent a non-cellular, non-sound absorptive section N, with no normally apparent line of juncture therebetween, in accordance with the invention.

Various procedures may be employed in regard to the pattern of progression to be employed without undue inconvenience, such as application first of all low density material, followed by application of higher density material. Alternatively, the acoustical plaster may be applied from one edge progressively across the wall, using the proper density of plaster as various areas are approached and coated.

Following the application of the acoustical plaster, including the material of high and that of low density, whether trowelled or sprayed on, it is often desired to stipple, perforate or otherwise roughen the surface, to obtain a desired surface appearance or to increase the absorptive quality of the low density material. Such additional surface treatments can be made throughout the wall in accordance with the invention, without disrupting the desired sound-absorbing and relatively non-sound-absorbing relation between the areas of the two differing density materials.

An improved acoustically treated wall or wall section is produced, in accordance with the invention, having acoustical plaster therethroughout, but varying in density

Published by AsbestosClaims.Law

asbestosclaims.law/library/23690/3

throughout preplanned areas, to provide a monolithic wall having a single continuous surface appearance while providing, unnoticably to the eye, the desired spaced patches of sound absorptive material.

Having completed a detailed disclosure of the preferred embodiments of our invention so that those skilled in the art may practice the same, we contemplate that variations may be made without departing from the essence of the invention or the scope of the appended claims.

We claim:

1. A partially sound absorptive wall structure comprising a layer of a set cementitious material forming the exposed surface of said wall structure, said exposed surface being formed with substantially identical surface texture, and appearance therethroughout and including preplanned dense, substantially non-sound absorptive sections of said material having a density of approximately

40 pounds per cubic foot and preplanned low-density, sound-absorptive sections of said material having a density of approximately 20 pounds per cubic foot, said dense sections being substantially indistinguishable in surface appearance from said low density sections.

2. The structure of claim 1 wherein said set cementitious material consists of a set mixture essentially of about 90 parts hydrated lime and about 10 parts mineral fiber.

References Cited in the file of this patent

UNITED STATES PATENTS

1,906,123	Eaton	Apr. 25, 1933
2,239,107	Lefebure	Apr. 22, 1941
2,762,738	Teale	Sept. 11, 1956

Published by AsbestosClaims.Law
asbestosclaims.law/library/23690/4