June 28, 1938. A. GLASS 2,121,962

SOUNDPROOF WALL STRUCTURE AND STRUCTURAL MEMBER FOR USE THEREIN

Filed April 16, 1936

Fig. 1.

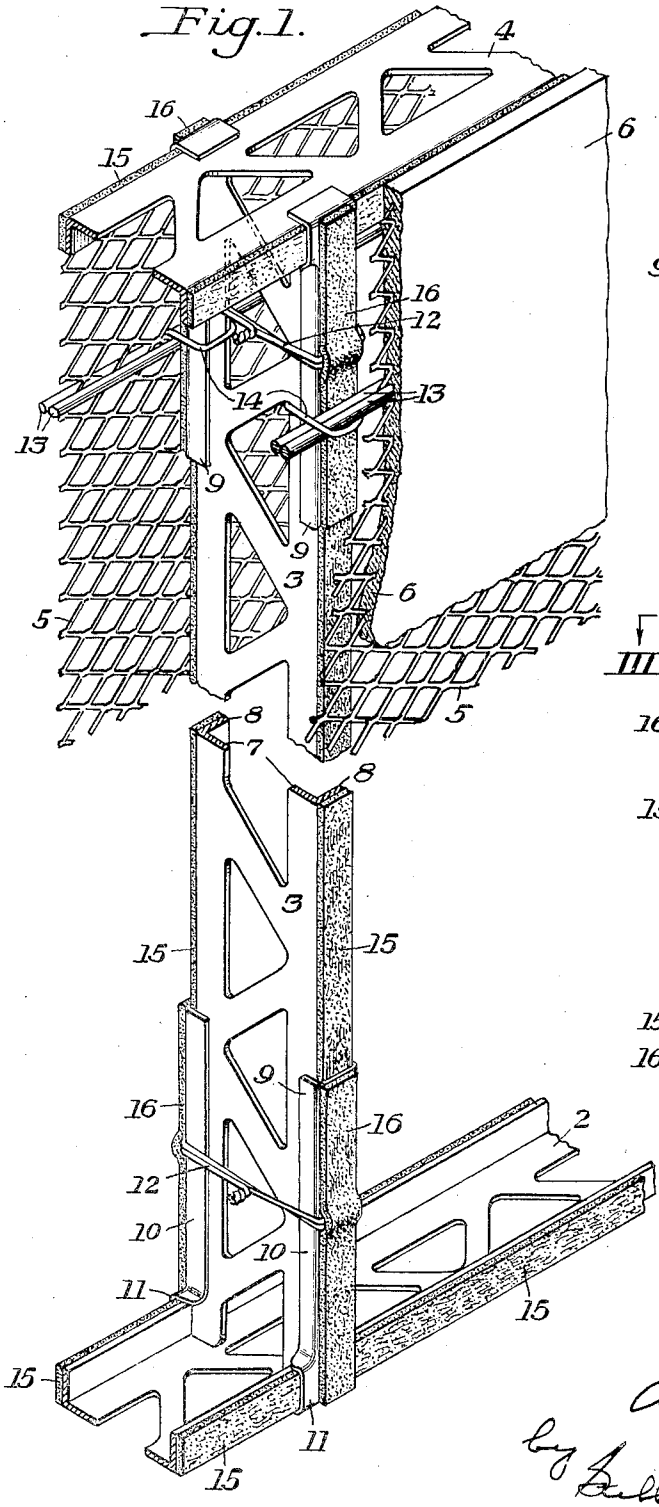


Fig. 2.

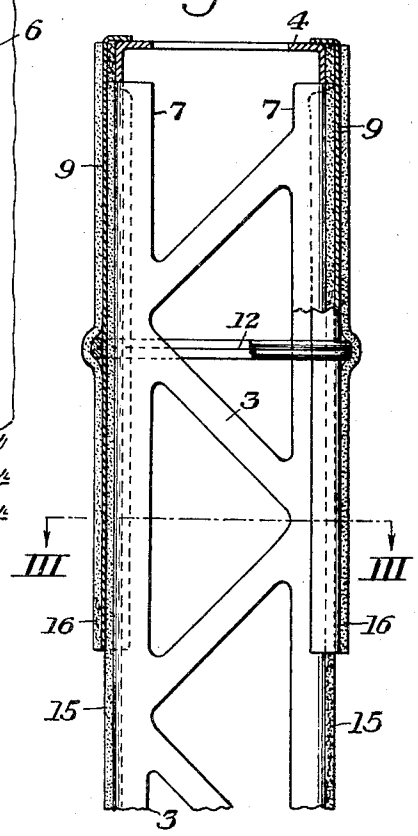
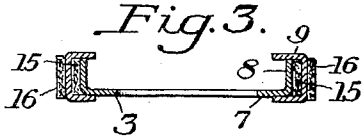


Fig. 3.



INVENTOR

Alexander Glass

by Fulbright, Clemon & Rowley

his attorneys

Patented June 28, 1938 2,121,962

UNITED STATES PATENT OFFICE

2,121,962

SOUNDPROOF WALL STRUCTURE AND STRUCTURAL MEMBER FOR USE THEREIN

Alexander Glass, Wheeling, W. Va., assignor to The Consolidated Expanded Metal Companies, Wheeling, W. Va., a corporation of West Virginia

Application April 16, 1936, Serial No. 74,679

12 Claims. (Cl. 72—46)

This invention relates to sound-proof wall structures and structural members for use therein. It relates more particularly to the construction of walls having sound-proof characteristics by the use of structural elements which are for the most part of standard design, eliminating the necessity of providing special shapes and allowing the wall to be constructed in substantially the same manner as standard walls as heretofore known. It relates still more particularly to a wall having sound-proof characteristics constructed in standard manner with a lath and plaster surface portion and to an improved stud for use in constructing such a wall.

It is well known that the acoustic properties of walls can be varied within wide limits depending upon the type of construction. It has heretofore been proposed to provide walls having sound-proof characteristics by the provision of structures which are of special design throughout and which provide means for erecting elements of the wall with sound-proofing material therebetween so as to maintain such elements out of direct contact and consequently reduce the vibrations transmitted by the wall. Numerous proposals of this nature have been made, most of them involving the use of special saddle or supporting members adapted to receive sound-proofing material on top of which the elements of the wall are erected. These structures require a departure from standard methods of wall construction necessitating the provision of numerous special parts which must be assembled in a particular way.

I have found that I can provide a wall having sound-proof characteristics while utilizing for the most part standard structural elements assembled in standard manner. In other words, I have found that it is not necessary to go to the extremes heretofore considered necessary to provide a satisfactory sound-proof wall. I provide a wall having sound-proof characteristics which comprises a load-supporting member with a surface portion of the wall connected therewith so as to be carried thereby and sound-proofing material interposed between the structural member and surface portion. The entire structure may be standard except for the provision of the sound-proofing material which I apply in such a way as to lend to the wall the desired sound-proof characteristics without interfering with the normal relationship of the wall elements.

I also provide an improved structural member having sound-proofing material applied thereto for use in the construction of walls having sound-proof characteristics. I preferably provide a load-supporting structural member adapted to be supplied as a standard element of a wall construction and having sound-proofing material connected therewith, rendering such structural member adaptable for incorporation in a wall structure in assembly with other standard elements so that the wall is constructed in exactly the same manner as a standard wall and without the necessity of taking any special steps by reason of the provision of the sound-proofing material.

Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawing I have shown a present preferred embodiment of the invention, in which

Figure 1 is a perspective skeleton view of a portion of a wall having sound-proof characteristics, the wall at various portions thereof being shown in various stages of construction;

Figure 2 is a vertical transverse cross-sectional view through the upper portion of the wall shown in Figure 1; and

Figure 3 is a horizontal cross-sectional view taken on the line III—III of Figure 2.

Referring now more particularly to the drawing, there is shown a wall construction having sound-proof characteristics whose principal elements are structural members 2, 3 and 4 erected and assembled to form a load-supporting skeleton or framework for the wall and to which is connected metal lath 5, shown as being expanded metal lath, to which is applied plaster 6. The structural members 2, 3 and 4 may be generally of standard design, being shown as sheet metal members of channel form each having a slotted web 7 and opposed flanges 8. As shown, the flanges 8 extend at right angles to the web 7 and in the same direction therefrom.

The relationship between the structural members 2, 3 and 4 in the framework or skeleton structure may be more or less standard, the members 2 and 4 being positioned in generally parallel opposed relationship with their flanges extending toward each other, and the member 3 (which may consist of a plurality of members suitably connected end to end) being placed in upright position and connected to each of the members 2 and 4. It is to be understood that a plurality of members 3 will be provided in a wall, only one being shown in the drawing to enable the drawing to be made to sufficiently large scale to clearly illustrate the invention. In the form

shown the members 2, 3 and 4 are the same size, although it is desirable for the member 2 or the members 2 and 4 to be of slightly larger size than the member 3 so that the member 3 can fit within the members 2 and 4. In Figure 1 the lower portion of the member 3 has the flanges and the portions of the web to which the flanges are connected cut off so that the portion of the web which is left fits between the flanges of the member 2. On the other hand, at the top of the framework the member 4 is shown as having its flanges resting on the tops of the flanges of the member 3.

The member 3 is connected with each of the members 2 and 4 by shoes 9 each of which comprises a channel shaped body portion 10 and a head 11. The body portion of the shoe embraces the edge of the member 3 and the head 11 embraces a portion of the member 2 or the member 4, as the case may be. A tie wire 12 is tied about the member 3 and the shoes 9 to maintain the assembly. The shoes 9 are ordinarily used to obtain desired vertical adjustment by spacing the member 4 a short distance above the top of the member 3, the position of the shoes 9 relatively to the member 3 determining the vertical adjustment of the structure.

The expanded metal lath 5, which may be of standard construction incorporating at intervals opposed rods 13, is connected to the framework just described by being wired to the uprights 3 which serve as studs. Such wiring of the lath to the studs is shown at 14 in Figure 1. The plaster 6 is then applied to the lath in well known manner.

All of the structure above described is standard and the wall has very desirable acoustic properties. I provide for still further improving the acoustic properties of the wall without, however, in any way departing from the standard structure. It has heretofore been appreciated that by constructing a wall with sound-proofing material utilized in various ways therein the acoustic properties of the wall may be improved. However, the efforts which have been made to impress walls with sound-proof characteristics have entailed complete redesigning of the wall and the use of special shapes and structural members, which has made it necessary to depart entirely from standard construction in building walls having sound-proof characteristics, very greatly increasing the cost both from the standpoint of material and from the standpoint of erection.

I provide sound-proofing material 15 at the outside faces of the flanges of the members 2, 3 and 4 as shown in the drawing. The primary purpose of this sound-proofing material is to reduce or prevent metal-to-metal contact between the expanded metal lath 5 and the supporting framework of the wall, as such metal-to-metal contact is believed to be responsible for a portion of the sound vibrations transmitted, reflected and amplified by a wall of the type in question.

The sound-proofing material may be any of a wide variety of appropriate materials which are readily available. For example, felt or material of similar composition having sound-proofing qualities is satisfactory. It is convenient to provide felt in rolled strips whose width is equal to the depth of the structural member to which the felt is to be applied. The sound-proofing material may be connected with the structure in various ways and either temporarily or permanently. I prefer to connect it with the structural members in a more or less permanent manner, as, for example, by applying the same to the outer faces of the flanges by the use of a suitable adhesive such as glue. Alternatively, clips of simple design may be used for connecting the sound-proofing material to the flanges of the structural members.

I provide as standard articles of commerce structural members as shown with sound-proofing material glued or otherwise permanently connected with the outer faces of the flanges. These structural members may be used in fabrication of walls having sound-proof characteristics in precisely the same manner as non-sound-proof walls as heretofore provided and as described above. No special shapes and no special erection methods are required. As each of the studs and each of the top and bottom base members has sound-proofing material connected with the outer surfaces of its flanges throughout the entire extent thereof, the metal lath at no point comes in contact with any of such members.

The sound-proofing material on the outer faces of the flanges of the studs passes inside the shoes 9 and to prevent metal-to-metal contact between the lath and the shoes additional pieces 16 of sound-proofing material may be provided at the outer faces of the shoes. The wires 12 may be passed either inside or outside the sound-proofing material 16, being shown inside in the drawing. The strip 16 may be connected with the outer faces of the shoes when the shoes are manufactured or it may be connected therewith on the job and the manner of connection may be temporary or permanent as desired.

With a construction as shown in the drawing the metal-to-metal surface contact between members of the wall is very slight and insufficient to render the wall acoustically undesirable for most purposes. The wall surface comprising the lath and the plaster is substantially entirely segregated from the framework, which is particularly important. Yet this result is accomplished as above explained using nothing but standard structural members assembled in standard manner.

It is to be understood that the expression "sound-proof characteristics" and like expressions herein are used to denote characteristics which distinguish a structure from another structure which is not sound-proofed at all. For example, a structure may possess sound-proof characteristics and yet not be entirely sound-proof, but it may be considerably more sound-proof than a comparable structure and sufficiently so for the purpose intended. Also, the word "wall" is used herein as a word of definition and not of limitation and comprehends not only vertical walls but inclined and horizontal walls, including floors, ceilings, etc.

Reference is herein made to load-supporting members and structures incorporated in a wall, and it is to be understood that the word "load-supporting" and its equivalents are used to describe the character of the structure or structural member so far as the wall is concerned as distinguished from other portions of the building thereabove. For example, the structural member 3 is load-supporting in the sense here intended because it directly carries and supports the surface portion of the wall comprising the expanded metal lath 5 and the plaster 6. The structural member 3 does not ordinarily act as a column in the building as a whole to support portions of the building thereabove, although it may in some cases act as such a column.

While I have shown and described a present

preferred embodiment of the invention, it is to be distinctly understood that the same is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A wall having sound-proof characteristics, comprising a load-supporting skeleton structure, a lath and plaster surface portion of the wall connected with said skeleton structure so as to be carried thereby, sound-proofing material interposed between adjacent parts of the skeleton structure and surface portion, and means concealed from the outside of the wall maintaining the sound-proofing material in place.

2. A wall having sound-proof characteristics, comprising a load-supporting member having an outwardly facing flange, a surface portion of the wall lying along said flange and connected with said member so as to be carried thereby, and a strip of sound-proofing material whose width approximates that of said flange interposed between said flange and said surface portion.

3. A wall having sound-proof characteristics, comprising a stud, a surface portion of the wall wired to the stud within the confines of the wall, and sound-proofing material interposed between the stud and surface portion.

4. A wall having sound-proof characteristics, comprising a supporting member, lath carried by the supporting member, sound-proofing material shaped to conform to the supporting member interposed between the supporting member and lath, and wall surfacing material applied to the lath.

5. A wall having sound-proof characteristics, comprising a metal supporting member, metal lath carried by the supporting member, sound-proofing material fastened to the supporting member within the confines of the wall maintaining the supporting member and lath out of substantial metal-to-metal contact, and wall surfacing material applied to the lath.

6. A wall having sound-proof characteristics, comprising a supporting member, expanded metal lath carried by the supporting member, sound-proofing material maintaining the expanded metal lath out of substantial contact with the supporting member, wall surfacing material applied to the lath, and means concealed from the outside of the wall maintaining the sound-proofing material in place.

7. A wall having sound-proof characteristics, comprising a stud, a sheet of foraminous lath connected with the stud, sound-proofing material maintaining the lath out of substantial contact with the stud, wall surfacing material applied to the lath, and means concealed from the outside of the wall maintaining the sound-proofing material in place.

8. A wall having sound-proof characteristics, comprising a supporting member, a lining of sound-proofing material carried by the supporting member, lath carried by the supporting member, the lath lying against said lining and being thereby spaced from the supporting member, and wall surfacing material applied to the lath.

9. A wall having sound-proof characteristics, comprising a flanged metal stud, a lining of sound-proofing material carried by the flange of the stud, metal lath carried by the stud, the lath lying against said lining and being thereby maintained out of metal-to-metal contact with the stud, and wall surfacing material applied to the lath.

10. As an article of manufacture, a structural member adapted for the construction of a partition or the like and adapted to have a facing of the partition or the like lying thereagainst, said structural member having sound proofing material attached thereto throughout a portion thereof against which a facing of the partition or the like is adapted to lie, and attaching means for holding said sound proofing material closely in engagement with said portion of said structural member.

11. As an article of manufacture, a flanged stud adapted for the construction of a partition or the like and adapted to have a facing of the partition or the like lying against a flange thereof, said stud having sound proofing material attached to and completely covering the surface of a flange thereof against which a facing of the partition or the like is adapted to lie, and attaching means for holding said sound proofing material closely in engagement with said flange surface.

12. As an article of manufacture, a structural member adapted for the construction of a partition or the like and adapted to have a facing of the partition or the like lying thereagainst, said structural member having sound proofing material attached thereto throughout a portion thereof against which a facing of the partition or the like is adapted to lie, and adhesive attaching means for holding said sound proofing material closely in engagement with said portion of said structural member.

ALEXANDER GLASS.