

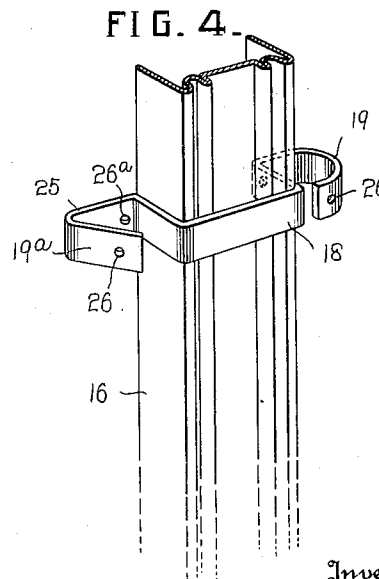
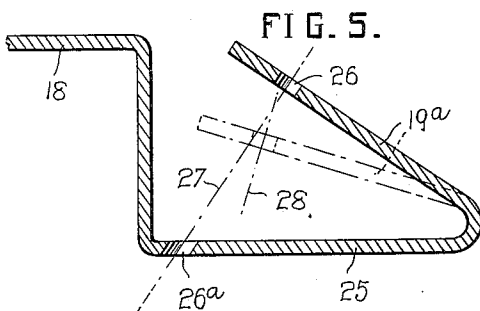
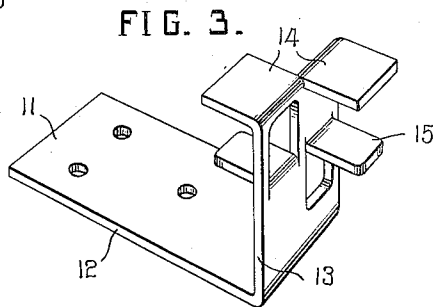
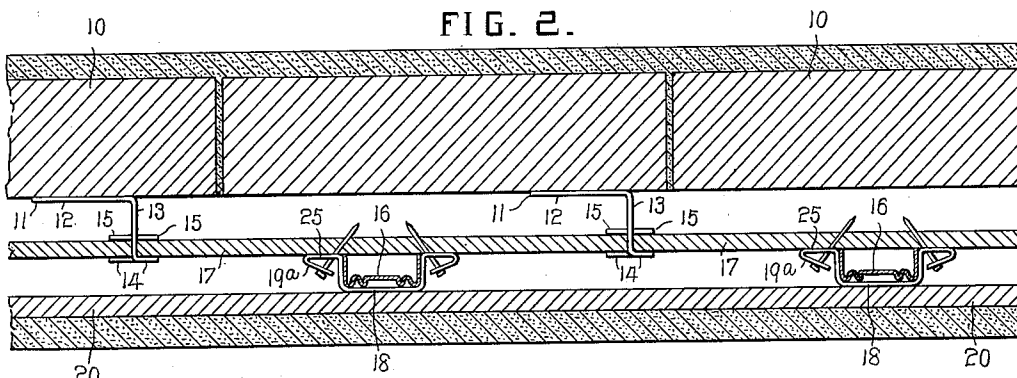
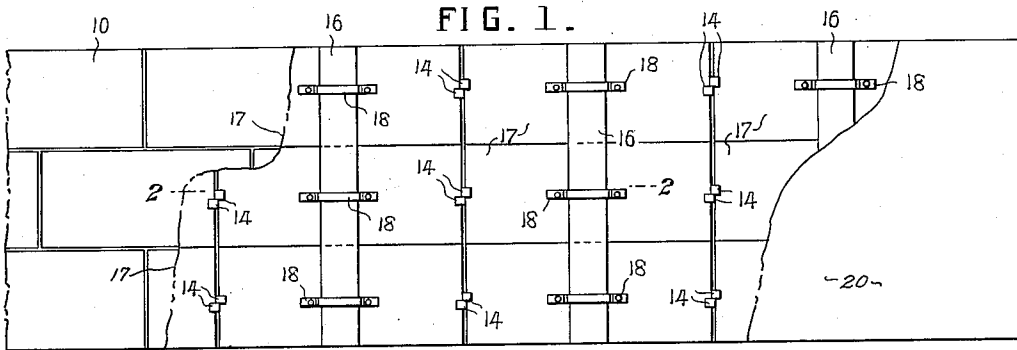
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BUILDING STRUCTURE

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BUILDING STRUCTURE

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This invention relates to improvements in building structures of various types to serve in preventing transmission of sound from one portion to other portions thereof and consists in the novel arrangement of the respective parts as hereinafter described and claimed.

It is of great importance in the erection of buildings of various types that they be so constructed that particularly the partition walls therein be of such nature that they are sound insulating in order that sound may not be transmitted therethrough. This form of construction, that is, one embodying sound insulating partition walls, is particularly desirable and valuable in buildings used for dwelling purposes and in office buildings.

Many alleged more or less sound insulating partitions have been constructed in various ways and subjected to numerous tests but in general their efficiencies have been relatively low and the problem of sound insulation has not been economically solved. In the few sound deadening partition wall structures that have been devised and proven somewhat satisfactory the structures have been quite massive and heavy, whereby the actual sound insulation value has been due apparently primarily to the weight of the wall rather than because of its construction.

In practically all alleged sound insulating wall structures heretofore proposed there has been some form of more or less direct connection from one side of the partition wall to its other side which in instances has been interrupted by the interposition of a limited amount of soft sound deadening material which though on final analysis has generally been so employed as to be relatively ineffective in preventing the transmission of sound.

In order to overcome and remedy the defects of previously proposed sound insulating wall structures there has been devised a plan of building construction which is extremely effective in preventing transmission of sound through the partition walls built in accordance with the construction devised. The particular object of this invention is to provide a relatively light weight, easily erected, and economical partition wall structure which will be effective in preventing the transmission of sound from one side to the other side thereof. Other objects of the invention are to provide a sound insulating wall structure wherein there is no direct connection through the structure and wherein the indirect connection provided is made through a relatively extended portion of material having but little

tendency for the transmission of sound. There is also in this invention comprehended the various details of construction of the partition wall structure together with other and further objects thereof which will appear upon consideration of the following detailed description.

The invention is shown in the accompanying drawing in which:

Fig. 1 is an elevation of a section of partition wall embodying the improved sound insulating structure.

Fig. 2 is a section taken on line 2-2 of Fig. 1.

Fig. 3 is a perspective view of furring strip used in erecting the sound insulating wall of the invention.

Fig. 4 is a perspective view of a clip which is utilized in the erection of the wall structure.

Fig. 5 is an enlarged detail of structure shown in Figure 4.

The sound insulating wall structure provided according to the invention comprises essentially a main supporting portion which may comprise studs but which is preferably a relatively thin core built up of gypsum tile, brick, terra cotta tile, or the like, on which there is mounted by means of the furring clips, a relatively light weight sheet material such as one of the available fiber insulating boards on which in turn there is mounted further furring strips which carry the plaster base which may be expanded metal lath, plaster board, fiber insulating board, or in fact any material which may serve as a plaster base. The furring strips first mentioned, that is, those attached to the wall, and the furring strips last mentioned, or those supporting the base for the plaster sheet, are off-set so that the fiber sheet or heat insulating material mentioned constitutes the only connection from the face of the wall to the core thereof.

The structure comprises essentially a core wall which may be built up of brick, gypsum tile, or other various like materials, which wall is preferably rather thin, that is, not over about 3 inches thick in order that the overall thickness of the partition wall may be kept down. Mounted on the face of the core wall in vertical rows about 2 feet apart there are provided clips which serve for the mounting of the light weight sheet material making up the intermediate portion of the wall structure. Clips may of course either be built into the core wall or they may be appropriately secured thereto as by nailing or the like.

Mounting clips as constructed particularly to be nailed to the core wall comprise substantial-

ly an L-shaped member having a portion 12 which is nailed against the core wall and an upstanding portion 13 which is disposed relatively at right angles to part 12, which portion 13 is provided with oppositely directed tongues in pairs 14 and 15, between which pairs of tongues the central fiber board portion of the structure is adapted to be received and retained. Of course the means for mounting the intermediate fiber board sheet need not be that specifically disclosed in this application and in fact it may constitute any other means, such as furring strips or clips of other form to which the fiber board may be secured and be in turn secured to but spaced from core wall 10.

Approximately midway of the distance between the vertical rows of furring clips 11 there are secured furring strips 16 which preferably extend vertically from the bottom of the wall to the top thereof. These furring strips 16 may be of substantially any type desired but those disclosed comprise relatively light weight metal strips formed to substantially channel section and provided with strengthening corrugations.

Furring strips 16 may be secured to the fiber sheets 17 by means of any desired securing devices which will retain the strip in place, but there is disclosed herein a preferred securing clip which is quite cheap but by which the furring strip 16 may be quickly and satisfactorily secured to fiber board 17.

The furring strip securing clip comprises a relatively narrow metal band which is basically of channel form, that is, it has a shape generally similar to that of the furring strip 16 which is to be secured thereby. The clip for securing the furring strip 16 has a main body portion designated at 18 and from Fig. 4 it will be seen that the ends of the side legs of the channel form clip are bent exteriorly, one bent substantially circularly as at 19, the other being bent to a substantially triangular form as is shown at 19a; the different forms at 19 and 19a being illustrated only to disclose alternative structures which will serve the desired purpose. In use the two ends of the clips will be similarly formed. A pair of holes such as 26 and 26a is provided in each of the portions 19 and 19a of the clip whereby a nail may be entered through each pair of holes to be driven into fiber board 17 at approximately an angle of 45 degrees from the vertical with the nails in both ends entering from opposite directions inclined toward each other, whereby they tend to intersect within or relatively closely behind the rear surface of fiber board 17. When the clip is formed the holes of each pair are in substantial coaxial alignment as indicated by the dot and dash line in Figure 5 to readily receive a nail therethrough, but when the head of each securing nail is driven up, against the intumed end of the clip, the following blows of the hammer will draw said end toward its adjacent band portion 25, thus positively forcing said holes out of alignment as indicated by the line 28 and thereby creating a tight pinching of the nail to firmly retain it in place.

In constructing the desired sound insulating wall there is erected first the core member 10 which as stated may be of brick, tile, or the like, and there is secured thereon a vertical row of clips 11, between the prongs 14 and 15 of which clips there is inserted one edge of a 2-foot wide board 17, preferably a fiber insulating board and there is then applied to the opposite edge of this board further clips 11 which are nailed or other-

wise secured to wall core 10. A second board 17 is inserted in the prongs on the other side of the last mentioned row of clips 11 and a third row of clips are placed on the far edge of this second board and are secured to the core wall 10, which operations are repeated until the clips and board have been applied across the entire width of the wall.

Furring strips 16 are now properly secured to the outer face of boards 17 by means of clips 18 or other appropriate securing means and are positioned substantially centrally of the vertical rows of clips 11 for reasons which will hereinafter be more fully mentioned.

Expanded metal lath 20 or any other appropriate plaster receiving material is secured to furring strips 16 by any appropriate means serving to secure such plaster receiving base material thereto and then there is applied to this plaster base material 20 a plaster surface sheet which comprises the finished face of the wall.

It is of course understood that the construction just described is that for building up a wall which is sound insulated from one side only and that for an inside partition wall which is to have a maximum sound insulation that the auxiliary structure will be erected on both sides of core structure 10.

With the construction above described there is provided a relatively heavy wall core member which of itself tends somewhat to prevent sound transmission on which wall there has been erected what might be termed a springy or resilient facing. By mounting the plaster receiving base material 20 on furring strips 16, which are arranged substantially intermediate of furring clips 11 that support the board sheets 17, the construction is such that board sheets 17 serve as flexible beams which permit a certain amount of vibration in the furred wall face. It being well understood that sound may be dissipated by causing the sound waves to impact and set into motion members having inertia, that principle has been availed of in the construction of the described wall structure. Sound waves impinging on the wall surface tend to set into vibration the furred wall structure which has been described and thereby the sound is more or less dissipated through the energy consumed in causing vibration on the wall structure.

In the structure described the sound is absorbed or dissipated not only through its conversion into work in overcoming the inertia of the facing structure but it is also absorbed due to absorption in the air spaces provided between the various layers of the structure and also to some extent through its conversion into heat within the cells and pores of the fiber insulating board members 17. Particularly in the construction as described there is no direct short path from one face of the wall to the other face thereof so that the transmission of sound through conduction is maintained at a minimum. Sound to be conducted from one side of the wall to the other side would have to pass from the face portion through a furring member 16 to sheet material 17 to furring clips 11 and thence through the core portion 10, which course it is readily seen is long, is tortuous, and the materials of which do not comprise in total continuous sound conductors.

There having been above described the preferred embodiment of the invention, we claim:

1. A wall structure comprising a base portion, a fibrous sheet material secured to but spaced therefrom, and a finish receiving wall portion se-

cured to but spaced from the fibrous sheet material, means securing the fibrous sheet material to the base portion and means securing the finish receiving wall portions to the fibrous sheet portion, the several means off-set one relative to the other.

2. A sound insulating wall structure comprising a base wall support member, and a finish receiving face portion, means securing the face portion to a beam member and means securing the beam member to the base support, the first and second securing means off-set one from the other.

3. In a sound insulating wall structure, a base wall portion, furring members secured thereon, an intermediate wall portion mounted on the furring members, other furring members mounted on the intermediate wall portion in off-set relation to the first mentioned furring members and a surfacing receiving wall portion mounted thereon.

4. In a sound absorbing wall structure comprising a plurality of spaced laminae, a spacing and mounting means comprising an L-shape member having on one leg thereof outwardly projecting pairs of spaced tongue members adapted to receive and support a sheet-like material, two adjacent tongue members pinched from the body portion of said leg and bent in opposite directions.

5. In a sound absorbing wall having incorporated therein a sheet of relative cellular spongy sound absorbing material, a second sheet material supported by and mounted on the sound absorbing material through the intermediacy of a furring strip secured to the sound absorbing material by means of bands shaped substantially to fit over the furring strip and having their ends bent back on themselves in spaced relation and provided with aligned nail holes at an angle to the horizontal, whereupon nails passing through the aligned holes and driven up tend to intersect adjacent the rear of the sheet of sound absorbing material and are gripped in place through misalignment of the nail receiving holes.

6. A sound absorbing structural element comprising

a primary portion of relatively massive construction, a panel of relatively light weight material secured thereto along spaced substantially parallel lines, and a facing member spaced from the panel and secured thereto along spaced substantially parallel lines laterally off-set with respect to the lines of attachment of the panels to the primary wall portion.

7. In a sound proof structure, a structural panel comprising a core member of substantially rigid construction, a sound impacting member in spaced parallel relationship to the core member, a fiber insulation board between, but spaced from, the core member and sound impacting member, and means securing the fiber insulating board to the core and sound impacting members, the respective securing means off-set one from the other.

8. A wall structure comprising a base portion, an outer finish receiving portion and a flexible sheet form intermediate portion, substantially rigid means mounting and securing the outer portion to the intermediate portion in spaced relation and substantially rigid means mounting and securing the intermediate portion to the base portion in spaced relation, the mounting and securing members between the outer and intermediate portions and between the intermediate and base portions being offset in spaced, substantially parallel planes whereby the flexible sheet form intermediate portion serves as a beam mounting for the outer portion.

9. A wall structure comprising a base portion, an outer finish receiving portion and a flexible sheet form intermediate portion, the several parts of the structure spaced one from the other, substantially rigid offset securing means connecting said wall portions in spaced relation and permitting vibration of the outer finish receiving portion, through flexure of the intermediate wall portion vibratable independently of the base portion.

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