ABSTRACT OF THE DISCLOSURE

Transmission of undesirable sound across a partition is attenuated by the use of a high transmission loss structure which tend to isolate one side of the partition facing a source area from the other side of the partition facing a receiving area. The high transmission loss is achieved by using two studs which are separated from one another by an air gap. The wall facing the sound source area is attached to one stud portion while the wall facing the sound receiving area is attached to the other stud portion. To facilitate the initial construction of the wall, the two stud portions are held together by a pin member which positions the two portions a proper distance apart, thereby enabling the builder to handle the two studs as a unitary structural member of conventional size. After the studs have been erected in place, the portions may be completely isolated acoustically from one another by severing the pins.

Background of the invention

The control of sound transmission through wall partitions is receiving much attention today due to modern building trends including construction of motels, apartments, and co-operative or town-house structures. In addition, the increased use of electronic equipment producing higher levels of noise, and the medical recognition of the fatiguing effects of high noise levels have also accelerated the interest in noise control. Coupled with the interest in noise control is the desire, of course, to achieve such control in economical fashion. Several reasonably effective, but costly, methods have already been proposed and used in several instances. For example, a reasonably efficient sound control partition can be constructed using two sets of wall studs which are spaced in the partition with one set jutting out slightly in one direction with a wall hung thereon, and the other set jutting out slightly in the opposite direction with the second wall hung on the second set. Neither set of studs, then, is in contact with both walls, and the two are relatively independent of one another. One of the reasons that this construction is effective lies in the discovery that much of the sound transmission from one wall to another in a building partition is actually through the wood stud and not through the air space in between the walls. However, the cost factor is readily apparent in that twice the number of studs must be used to achieve this effect. Another method which has been proposed is to use sheet lead in the partitions. In this instance also, cost has limited the application of this particular design. U.S. Patent No. 2,922,201, attempts to overcome the above cost factors by using unitary studs which have been slotted for a predominant portion of the length, thus isolating the central portion of the two halves of the stud. However, the stud halves remain fastened together, (and, therefore, acoustically coupled) adjacent the ends of the stud. This construction, therefore, still allows some sound transmission due to the solid unslotted portions adjacent to the ends; but it does greatly facilitate initial construction of the building in that a conventional size 2 x 4 can be used.

Summary of the invention

Quite surprisingly, a high transmission loss partition construction has now been discovered which is economical, yet provides the acoustical isolation desired. In accordance with the invention, a high transmission loss partition for reduction of sound transmitted from a source area to a receiving area comprises a plurality of wall support members each comprising a pair of members spaced apart from one another, one member having a first surface thereon to support a vertical facing, and the other member having a surface thereon to support a vertical facing opposite and parallel to the facing carried by the first surface. The members are held in spaced apart relationship by severable pin members imbedded in the members adjacent the ends of the wall support.

Brief description of the drawings

FIGURE 1 is a partially cut-away, isometric view of the transmission loss partition.

FIGURE 2 is a cross-sectional view of the wall support and the severable pin.

FIGURE 3 is an isometric view of an alternate construction.

Detailed description

Referring now to FIGURE 1, the invention is illustrated in a wall partition construction for a dwelling house. The wall support assembly is generally indicated at 2 and comprises a first member 4 and a second member 6 which are spaced apart from one another by an air space generally indicated at 8. The wall support is conventionally nailed or in similar manner fastened to a bottom sill plate 20 and a top head plate 30. A first facing surface 50 is shown which is carried by member 4 facing thereagainst. A second facing surface 60 is mounted to member 6 of wall support assembly 2. The air space 8 between the wall support members acts to acoustically isolate the opposite facing surfaces.

Members 4 and 6 of wall support assembly 2 are spaced apart by pins 12 which are inserted into pre-drilled holes in the respective members. As shown more clearly in FIGURE 2, pin 12 may be a threaded component such as a twist nail or the like which is driven into the openings in members 4 and 6. The pin is driven in a predetermined distance to maintain the space 8 between the members at a given distance which can be about ¾". The distance D between the outside edge of the two studs is usually determined so as to provide a total width of the members plus the space therebetween equal to the width of a conventional stud such as, for example, a nominal 2 x 4.

After the wall support has been fastened to the top plate 30 and sill plate 20, the pins 12, as more clearly illustrated in FIGURE 2, may be severed with the use of a chisel to complete the acoustical isolation of member 4 from member 6 and thus to insure that facing members 50 and 60 are in no way acoustically coupled to one another through the studs. It should be noted here that, in acoustical constructions, the facing material such as wall board or the like is fastened to the studs by screws and is not nailed. Hence the need for additional strength during application of the facing material is not so great as if nails were being driven into the stud.

Referring now to FIGURE 3, an alternate structure is shown wherein the stud or wall support assembly 2' has been cut in a sine wave type arc to define the two members 4' and 6' which are acoustically isolated from one another by an air space 8'. In this construction, a vertical pin 12' is driven through both members at the points of curvature so as to couple both members together for purposes of physical strength yet minimize acoustical transmission from one member to the other. In this construction as
well, the pin 12' may be severed after the wall support assembly has been fastened to the head and sill plates.

As an example of the acoustical results obtainable using the structure of the invention, a test wall panel was constructed as follows, in one instance, 2" x 3" solid wood studs 24" on center with solid wood head and sill plates. Each side of the partition had one layer of ½” gypsum wallboard fastened to the stud by screws 12" apart vertically beginning 2" from the top. All perimeter void areas were caulked. A second test partition was constructed using the wall support assembly of the invention in a 2" x 3" cross-sectional configuration. The studs of the invention were 24" on center and fastened to solid wood stud head plates and sill plates as in the comparative construction. To each side was attached one layer of ½” gypsum wallboard with screws 12" on center beginning 2" from the top and all perimeter voids caulked. The sound transmission loss of each partition was then determined in accordance with ASTM Test No. E-90-66T. In the case of the conventional partition using solid studs, the sound transmission loss of the partition received a rating of 38. The partition constructed using the wall support assemblies of the invention received a sound transmission loss rating of 42. Similarly, when 2" x 4" dimensions were substituted in the above constructions, the partition using solid wood studs had a sound transmission loss of 39 while the partition using the wall support assemblies of the invention has a sound transmission loss of 43.

Thus, the invention provides a material loss of sound transmission without need for additional materials which would raise the cost of the construction and without thickening the wall and thus cutting down on the usable area in the building.

What is claimed is:

1. A relatively high sound transmission loss partition comprising a base plate anchored to a floor and a top plate disposed in spaced parallel relation thereto, a plurality of spaced parallel studs disposed between said base and top plate, each stud comprising a pair of parallel stud sections disposed in spaced apart relation throughout their length, each stud section being secured at its respective end to said base and top plate, each pair of stud sections having inner surfaces in opposed relation and outer surfaces disposed outwardly of said partition, the opposed