May 10, 1938. W. D. BARGE 2,116,654

SOUNDPROOF BUILDING CONSTRUCTION

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Fig. 1.

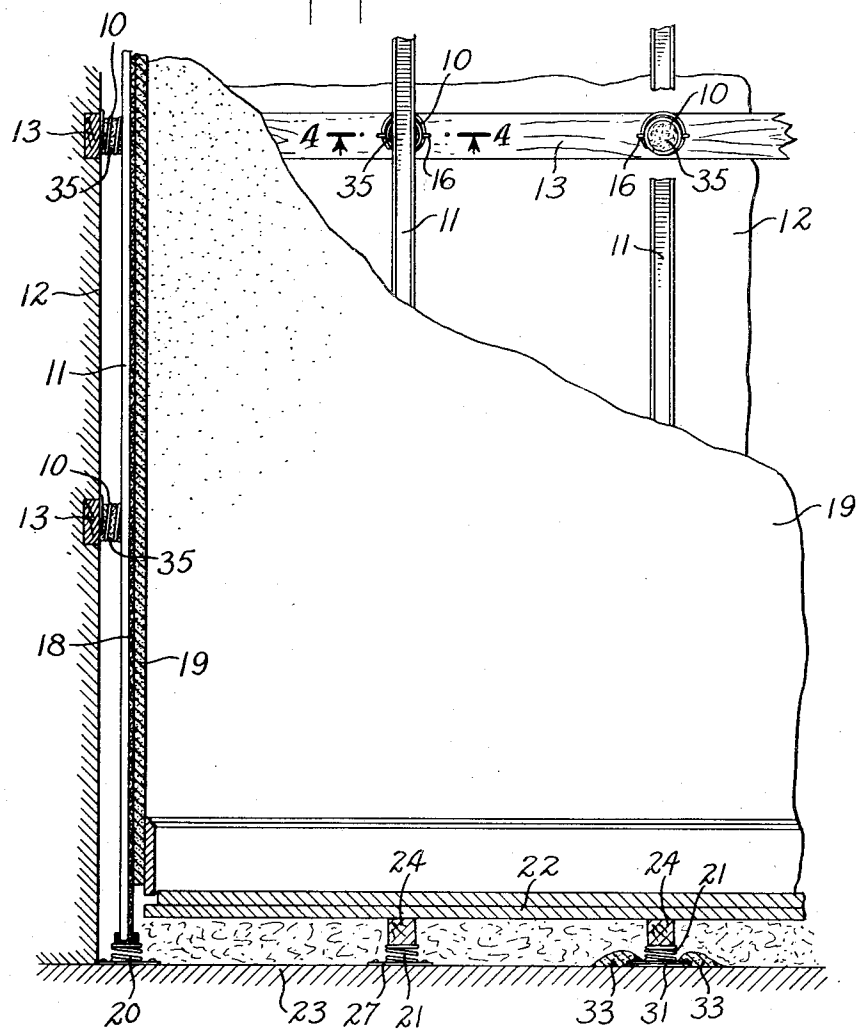

Fig. 2.

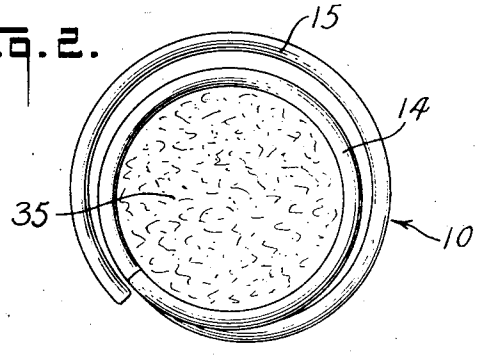

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Fig. 3.

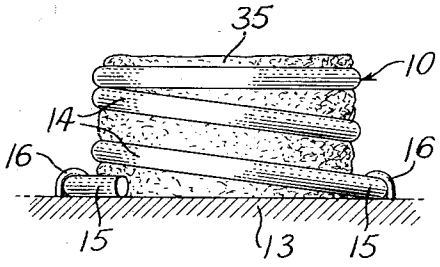


Fig. 4.

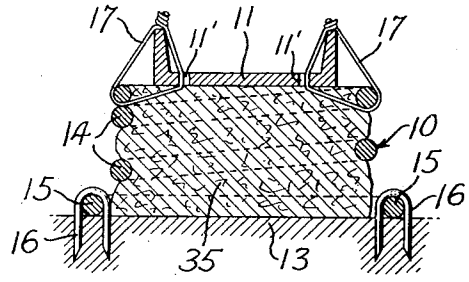


Fig. 5.

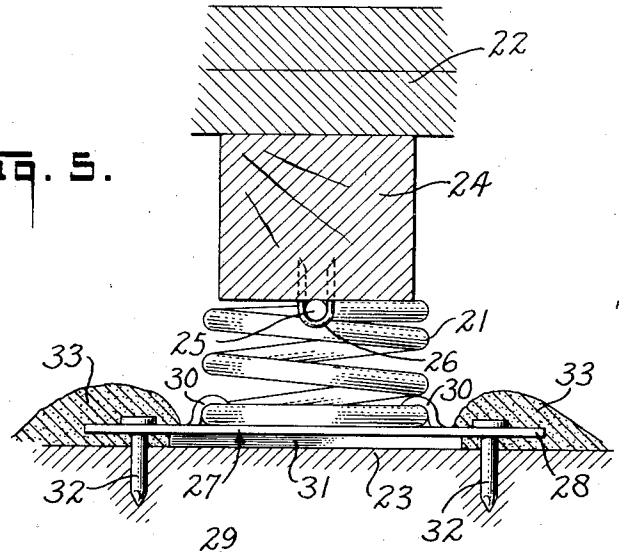
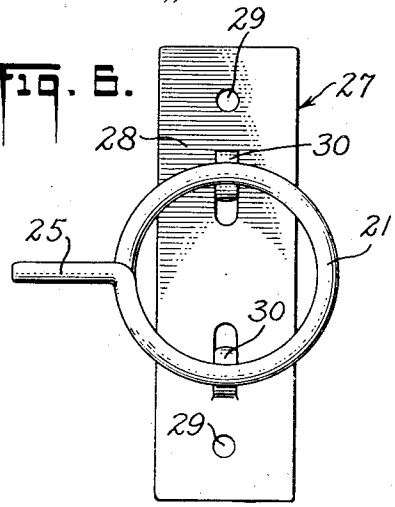


Fig. 6.



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SOUNDPROOF BUILDING CONSTRUCTION

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Application February 21, 1935, Serial No. 7,537

3 Claims. (Cl. 20—4)

This invention relates to soundproof building construction and has reference more particularly to attaching means for resiliently connecting the various structural parts composing walls, ceilings and floors of buildings.

An object of the invention is to provide a practical and convenient form of resilient connector of the character described together with simple and practical means for attaching such connector to various building structures.

A further object is to provide a highly efficient resilient connector and simple and efficient means therewith for absorbing substantially all vibrations within the range of audibility that might otherwise be transmitted to and from said connector.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown some of the various possible embodiments of my invention:

Fig. 1 is a vertical cross-sectional view through a part of a side wall and floor of a room showing certain features of the present invention in side elevation, a portion of another wall being broken away to show some of the parts in end elevation;

Fig. 2 is an end elevation of a form of sound deadening device shown in Fig. 1, but on an enlarged scale;

Fig. 3 is a plan view of the same, showing a way of attaching the device to a supporting structure;

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 1, and on an enlarged scale;

Fig. 5 is an enlarged section of a part of the floor construction, showing in side elevation a modified form of spring support and its manner of attachment to a base floor and to a sleeper of the finishing floor structure; and

Fig. 6 is a top plan view of the spring element and anchor plate shown in Fig. 5, the upper floor structure being omitted.

In carrying out the objects of the present invention a plurality of helical springs are interposed between and serve to connect the spaced structural parts, whether of floors, walls or ceilings, and the springs are shaped to promote their ready attachment to the structural parts which they connect. In some instances special devices are provided for facilitating their said attachment. Fig. 1 discloses a plurality of helical springs 10 which serve to secure furring strips or channels 11 to a base wall 12, which may consist of wood, cement, tiles, or any other suitable material. If concrete or tile is used in the construction of the base wall, nailing strips 13 are preferably incorporated in the structure in appropriate relation to the scheme of distribution of the springs so as to provide means for securing the springs to the wall.

In wall structures particularly, in order that the helical springs may be attached more easily to the nailing strips, the former preferably take the form of the springs shown in Figs. 1 to 4. As shown, springs 10 comprise a plurality of convolutions 14 helically arranged so that all have substantially the same pitch diameter, and a convolution at one end of the spring, as at 15, of greater diameter than the others. This last larger turn extending beyond the periphery of the rest of the spring may be readily secured, as by staples, 16, to a supporting surface, such as the nailing strip 13 of base wall 12. It will be understood that the whole last turn of the coil need not extend beyond the coil periphery since the said last turn may be bent or distorted in various other ways to provide portions extending beyond the periphery and adapted to coact with nail or staple. The furring strips 11 may be punched as at 11' and attached to the free ends of the springs 10 by means of tie-wires 17, or the furring strip need not be punched for the tie-wires, in which event, the tie-wires would be passed entirely around the furring strip. The furring strip may also be secured to the spring by means of any form of clip suitable for the purpose.

Any suitable lathing, for example, expanded metal lathing 18, may be fastened to the furring strips 11, for the support of a finishing wall 19 consisting of plaster, wallboard, or the like; and the whole finishing wall structure including the furring strips or channels 11 may be resiliently supported by a plurality of coil springs 20, which may be constructed like the springs 10, or may be of the nature of the springs 21, supporting the upper finishing floor 22.

A rough or foundation flooring is shown at 23; and 24 are the sleepers to which the finishing flooring is nailed. Each helical spring 21 has the free end of its upper turn bent outwardly as at 25, Figs. 5 and 6, to provide means extending beyond the circumference of the spring, that may

be easily fastened to a sleeper 24, as by a staple 26. The lower ends of the springs are fastened to the under flooring 23 preferably by means of anchor-plates 27. Each anchor-plate comprises a plane metal plate 28 provided with nailing holes 29, and struck up tongues 30 which may be bent over the lower turn of a spring 21 as shown in Fig. 5.

It is desirable not only that the finishing floor be resiliently supported but also that it be level. The anchor-plates 27 provide a simple and effective means for leveling the floor 22 during construction, and for attaching the lower ends of the floor supporting springs to the lower rough flooring. A practical method of building a floor structure is as follows: The proper number of sleepers 24, having been furnished, are laid upside down and the desired number of springs, properly spaced, are fastened to them by securing the projecting portions 25 of the springs to the sleepers with staples. All of the sleepers are then turned over so that they are supported by the springs. After the sleepers have been properly spaced they are leveled up by forcing beneath them wedges or shims 31 of sufficient thickness to bring the upper surfaces of the sleepers to the desired level. The plates 28 may then be nailed in place to the rough floor, as at 32, after which the space beneath and around the plates may be filled in with grout, as at 33.

Floor and wall structures like those above described will be sufficiently soundproof under most conditions where soundproofing is desirable, since the helical spring connectors properly distributed between spaced portions of the wall will absorb most vibrations within the range of audibility and prevent them from being transmitted from one portion of the structure to another.

So far as floors are concerned, if the resiliency and number of springs used is properly related to the mass of the finishing floor, since the springs are loaded by the weight of the finishing flooring, it is normally not necessary to provide any other vibration-absorbing medium, although an insulative fill may be provided between the rough and finishing floorings. With resiliently supported wall structures, however, the conditions are different, for since the weight of the finishing wall is not carried by the springs 10, the latter are ordinarily not placed under any substantial load, and it is therefore possible for these springs, or some of them, to respond to vibrations at their own natural period and hence become more or less microphonic. Such a condition exists with most forms of clips or retaining means used for attaching a finishing wall or panel to a base wall structure. Coil springs, as retaining means, are superior in many ways to most forms of furring clips, and particularly in respect to their ability to absorb heavy vibration, but when using them for this purpose it is often found desirable to provide against microphonic disturbances. It is within the conception of the present invention to provide against such microphonism by insulating each spring by means of damping means in the form of a core 35 of wool or hair felt or other similar vibration-absorptive material. The cores 35 are formed to fit snugly within the helical springs and they should be of such length as to be somewhat compressed between the portions of the wall structure to which the ends of the springs are made fast.

Not only will each core prevent singing of its respective spring but the cores taken as a whole in combination with their containing springs provide an extremely efficient means for absorbing substantially all forms of vibration which might be transmitted from a base wall to a finishing wall or panel, and the absorption is equally complete, whether the vibrations are due to relative movements of parts of the wall structure or have their origin extraneously of the wall structure. It should also be noted that combining vibration-absorptive cores with the springs appears to add to the efficiency of the springs, to prevent the formation of wall cracks as the various portions of the wall expand and contract.

It will be seen from the above description that the present invention provides a construction using helical springs as sound insulators whereby such vibrations as have a tendency to pass through the springs from one part of a wall structure to another part thereof, are absorbed, thus preventing sympathetic vibration at its natural period of the whole floating wall structure, and whereby microphonism of the individual springs is prevented; and it will be observed that efficient means are provided for supporting helical spring connectors in proper relation to the structures with which they are employed.

It will be understood that should it be deemed desirable to furnish wall and floor supporting springs 21 and 20 with vibration-absorbing cores, such modification is within the intended scope of the present invention; and it is also within the scope of the invention to employ the different forms of springs hereinbefore described, interchangeably, to support walls, floors, ceilings or other resiliently connected structural members; and the connection of springs to structural members may be accomplished by nailing the springs directly to said members, as at 16 or 26 in the drawings; or anchor-plates similar to plates 27 may be used for this purpose.

As many possible embodiments may be made of the above invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A sound-deadening support for resiliently connecting opposed structural members in which a coil spring is attached at its ends to the respective structural members and surrounds a core of vibration-deadening material held in a compressed condition within the spring by contact at its ends with said structural members.

2. A sound-deadening support for resiliently spacing opposed structural members in which a coil spring having its ends in contact with the respective structural members is disposed between said members and surrounds a core of vibration-deadening material held in a compressed condition by contact at its ends with said structural members.

3. In building construction, in combination, a pair of opposed structural members, a plurality of coil springs interposed between said members in end contact therewith, and vibration-deadening material held within said springs in a compressed condition by contact with the respective structural members.

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