

April 26, 1938.

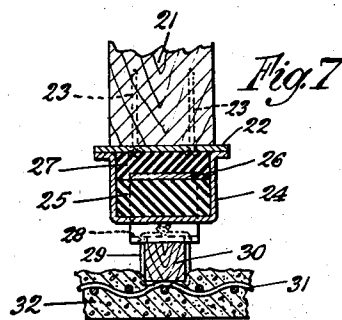
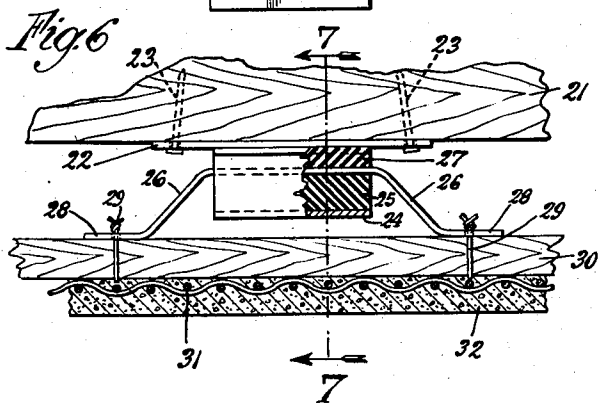
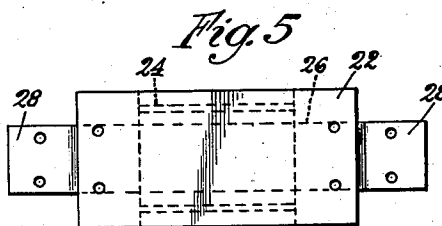
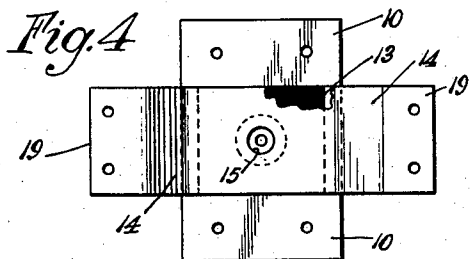
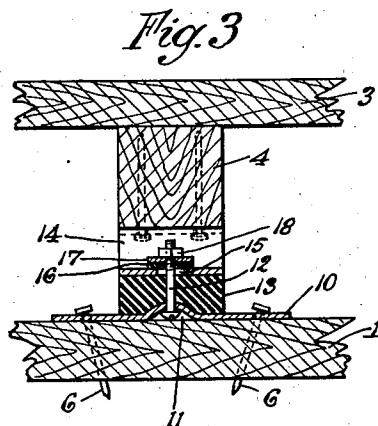
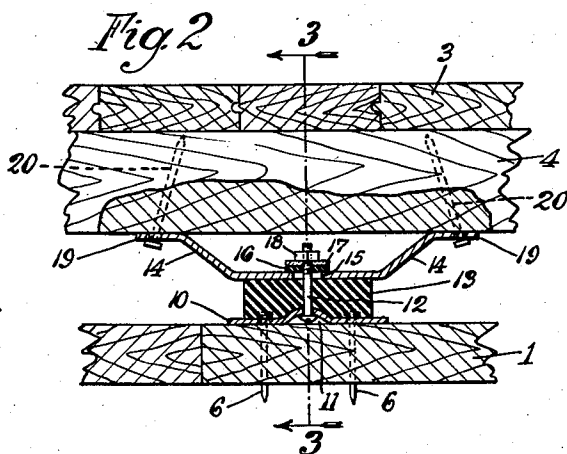
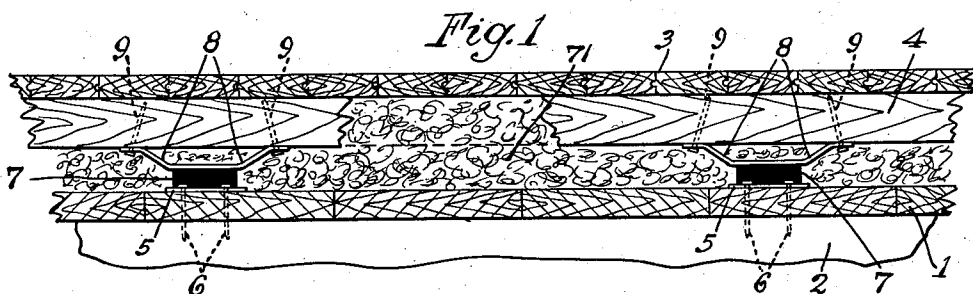
C. D. STEVENS

2,115,238

SOUNDPROOF BUILDING CONSTRUCTION

Filed Dec. 12, 1935

2 Sheets-Sheet 1



Inventor
Charles D. Stevens
by Parker & Carter.
Attorneys.

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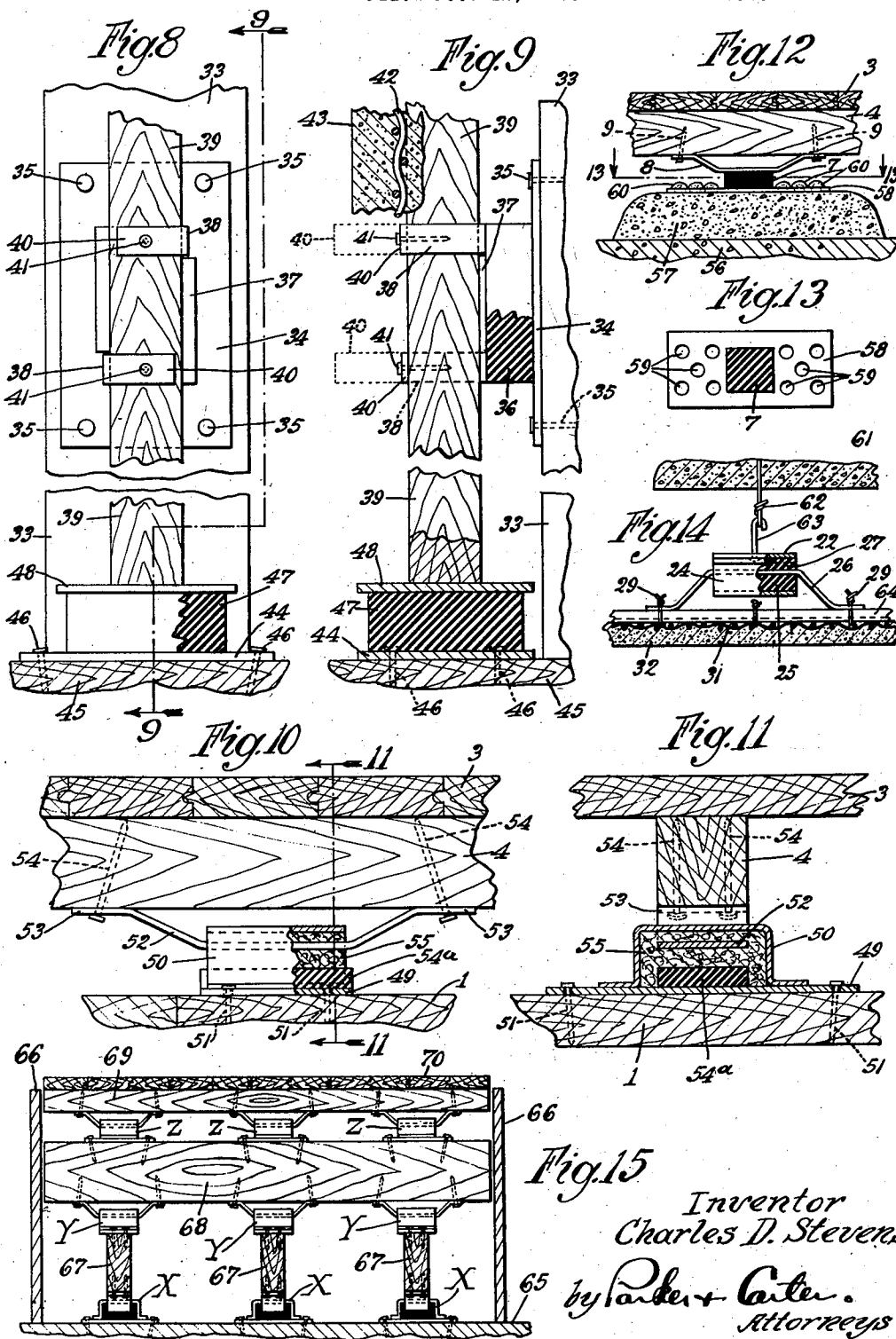
C. D. STEVENS

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SOUNDPROOF BUILDING CONSTRUCTION

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Inventor
Charles D. Stevens
by Parker & Carter.
Attorneys

UNITED STATES PATENT OFFICE

2,115,238

SOUNDPROOF BUILDING CONSTRUCTION

Charles D. Stevens, Chicago, Ill., assignor to
Walter E. Rutledge, trustee, for C. Whitney
Stevens, A. C. Herbert, and W. E. Rutledge, all
of Chicago, Ill.

Application December 12, 1935, Serial No. 54,006

7 Claims. (Cl. 20-6)

This invention relates to insulation and to the construction of walls, floors and other space-enclosing and space-dividing means which are insulated to limit or to prevent the transmission of sound and vibration generally.

One object of the invention is to provide a satisfactory sound insulating wall and floor construction. Another object is to provide a "chair" which is simple, inexpensive and readily usable in the manufacture and installation of walls, floors and the like.

Other objects will appear from time to time in the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:—

Figure 1 is a generally vertical section through a floor embodying the construction and the device of the invention;

Figure 2 is a longitudinal vertical section on an enlarged scale extending longitudinally of one of the devices or "chairs", showing a modified form of chair;

Figure 3 is a transverse vertical section taken at line 3—3 of Figure 2;

Figure 4 is a plan view of the device of Figure 2;

Figure 5 is a plan view of a modified form illustrated further in Figures 6 and 7;

Figure 6 is a view generally similar to Figure 2 but showing a ceiling construction embodying a modified form of chair and construction;

Figure 7 is a transverse generally vertical section taken at line 7—7 of Figure 6;

Figure 8 is an elevation, showing a modified form of construction and chair with parts in section and parts broken away, the construction being that suitable for a wall or partition;

Figure 9 is a section taken at line 9—9 of Figure 8;

Figure 10 is a view generally similar to Figures 2 and 6, showing a further modified form of chair construction;

Figure 11 is a transverse generally vertical sectional detail taken at line 11—11 of Figure 10;

Figure 12 is a generally vertical section illustrating the chair of Figure 1 applied to a concrete or analogous member and embodying a modified base plate;

Figure 13 is a sectional view taken at line 13—13 of Figure 12;

Figure 14 is a sectional view of a ceiling construction showing the chair of Figure 6 applied to a concrete support and carrying a plaster ceiling;

Figure 15 is a transverse vertical section illus-

trating a composite structure built up of the chairs and primarily adapted as a support for machinery.

Like parts are designated by like characters throughout the specification and drawings.

As shown in Figure 1, the planks 1 indicate the rough flooring. They may be mounted upon a support or base or foundation 2 in any suitable manner. A finished floor formed of planks 3 is supported upon a series of screeds 4. In the form shown in Figure 1 the screeds are supported on chairs, each of which is composed of a plate 5 suitably perforated to receive nails 6 by means of which it is secured to the rough flooring. A block of rubber 7 is fused or vulcanized to the upper surface of the plate 5 and an arm member 8 is fused or vulcanized to the upper surface of the block of rubber. These arms are perforated at their outer ends to permit nails 9 to be driven into the screeds 4. The arms are preferably flattened at their outer ends to fit smoothly against the lower surface of the screed and the perforations through which the nails fit may or may not be of such size as to permit some play. In other words, they may or may not fit the shank of the nail snugly. Where in the specification and claims the word "nail" is used it is to be understood as meaning a screw, a nail, a pin or other generally analogous member by means of which two parts may be fastened together.

As shown in Figures 2 and 3 the floor construction is the same as that just described, except that a lower plate 10 is used which is provided preferably adjacent its center with a raised socket portion 11 preforated to permit a bolt or fastening member 12 to pass through it. A block of rubber 13 is secured preferably by vulcanizing to the upper surface of the plate 10 and carries on its own upper surface the arm member 14 which is perforated as at 15 to permit the bolt 12 to pass through. A cushioning washer, such as a rubber or somewhat compressible member 16, is positioned about the upper end of the bolt and a second washer 17 is positioned above the member 16. A nut 18, threaded upon the bolt, holds the parts removably together. The arms 14 are bent outwardly and upwardly and terminate in flat perforated portions 19 through which nails 20 pass to secure the arms to the screeds 4. The form of chair shown in Figures 2 and 3 is essentially the same as that shown in Figure 1 except for the presence of the bolt and nut construction and the structural modifications which the presence of the bolt makes necessary. In this form the rubber member may or may not be fused

or vulcanized to the plates above or below it but preferably they are vulcanized and the bolt and nut construction serves as an additional securing means.

The chairs or other structures of this invention are suitable for use with ceiling constructions. Where the chair is to be used in supporting a ceiling some modification may be desirable. Thus as shown in Figures 5, 6, and 7 the chairs are secured to joists 21. In this form the chair comprises a plate 22 secured by nails 23 or otherwise to the joists 21. A housing member 24 is secured to the plate 23. It may be riveted, welded or otherwise secured and encloses the cushioning members. While these may take a variety of forms, as shown they comprise a lower or load carrying cushioning member 25 which may be of rubber. Upon it rests an arm member 26 and above the arm 26 is a second cushioning member 27. The arm member 26 terminates at each of its lower ends in flattened perforated portions 28 through which wire or other ties 29 pass. As shown the wire ties 29 secure a furring strip 30 to which lathing is attached. In this case the lathing is in the form of a wire screen 31 and plaster 32 is in contact with and supported by the lathing 31. The cushion members 25 and 27 may merely be enclosed in and held in place by the housing member 24 and the plate 22 or they may be vulcanized to one or the other of these parts. The lathing may be held by the ties 29 or may be nailed.

In the wall construction shown in Figures 8 and 9, 33 is a wall member. It may be of any size and shape and may merely be a support such as a vertically positioned piece of wood. It may be a part of an outside wall or anything of sufficient strength to serve as a positioning and supporting means for an inner wall. It may, for example, be studding. The chairs are thus secured to studs 33. The chairs for the wall support comprise plates 34 secured by bolts 35 or otherwise to the studs 33. Vulcanized or fused to the plate 34 are rubber blocks 36. On their outer faces the rubber blocks carry plates 37 each of which carries a pair of outwardly projecting arms 38 which are positioned to receive furring strips 39. When these strips are in place as shown in Figures 8 and 9 the outer ends 40 of the arms 38 are bent into place over and engaging the furring strips and may be secured by nails 41. Metallic or other lathing 42 is secured to the furring strips and a plaster 43 is formed on the lathing.

At their lower ends the furring strips rest upon members formed of base plates 44 secured to the flooring or foundation member 45 by nails 46. Secured preferably by vulcanizing to the upper face of the plates 44 are rubber blocks 47 which carry on their upper faces plates 48 upon which the lower ends of the furring strips 39 rest.

As shown in Figures 10 and 11 a modified form of chair is used. The floor construction is the same as that described in connection with Figure 1 but the chair, instead of comprising merely a rubber block, comprises a base plate 49 to which a housing 50 is secured. The base plate may be fastened to the rough flooring 1 by nails 51 or otherwise. An arm member 52 passes through the housing but is out of contact with it. At its upper ends the arm member is provided with flat screed contacting portions 53 which are secured to the screed 4 by nails 54. Positioned within the housing and preferably in contact with the lower plate 49 is a rubber block

54a. Above the rubber block, between it and the arm portion 52, is a felt section 55. This felt section may lie along the edges of the rubber block as shown particularly in Figure 11, being spaced in that figure between the edges of the rubber block 54a and the adjacent sides of the housing 50. In other words, the rubber block fills only a portion of the space within the housing and preferably the remainder of that space is filled by the felt. Passing through the felt the arm section 52 rests upon and is supported by the felt and is held out of contact with the housing and with the rubber. The weight carried by the arm member is transmitted through the felt to the rubber block and thence to the remainder of the supporting structure. The rubber block may or may not be vulcanized or otherwise secured to the plate 49.

In the modified form shown in Figure 12 the upper part of the floor is that shown in connection with Figure 1 and the chair is of the form shown in that figure. The lower plate, however, differs from the lower plate 5 shown in the form of Figure 1, since it is intended primarily for use in connection with concrete supports. As shown 56 is a concrete or other foundation member upon which cement spotting 57 is formed. The spotting may, of course, be of any plastic material suitable for use as a supporting member in building constructions. The chair is positioned upon this cement spotting when it is still soft. The lower part of the chair comprises a plate 58 perforated as at 59. As shown in Figure 12, when the plate is applied to the soft cement, portions 60 of the cement press through and rise above the plate 58 and tend to extend beyond the perforations 59 so that they key with the plate and the plate is thus positioned and held in position on the cement spotting.

In the ceiling construction of Figure 14, the chair used is essentially the same as that used in Figure 6. Instead, however, of securing the ceiling to wooden joists, the ceiling is secured to an arch 61 from which wire or other loops 62 depend. A hook 63 engages the plate 22 secured to the housing member 24 of the chair and thus the chair is suspended from the arch 61. Instead of the furring strips 30 as shown in Figures 6 and 7, preferably metallic channels 64 are used and the lathing 31 is secured to these channels by wire ties 29 in the same manner in which the lathing 31 is secured to the wooden furring strips 30 in the form shown in Figures 6 and 7.

In the machinery support or platform shown in Figure 15, almost any combination of the various forms of chairs may be used, and that figure illustrates only one suitable form. As shown there is a base or foundation 65 upon which side walls or enclosure members 66 are positioned. A series of chairs, indicated generally as X, is secured to or supported from the foundation 65. Beams or screeds 67 are supported upon this series of chairs. On their upper edges they carry chairs Y and upon these beams or screeds 68 are supported which in turn carry on their upper faces a series of chairs Z and upon these are supported screeds 69 which carry on their upper faces a finished flooring 70. The chairs shown in Figure 15 resemble those of the form illustrated in Figures 10 and 11. As shown, however, the interior of the housing may be entirely filled with rubber instead of being filled with the combined rubber and felt arrangement of Figures 10 and 11. It is to be

understood, however, that any form or any combination of the forms of chairs might be used in the device of Figure 15.

In the various forms of floors shown, sound deadening or insulating material is inserted between the rough floor and the finishing floor. To simplify the drawings, however, such material is shown only in Figure 1, in which mineral wool 71 is shown as filling the space between the two floors. It is to be understood that this might be omitted or that any sort of sound deadening or sound insulating material might be used and such insulating material might be used in connection with any of the constructions shown.

It will be realized that whereas I have herewith shown and described a practical operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing materially from the spirit of my invention and I wish, therefore that my showing be taken as in a large sense diagrammatic.

In particular, where rubber is spoken of in the specification and claims, any generally analogous material is included, and the invention is not limited narrowly to the use of rubber but includes the use of other cushioning materials.

The fact that the members forming the supporting element, as for instance in Figures 2 and 3, the lower plate 10 and the arm members 14 are each nailed or otherwise fastened to the rough flooring 1 and the screed 4, makes it possible for this element to serve both as a load supporting member and as a hold-down member, thus obviating the necessity of having any hold-down.

One of the advantages of the upper cushion 27 in connection with the ceiling support as shown in Figures 6 and 7 is that this cushion which normally does not carry any load, limits the upward movement of the ceiling structure in the event of a tendency toward displacement as a result of building operations and the like, as for instance, without it there might be a tendency for the ceiling to give under the upward thrust of the plasterer's trowel.

One of the very serious problems in connection with sound proofing especially floors, is the tendency which floors have to rise as a result of warping of the wood caused by dampness, expansion and contraction and the like. The device which I have produced, while it supports the floor, at the same time holds it down and the cushioning effect and sound proofing and deadening effect is equally important both in connection with my device as a hold down and as a floor support.

I claim:

1. In a ceiling construction, insulating means for supporting the ceiling, comprising a hollow member suitable for attachment to a structural member, a second member lying within said hollow member and suitable for attachment to a second structural member, and non-metallic insulating material surrounding said second member, spacing it away from said hollow member,

said insulating material being of a plurality of kinds.

2. A construction device for use in joining structural members, said device comprising a part adapted to be secured to a structural member, and shaped with a hollow portion, a second part adapted to be secured to a different structural member and passing through said hollow portion, a rubber member positioned within said hollow portion and in contact with one of said parts and out of contact with the other, a quantity of insulating felt like material surrounding the rubber and filling the space within said hollow member.

3. In a construction device, a part adapted to be secured to a structural member and including a hollow portion, a second part adapted to be secured to a second structural member, and lying within said hollow portion, and two sections of different insulating material lying within said hollow member, positioning and supporting said second member.

4. In a construction device, a part adapted to be secured to a structural member and including a hollow portion, a second part adapted to be secured to a second structural member, and lying within said hollow portion, and two sections of different insulating material lying within said hollow member positioning and supporting said second member, said insulating material comprising two different types of insulation.

5. A chair for building construction comprising two, spaced, perpendicular members, a non-metallic resilient cushion joining them together and adapted to hold them in working relationship both under compression and tension loads, each member having outwardly extending portions at the ends thereof and means for fastening such portions to the structural parts of a building.

6. A chair for building construction comprising two, spaced, perpendicular members, a non-metallic resilient cushion joining them together and adapted to hold them in working relationship both under compression and tension loads, each member having outwardly extending portions at the ends thereof and means for fastening such portions to the structural parts of a building, one of said members having resilient arms interposed between the non-metallic cushion and the point of contact of the member with the building.

7. A chair for building construction comprising two, spaced, perpendicular members, a non-metallic resilient cushion joining them together and adapted to hold them in working relationship both under compression and tension loads, each member having outwardly extending portions at the ends thereof and means for fastening such portions to the structural parts of a building, positive means for limiting the relative excursion of the two spaced members as the non-metallic cushion yields.

CHARLES D. STEVENS.