May 22, 1934. C. GERBER 1,959,530

STRINGED MUSICAL INSTRUMENT

Filed Nov. 25, 1932 2 Sheets-Sheet 1

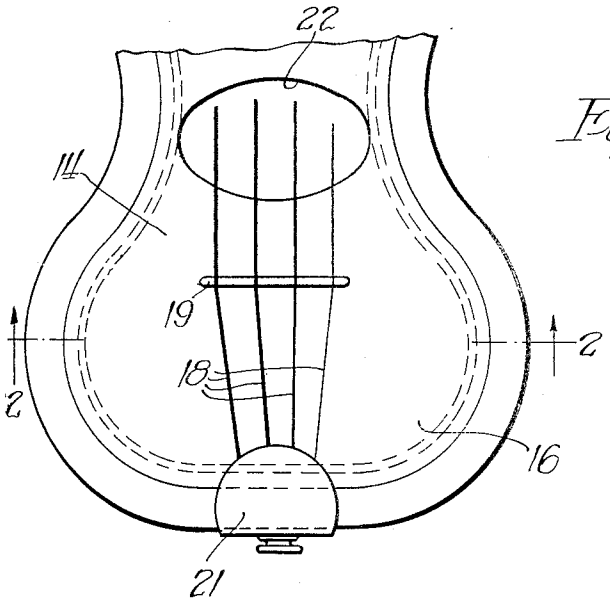


Fig. 1.

Fig. 2

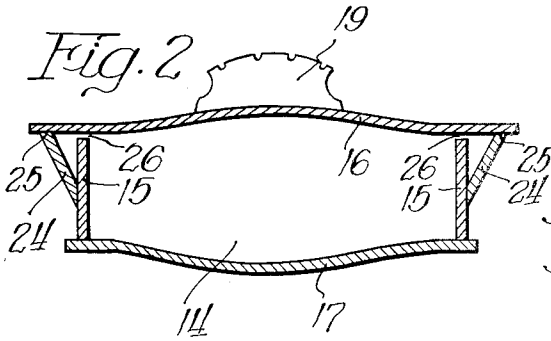


Fig. 4.

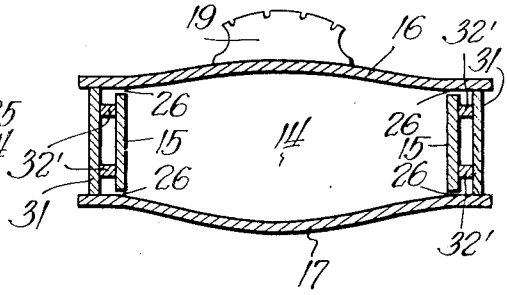


Fig. 3

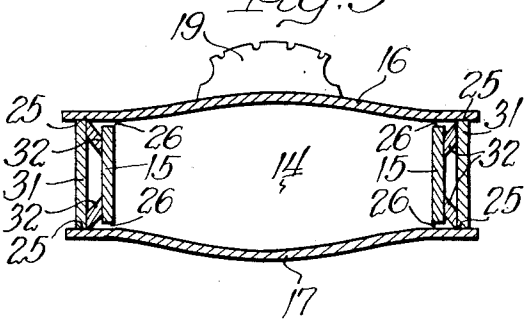
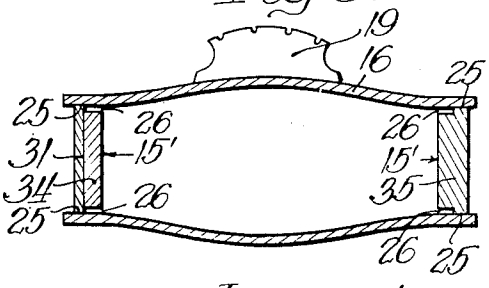


Fig. 5.



Inventor:
Charles Gerber.

By Brown, Jackson, Boettcher & Dienner
Attys.

May 22, 1934. C. GERBER 1,959,530

STRINGED MUSICAL INSTRUMENT

Filed Nov. 25, 1932 2 Sheets-Sheet 2

Fig. 6.

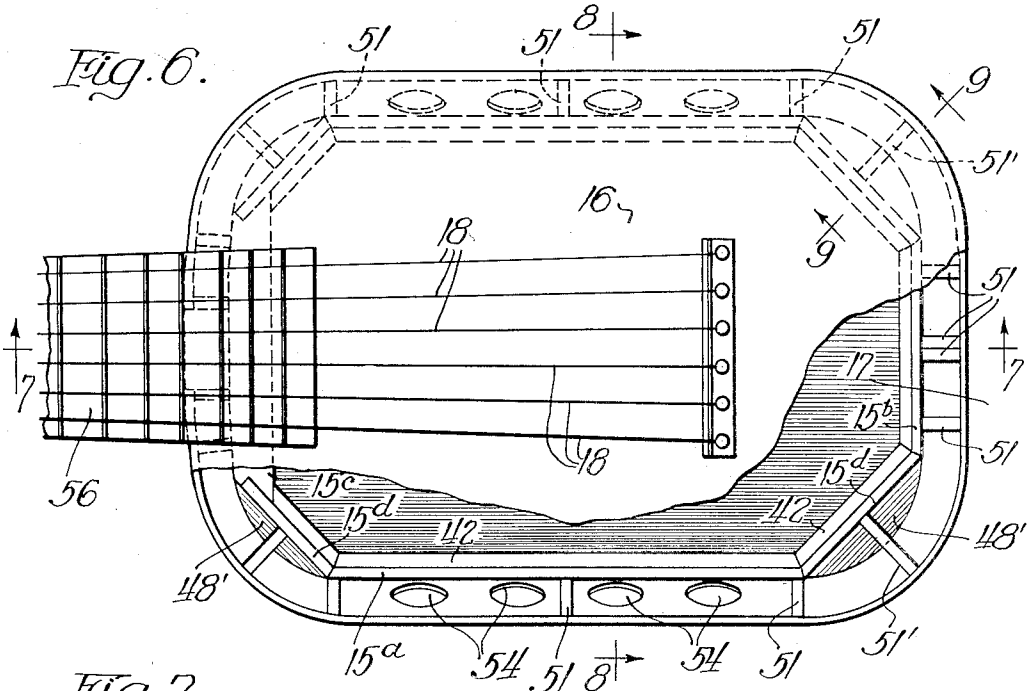


Fig. 7.

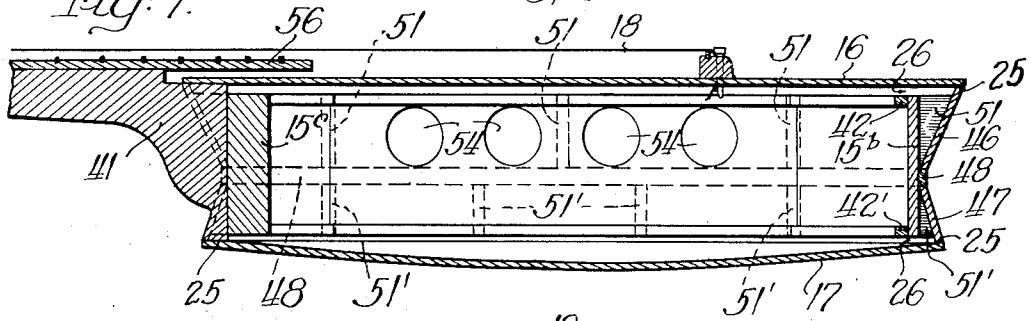
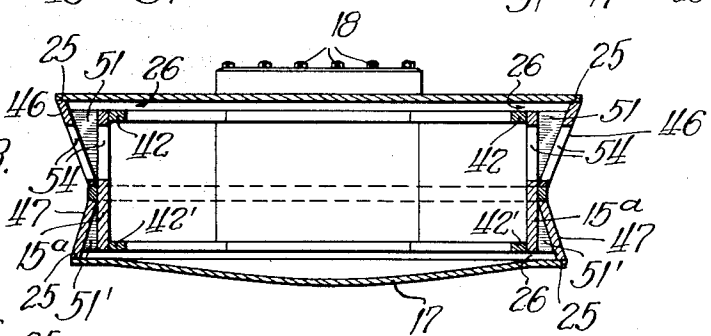


Fig. 8.



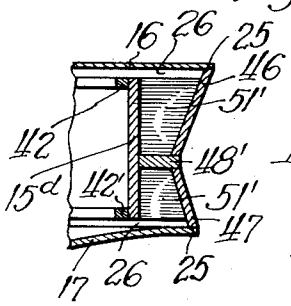


Fig. 9.

Inventor:
Charles Gerber.
By Brown, Jackson, Boettcher & Dienner
Attys.

Patented May 22, 1934

1,959,530

UNITED STATES PATENT OFFICE

1,959,530

STRINGED MUSICAL INSTRUMENT

Charles Gerber, Madison, Wis.

Application November 25, 1932, Serial No. 644,174

13 Claims. (Cl. 84—291)

The present invention relates to musical instruments and particularly to an improved construction of body or sound box for stringed musical instruments.

The present application is a continuation in part of my co-pending application, Serial No. 551,911, filed July 20, 1931.

One of the principal objects of the invention is to improve the construction of the sound boxes of stringed instruments, such as guitars, mandolins, violins, ukuleles, etc., to the end of improving the tone quality and responsiveness of the instrument. In the conventional sound box, the top and bottom walls are resonant sounding boards, substantially all portions of which vibrate with a varying degree of responsiveness from one side edge of the sounding board to the other side edge. The central portion of the sounding board is capable of the greatest amplitude of vibration, since this central portion is not dampened or restrained by attachment to other portions of the instrument. The amplitude of vibration or responsiveness of the sounding board diminishes from the central portion outwardly towards the edges of the board. At the side edges where the sounding board is attached to the side walls or frame structure of the instrument, the amplitude of vibration is a minimum, owing to the dampening or restraining influence of the mechanical attachment of these edge portions to the side walls. The dampened resonance of the sounding board around its edges, by reason of this mechanical attachment to the side walls, results in there being a band or zone of air extending around the inside of the sound chamber, in immediate proximity to the side walls thereof, which band or zone is relatively inert, or at least does not vibrate with the responsiveness of the body of air more nearly in the center of the instrument. This marginal portion or lining of relatively inert air extending around the inside of the side walls of the sound chamber has a dampening influence on the more active volume of air responding to the greater amplitude of the central portion of the sounding board. My improved sound box aims to establish a greater intensity of vibration in these marginal portions of the confined body of air by enabling the sounding boards to have an increased amplitude of vibration directly adjacent to these marginal portions of the confined body of air. That is to say, the mechanical attachment of the edges of the sounding board is so arranged that it does not have the former dampening or restraining influence on those portions of the sounding board in immediate proximity to the effective side walls of the sound chamber. This is accomplished by having the mechanical attachment established between the edges of the sounding board and secondary or outer wall structures which are spaced outwardly from those inner walls which substantially or approximately define the sides of the sound chamber.

Other objects of the invention, pertaining to improved structural details of this general type of instrument, and pertaining to other related features, will appear from the following description of certain preferred embodiments of my invention. In the accompanying drawings illustrating such embodiments:—

Figure 1 is a fragmentary plan view of a typical instrument, such as a guitar, embodying the invention;

Figure 2 is a transverse sectional view taken approximately on the plane of the line 2—2 of Figure 1;

Figures 3, 4 and 5 are transverse sectional views illustrating modified constructions;

Figure 6 is a plan view, principally in section, illustrating a modified embodiment of my invention;

Figure 7 is a longitudinal sectional view taken approximately on the plane of the line 7—7 of Figure 6;

Figure 8 is a transverse sectional view taken approximately on the plane of the line 8—8 of Figure 6; and

Figure 9 is a detail sectional view taken approximately on the plane of the line 9—9 of Figure 6.

Referring first to Figures 1 and 2, the improved sound box of the instrument is indicated generally at 14, being defined between the side walls 15 and the top and bottom walls 16 and 17. One or both walls 16, 17 may function as resonant sounding boards and may be flat, bowed, or given any other desired conformation, depending upon the type of musical instrument. The strings 18 may extend across a bridge 19 and be anchored to a tail piece 21, or may be arranged in any other relation, depending upon the type of instrument. In the embodiment illustrated in Figure 1, I have shown the top sounding board or belly 16 having a sound opening 22 therein, but, as hereinafter described in connection with other embodiments, I also contemplate a construction wherein the top and bottom sounding boards are substantially solid or closed.

Referring to Figure 2, the top wall 16 embodies my invention in having its outer edge

portions mechanically attached to inclined side walls 24 at points spaced outwardly from the main side walls 15 of the sound chamber. These points of mechanical attachment are indicated at 25, consisting of a glued or other attachment of the top wall 16 to the upper edges of the inclined side walls 24. The inclined side walls are secured in any suitable manner to the outer sides of the main side walls 15. A small space 26 is left between the top wall 16 and the upper edges of the main side walls 15.

It will be observed that the above described construction enables the top sounding board 16 to vibrate over a span extending up to and beyond the main side walls 15. Hence, substantially all portions of the body of air confined within the sound chamber 14, between the side walls 15, is set into a more active vibration than has been true in prior constructions wherein the mechanical attachment of the top wall 16 directly to the upper edges of the main side walls 15 has dampened the vibratory motion of the top wall adjacent to said side walls, resulting in relatively inactive zones of air around the margins of the sound chamber 14, as previously described. The space 26 between the top wall and each side wall is preferably of such a degree as to just permit free vibratory movement of the top wall without interference by the side walls. The points of mechanical attachment 25 between the top wall and the inclined secondary walls 24 are preferably spaced outwardly sufficiently far from the main side walls 15 as to permit of ample vibration of those portions of the top wall lying in proximity to the side walls 15 to enable the marginal zone of air within the sound chamber to be set into an active or more intense vibration. This construction is preferably extended around the entire sound box, including the ends as well as the sides thereof. The sloping outer members 24 are preferably continuous walls, although they might consist of discontinuous members having spaces therebetween, or may be provided with sound openings. The above described construction may also be duplicated for the bottom sounding board 17, as I shall hereinafter describe in connection with Figures 6–9, inclusive.

Figure 3 illustrates a modified construction wherein the side walls 15 are spaced from both the upper and lower sounding boards. The edge portions of said upper and lower walls have mechanical attachment to outer secondary walls 31. The inner walls 15, which substantially define the sides of the sound chamber 14, are supported from these outer walls 31 by inclined struts or supporting members 32, which are fastened to the two walls. The members 32 may consist of continuous walls or strips, or may consist of separated blocks or struts. As in the preceding embodiment, the spaces 26 between the top and bottom walls and the side walls 15 permit effective vibration of those portions of the top and bottom walls in immediate proximity to the side walls 15, and hence set into vibration the air lying adjacent to the side walls 15.

Figure 4 illustrates the same general construction as is shown in Figure 3, with the exception that the supporting members 32′, which extend between the inner and outer walls, are set at right angles to both walls instead of being inclined.

Figure 5 illustrates two forms of a solid construction wherein the side surfaces 15′ of the sound chamber are defined by thickened portions of the side walls, which thickened portions have no mechanical attachment to the upper and lower sound boards. In the construction illustrated at the lefthand side of Figure 5, the side wall 31 has attached to its inner face a strip 34 of wood or other suitable material, the upper and lower edges of which are spaced out of contact with the top and bottom sounding boards to leave the vibrating spaces 26. The inner surface 15′ of this strip 34 defines the main side wall of the sound chamber. In the construction illustrated at the righthand side of Figure 5, the outer wall and the filler strip are constructed in the form of an integral member 35.

While my invention is primarily intended to be built into new instruments during the manufacture thereof, it will be observed that some of the above described embodiments are of such a nature as to enable the invention to be readily incorporated in existing instruments of conventional design. For example, the constructions illustrated in Figures 3, 4 and 5 can be readily built into old instruments, as by allowing the conventional side walls to remain as the outer walls 31 and mounting the narrower inner walls thereon; or this process may be reversed by retaining the original side walls to function as the inner walls 15 and mounting them on new outer walls 31 of a greater width than the original side walls. The construction illustrated in Figure 2 can also be embodied in old instruments.

Referring to the embodiment illustrated in Figures 6–9, inclusive, the inner wall structure constitutes the supporting frame of the sound box and comprises the longitudinal side wall members 15*a*, the transverse end wall members 15*b* and 15*c*, and the diagonally extending wall members 15*d* at the corners of the sound box. The end wall 15*c* at the head end of the instrument is relatively thick for attachment of the neck 41 thereto. Extending inwardly from the upper and lower edges of these inner walls 15*a*, 15*b* and 15*d* are strips 42 and 42′ which are glued or otherwise secured to said walls. These strips constitute inwardly extending ribs around the upper and lower margins of the inner wall structure, serving to reenforce the latter.

The top and bottom sounding boards 16 and 17 are attached to an outer wall structure which circumscribes substantially the entire sound box. This outer wall structure comprises an upper wall portion 46 flaring outwardly and upwardly for attachment to the edges of the upper sounding board 16, and a lower wall portion 47 flaring outwardly and downwardly for attachment to the edges of the lower sounding board 17. The proximate inner edges of these flaring walls 46, 47 are glued in abutment against the top and bottom edges of a strip 48 which is secured to the outer side of each side and end wall member 15*a* and 15*b*. Said flaring outer walls are preferably formed on a curve around the corners of the sound box, and at these points the ribs 48 are constructed in the form of arcuate segments 48′ (Figure 9) projecting out from the diagonal corner pieces 15*d* of the inner wall for accommodating attachment to the curved portions of the flaring outer walls. The flaring outer walls 46 and 47 are reenforced at spaced points by vertically extending wedge-shaped struts 51 which are secured between each outer wall portion 46 and 47 and the outer surface of the inner wall structure. The diagonal struts 51′ at the corners of the instrument are also secured to the arcuate segments 48′.

The upper and lower edges of the flaring outer

walls 46, 47 project slightly beyond the upper and lower edges of the inner walls 15*a*, 15*b* defining the sound chamber, so as to space the top and bottom sounding boards 16 and 17 from the top and bottom edges of the inner wall structure to a sufficient degree to prevent this inner wall structure from interfering with the vibration of said sounding boards. These top and bottom spaces are indicated at 26. The sounding boards or walls 16 and 17 may be either flat or bowed, as desired. In one preferred embodiment of my invention, these top and bottom sounding boards are of solid or closed construction. In such embodiment, I provide lateral sound openings 54 in the side walls of the instrument. As shown in Figure 8, these sound openings consist of aligned apertures provided in the inner wall structure 15*a* and in the outer flaring walls 46.

The finger-board 56 is secured to the neck 41 in the conventional manner and may extend inwardly over the top sounding board 16, but is supported out of contact with this sounding board. The strings 18 may be extended over a bridge to a tail piece, or may be anchored to a bridge secured to the top sounding board, depending upon the type of instrument.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining a sound chamber and constituting the supporting frame of the instrument, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said inner wall structure and flaring outwardly and upwardly therefrom, and comprising lower wall portions secured to said inner wall structure and flaring outwardly and downwardly therefrom, imperforate top and bottom sounding boards secured to the edges of said upper and lower flaring wall portions, said top and bottom sounding boards being spaced from the upper and lower edges of said substantially vertical inner walls, sound openings extending through said inner and outer wall structures, and a neck secured to said inner wall structure.

2. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining a sound chamber and constituting the supporting frame of the instrument, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said inner wall structure and flaring outwardly and upwardly therefrom, and comprising lower wall portions secured to said inner wall structure and flaring outwardly and downwardly therefrom, struts arranged at spaced points between said flaring wall portions and said vertical walls, top and bottom sounding boards secured to the edges of said flaring wall portions, said sounding boards being spaced from the upper and lower edges of said substantially vertical inner walls, and sound openings extending through said inner and outer wall structures.

3. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, a rib projecting from the outer side of said vertical side walls intermediate the upper and lower edges thereof, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said rib and flaring outwardly and upwardly from said inner wall structure, and comprising lower wall portions secured to said rib and flaring outwardly and downwardly from said inner wall structure, and top and bottom sounding boards secured to the edges of said upper and lower flaring wall portions, said sounding boards being spaced from the upper and lower edges of said inner vertical side walls.

4. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, inwardly extending ribs extending around the upper and lower margins of said vertical side walls, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said inner wall structure and flaring outwardly and upwardly therefrom, and comprising lower wall portions secured to said inner wall structure and flaring outwardly and downwardly therefrom, and top and bottom sounding boards secured to the edges of said upper and lower flaring wall portions, said sounding boards being spaced from the upper and lower edges of said inner vertical side walls.

5. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, inwardly extending ribs provided around the upper and lower margins of said vertical side walls, outwardly projecting ribs provided around the outer sides of said side walls intermediate the top and bottom edges thereof, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said outwardly extending ribs and flaring outwardly and upwardly from said inner wall structure, and comprising lower wall portions secured to said outwardly extending ribs and flaring outwardly and downwardly from said inner wall structure, and top and bottom sounding boards secured to the edges of said upper and lower flaring wall portions, said sounding boards being spaced from the upper and lower edges of said inner vertical side walls.

6. A stringed musical instrument comprising an inner wall structure having substantially vertical side and diagonal corner walls defining the sides of a sound chamber, an outwardly projecting rib extending around said inner wall structure intermediate the top and bottom edges thereof and comprising arcuate segments projecting outwardly from the diagonal corner walls, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising upper wall portions secured to said rib and to said arcuate segments and flaring outwardly and upwardly from said inner wall structure, and comprising lower wall portions secured to said rib and to said arcuate segments and flaring outwardly and downwardly from said inner wall structure, and top and bottom sounding boards secured to the edges of said upper and lower flaring wall portions, said sounding boards being spaced from the upper and lower edges of the vertical walls of said inner wall structure.

7. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure, said outer wall structure comprising wall portions secured

to said inner wall structure and flaring outwardly and upwardly at an angle therefrom, and a resonant sounding board extending substantially at right angles to said inner and outer wall structures and being secured to the edges of the flaring wall portions of said outer wall structure and being spaced from contact with the adjacent edge of the inner wall structure.

8. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure and secured thereto, and top and bottom walls for said sound chamber, secured to said outer wall structure and spaced from the top and bottom edges of said vertical inner side walls.

9. A stringed musical instrument comprising an inner wall structure having substantially vertical side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure and secured thereto, and another wall extending substantially at right angles to said inner and outer wall structures and being secured to said outer wall structure and being spaced from the adjacent edge of said inner vertical side walls.

10. A stringed musical instrument comprising an inner wall structure having side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure, and top and bottom walls for said sound chamber secured to the top and bottom edges of said outer wall structure and spaced from the top and bottom edges of said inner wall structure.

11. A stringed musical instrument comprising an inner wall structure having side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure, and a resonant sounding board for said sound chamber, having its edge portions secured to said outer wall structure and being spaced from the adjacent edges of said inner wall structure.

12. A stringed musical instrument comprising an inner wall structure having side walls defining the sides of a sound chamber, an outer wall structure substantially surrounding said inner wall structure, imperforate top and bottom sounding boards for said sound chamber, said sounding boards being secured to said outer wall structure and being spaced out of contact from the adjacent edges of the inner wall structure, and sound openings extending through said inner and outer wall structures between said top and bottom sounding boards.

13. A stringed musical instrument comprising a sound box having upper and lower walls and connecting side wall means secured to the edges of said first-named walls, an inner wall construction carried by said side wall means and presenting a surface detached from said first-named walls and disposed inwardly of the points of connection between said first-named walls and said side wall means.

CHARLES GERBER.