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L. A. LOAR

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STRINGED MUSICAL INSTRUMENT

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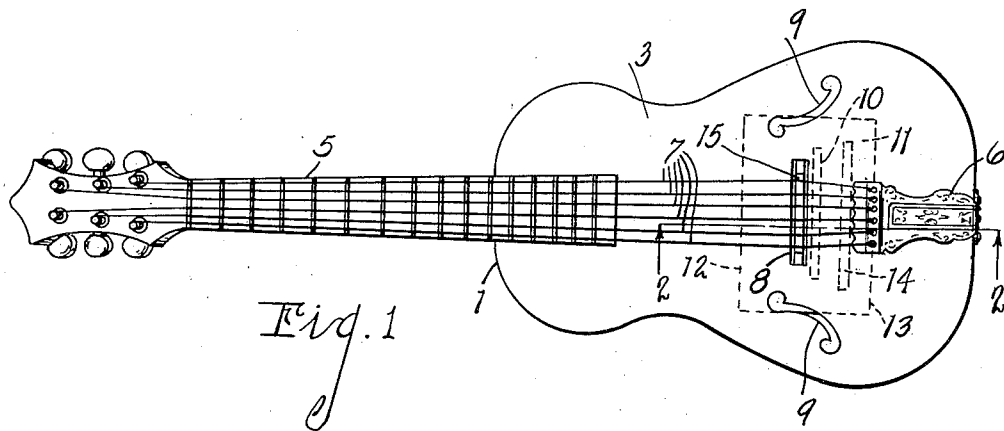


Fig. 1

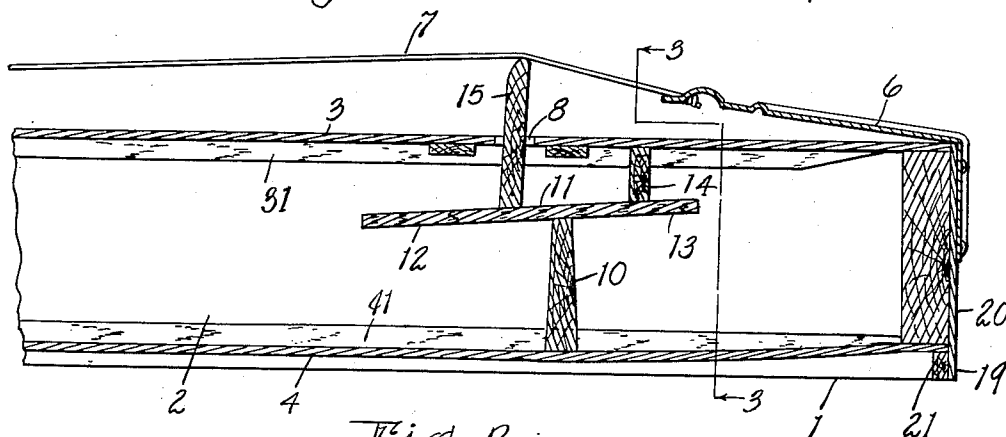


Fig. 2

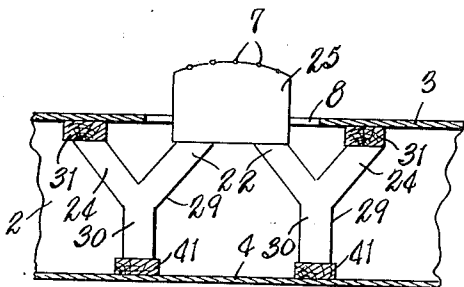


Fig. 3

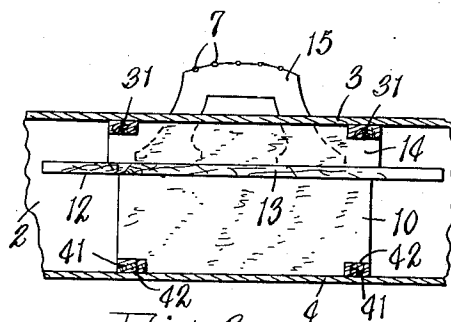


Fig. 4

INVENTOR
Lloyd A. Loar
BY Chappell & Carl
ATTORNEYS

UNITED STATES PATENT OFFICE

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STRINGED MUSICAL INSTRUMENT

Lloyd A. Loar, Kalamazoo, Mich., assignor, by
mesne assignments, to Acousti-Lectric Com-
pany, Kalamazoo, Mich., a corporation of
Michigan

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19 Claims. (Cl. 84—307)

My invention relates to musical instruments of the stringed type.

The main object of my invention is to provide a stringed musical instrument characterized by an improved sound box having a back and a belly which are vibrated oppositely and in unison with each other.

Another object is to provide an improved bridge construction for stringed musical instruments.

Objects relating to details and economies of my invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a top plan view of a guitar embodying the features of my invention.

Fig. 2 is an enlarged fragmentary section on a line corresponding to line 2—2 of Fig. 1.

Fig. 3 is a fragmentary transverse section on a line corresponding to line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 3 of a modification.

In the accompanying drawing I illustrate my invention as embodied in a guitar 1 having a sound box 2 provided with an upper sounding board or belly 3 and a lower sounding board or back 4. Mounted on the sound box are the usual finger piece 5 and tailpiece 6 which carry the tensioned strings 7. The belly and back are reinforced by spaced upper and lower longitudinal bars 31, 31 and 41, 41.

I preferably extend the lower edge 19 of the side wall 20 of the sound chamber or box 2 below the back sounding board 4 to provide a guard 19 for the latter. The guard is backed up by an inner reinforcing member 21.

The belly 3 has a transverse string bridge slot 8 therein and a pair of sound holes 9, 9 spaced from opposite ends of such slot. The back 4 has similar sound holes (not shown). On the inside of the sound box on the back in offset relation to the slot 8, I mount the back bridge 10, the back bridge being arranged in substantially parallel relation to the slot. The back bridge is cut out at 42, 42 to seat the bars 41, 41 as shown. A lever 11 in the form of a substantially rectangular plate is mounted on the back bridge 10 to provide oppositely extending portions or arms 12 and 13. A compression member or belly bridge 14 is disposed between the arm 13 and the inner side of the belly 3, the belly bridge being cut out to seat the bars

31, 31. The string bridge 15 is mounted on the opposite portion 12 of the lever so as to extend through the slot 8 without touching the belly.

With the parts of my bridge construction arranged in this manner, the string bridge 15 transmits the full string pressure directly on the forward portion of the lever 11. The back bridge 10 and the belly bridge 14 are so positioned relative to the string bridge 15 that such string pressure is transmitted to the inner side of the belly and the inner side of the back. While the bridges 10 and 14 and lever may be held in contact with each other by string pressure alone, I preferably glue these parts to each other and to the upper and lower sound boards to facilitate assembling the parts and to hold them in place. The bridges can be changed in position as desired to bring out the proper or desired tonal quality of the instrument.

The pressure of the back and belly on the bridges 10 and 14 acts on the lever 11 to balance the pressure exerted by the strings through the string bridge. As a string vibrates there is an increase and decrease of string pressure on the string bridge 15 that is instantly transferred to the sounding boards 3 and 4 through the lever and the bridges 10 and 14. As the resistance of the sounding boards to the string pressure automatically changes to bring about a state of balance, the sounding boards are vibrated simultaneously and oppositely to each other with the vibration of the string bridge. The pressure on the sounding boards causes them to vibrate together. The total sound-board area is the sum of the areas of the sounding boards 3 and 4 which is twice as great as that of an instrument with a sound box of the same size with only the top or belly of the box serving as a sounding board.

The air in the sound box of my instrument receives about twice as much sound pressure energy from the two sounding boards as it would from one sounding board. By means of the leverage principle used by me, each of the sounding boards receives as much pressure as the total available from the strings. The combined operation of the sounding boards in relation to the air in the sound box is similar to that of a bellows. The sound pressure rate of travel from the sounding boards through this air is more rapid than the air can be moved in a body and so instead of expelling and drawing in air through the sound holes 9 compression and rarefaction waves are generated in the internal air body in the sound box, which

waves are always of the correct value to exactly reinforce the effect of the sounding boards upon the outside air.

My improved construction results in a sound box wherein the belly and back vibrate in phase with each other to produce the same compression and rarefaction values in the external air at any given moment. The back acts as a sounding board and is vibrated directly from the strings in the same way that the belly is vibrated. Thus, without making the sound chamber of the instrument any larger the sound-board area is substantially doubled. Further, the air in the sound box is vibrated substantially in synchronism with the vibration of the sounding boards.

Referring to Fig. 4, there is illustrated a modification of my invention wherein the string bridge 25 is supported by a pair of Y-shaped lever bridges 29, 29 arranged between the belly and back bars 31 and 41, as shown, with their stems 30 resting on the back bars and their outer arms 24 engaging under the belly bars and their inner arms 22 carrying the string bridge. This arrangement is quite simple and yet the bellows action of the sound box 2 is substantially the same as that described above, when the strings 7 are vibrated. Further, if desired, the bridges 29 can be inserted in the sound box through the string bridge slot 8 without altering the parts of the box.

My invention makes possible smaller instruments for the tenor, baritone, and bass voiced stringed instruments with the tone improved in quality and intensity over that possible with prior constructions. While the tone in quality and intensity is improved, the manufacturing cost is decreased.

While I have described and illustrated my invention in connection with a guitar, it is to be understood that this is by way of example only, the invention being applicable to substantially all stringed instruments.

I have illustrated and described my improvements in embodiments which I have found very practical. I have not attempted to illustrate or describe other embodiments or adaptations, as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

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

1. In a bridge construction for stringed musical instruments having a sound box provided with a back and a belly, and spaced longitudinal upper and lower bars on said back and belly, the combination of an inner back bridge mounted on the back and having cut-out seats receiving said lower bars, a bridge lever pivotally mounted on said back bridge, the belly having a string bridge slot, an inner belly bridge disposed between said bridge lever and the belly at one side of said back bridge and having cut-out seats receiving said upper bars, and a string bridge mounted on said lever at the other side of said back bridge and extending through said slot clear of the belly.

2. In a bridge construction for stringed musical instruments having a sound box provided with a back and a belly, the combination of a bridge mounted on the back, a lever pivotally mounted on said bridge, the belly having a string bridge slot, a bridge disposed between said lever and the belly at one side of said back

bridge, and a string bridge mounted on said lever at the other side of said back bridge and extending through said slot clear of the belly.

3. In a bridge construction for stringed musical instruments having a sound box provided with a back and a belly, the combination of a transverse back bridge in said sound box, a longitudinal bridge lever pivotally mounted on said back bridge, compression means connecting said lever to the belly at one side of said back bridge, and a string bridge mounted on said lever at the other side of said back bridge, the back bridge and string bridge being spaced from the belly so as to be out of direct contact therewith.

4. In a bridge construction for stringed musical instruments having a sound box provided with a back and a belly, the combination of a back bridge in said sound box, a lever pivotally mounted on said back bridge, compression means connecting said lever to the belly at one side of said back bridge, and a string bridge mounted on said lever at the other side of said back bridge, the back bridge and string bridge being spaced from the belly so as to be out of direct contact therewith.

5. In a bridge construction for stringed musical instruments having a sound box provided with a back sounding board and a belly sounding board, the combination of a string bridge, a belly bridge, a back bridge, and a bridge lever connecting said bridges, the parts being arranged so that the belly and back sounding boards are vibrated simultaneously and oppositely by the vibration of said string bridge, the bridge lever being pivotally disposed on said back bridge within the sound box and supporting said string bridge and belly bridge at opposite sides thereof.

6. In a bridge construction for stringed musical instruments having a sound box provided with a back sounding board and a belly sounding board, the combination of a string bridge, a belly bridge, a back bridge, and a lever connecting said bridges, the parts being arranged so that the belly and back sounding boards are vibrated simultaneously by the vibration of said string bridge, the bridge lever being pivotally disposed on said back bridge within the sound box and supporting said string bridge and belly bridge at opposite sides thereof.

7. A musical instrument comprising a pair of spaced sound boards, a plurality of tensioned strings associated therewith, a string bridge for said strings, and means for vibrating said sound boards simultaneously with said bridge and oppositely to each other, said means including a lever supporting said string bridge, and a bridge extending inwardly from each of said boards for coaction with said lever at spaced points, said bridges being arranged relative to each other and said lever to be in compression under the action of said strings.

8. A musical instrument comprising a pair of spaced sound boards, a string bridge, and means for vibrating said sound boards simultaneously with said bridge including a lever supporting said string bridge, and a bridge extending inwardly from each of said boards for coaction with said lever at spaced points, said bridges being arranged relative to each other and said lever to be in compression under the action of said strings.

9. A stringed musical instrument comprising a belly sounding board, a back sounding board, and a side wall coacting with said boards

to provide a sound chamber, the lower edge of said side wall projecting below said back sounding board to constitute a guard for the latter, and a bridge construction including a string bridge and lever means for vibrating said sounding boards with the vibrations of said string bridge and comprising means acting to tension said sounding boards equally and oppositely in accordance with the compression on said string bridge.

10. A stringed musical instrument comprising a belly sounding board, a back sounding board, and a side wall coacting with said boards to provide a sound chamber, and a bridge construction including a string bridge and lever means for vibrating said sounding boards with the vibration of said string bridge and comprising means acting to tension said sounding boards equally and oppositely in accordance with the compression on said string bridge.

11. The combination in a stringed musical instrument comprising a body having front and rear sounding boards provided with spaced longitudinal bars, the front sounding board having a string supporting bridge opening therein, of a string bridge arranged through said opening in said front sounding board, a lever-like support for said string bridge, and thrust members operatively associated with said string bridge support and string bridge to translate the vibrations of the string bridge to both sounding boards through said bars, the thrust member on said rear sounding board constituting a fulcrum for said lever-like support and supporting said string bridge and the thrust member on said front sounding board at opposite sides of said fulcrum.

12. The combination in a stringed musical instrument comprising a body provided with front and rear sounding boards, of a string bridge disposed through an opening in the front sounding board, a lever-like support for said string bridge, a fulcrum member for said support carried by the rear sounding board, and a thrust member disposed between said support and the front sounding board, the fulcrum member engaging the bridge support between the string bridge and said thrust member.

13. The combination in a stringed musical instrument comprising a body having front and rear sounding boards, of a string bridge arranged through an opening in said front sounding board, a support for said string bridge disposed between said sounding boards, and members operatively associated with said string bridge support and string bridge to translate the vibrations of the string bridge mechanically to both sounding boards, the string bridge, support and members being arranged to form a couple acting to transmit the compression on said string bridge to said sounding boards in equal and opposite directions.

14. A stringed musical instrument comprising a body provided with front and rear sounding boards, a string bridge disposed through an opening in the front sounding board, a support for said string bridge disposed within the

body, and thrust elements disposed between said string bridge and the front and rear sounding boards and supporting said string bridge support so that its vibrations are translated to both of said sounding boards, the thrust member on said rear sounding board constituting a fulcrum for said support and supporting said string bridge and the thrust member on said front sounding board at opposite sides of said fulcrum.

15. A stringed musical instrument comprising a body provided with front and rear sounding boards, a string bridge, a lever-like support for said string bridge, a fulcrum member for said lever carried by the rear sounding board, and a tension member disposed between said lever and the front sounding board, the fulcrum member engaging the bridge support between the string bridge and said tension member.

16. The combination in a stringed musical instrument comprising a body having front and rear sounding boards, of a string bridge, a lever-like support for said string bridge, and members operatively associated with said string bridge support to support the same under the stress of the strings thereof and to translate the vibrations of the string bridge to both sounding boards, the string bridge, support and members being arranged to form a couple acting to transmit the compression on said string bridge to said sounding boards in opposite directions.

17. In a bridge construction for stringed musical instruments having a sound box provided with spaced back and belly sounding panels, and spaced longitudinal reinforcing bars on said panels, the belly panel having a transverse slot disposed between said bars, the combination of a pair of spaced Y-shaped lever bridges mounted on said back reinforcing bars and having their outer arms engaging under said belly reinforcing bars and their inner arms extending to a position under said slot, and a string bridge resting wholly on said inner arms and extending through said slot and spaced therefrom.

18. In a bridge construction for stringed musical instruments having a sound box provided with spaced back and belly sounding panels, and spaced reinforcing bars on said panels, the belly panel having a slot disposed between said bars, the combination of spaced lever Y-shaped bridges mounted on said back reinforcing bars and having their outer arms engaging said belly reinforcing bars and their inner arms extending to a position under said slot, and a string bridge resting on said inner arms and extending through said slot.

19. The combination in a stringed musical instrument having spaced sounding panels one of which has an opening, of a string bridge extending through said opening, and a plurality of lever bridges supporting said string bridge by the exertion of pressure in opposite directions on both of said sounding boards, said lever bridges being arranged in the form of a couple acting to transmit the compression on said string bridge to said sounding boards.

LLOYD A. LOAR.