L. C. BOND.

STRINGED MUSICAL INSTRUMENT.

APPLICATION FILED MAY 9, 1921.

1,431,773.

Patented Oct. 10, 1922.

2 SHEETS—SHEET 1.

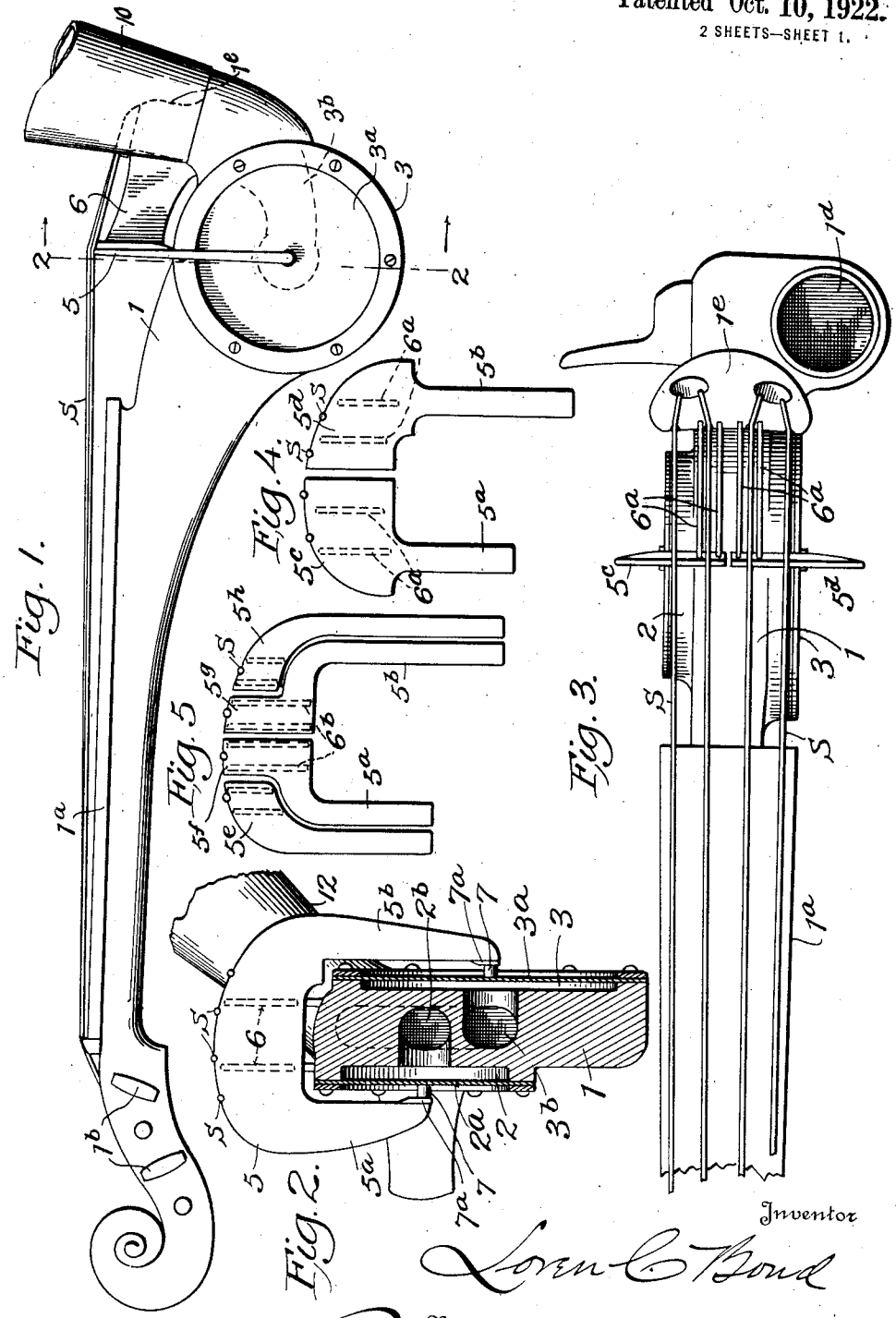


Fig. 1.

Fig. 4.

Fig. 5

Fig. 3.

Fig. 2.

Inventor

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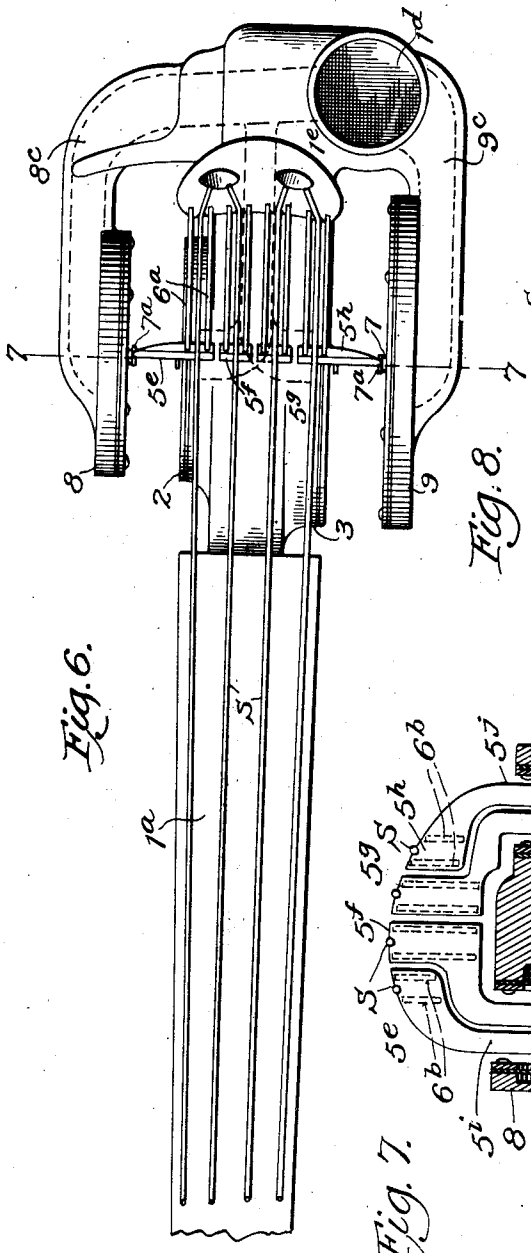


Fig. 6.

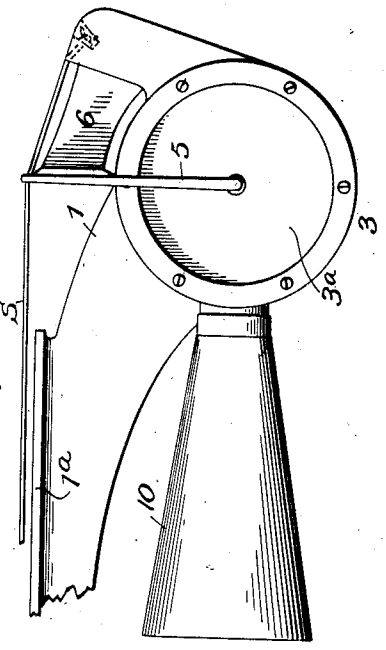


Fig. 8.

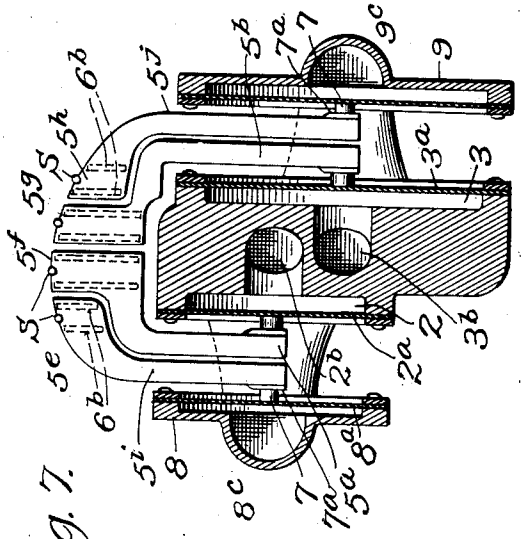


Fig. 7.

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UNITED STATES PATENT OFFICE.

LOREN C. BOND, OF WASHINGTON, DISTRICT OF COLUMBIA.

STRINGED MUSICAL INSTRUMENT.

Application filed May 9, 1921. Serial No. 468,129.

To whom it may concern:

Be it known that I, LOREN C. BOND, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Stringed Musical Instruments; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to stringed musical instruments and the object is to provide an instrument which will produce a very fine tone, and can be made very compact in size and can produce tones like a violin, viola, cello, bass viol, etc.

In my novel musical instrument the ordinary sounding apparatus or bodies are dispensed with and in place thereof I employ sounding boxes somewhat like those used in phonographs, the diaphragms of the boxes being directly connected with the bridge on which the strings are supported; and such bridge is mounted in an essentially novel manner, whereby lateral vibration of the bridge is permitted and all the vibration of the strings transmitted directly by the bridge to the diaphragms of the sound boxes, the bridge being so constructed and sustained that it can yield laterally with the vibration of the strings, and the diaphragm is positively operated with and by the bridge without any rocking of the bridge or any rubbing or sliding movements at the point of connection between the diaphragm and bridge.

A further object of the invention is to have a practically permanent connection between the diaphragm and the bridge so that they will move as one, and there will be no movable or adjustable joints between the bridge and the diaphragm whereby the transmission of the vibrations of the strings can be affected and discordant or undesirable noises or improper vibrations produced.

In my stringed instrument the bridge is yieldingly supported in such manner as to permit lateral motion thereof without there being any direct contact between the lower edge of the bridge and the box or frame of the instrument, and the bridge has downwardly extending portions which are connected directly and positively with the diaphragms of the sound boxes, without using any loose or hinged parts or connections.

A further object of the invention is to provide a sectional bridge so that any set of strings or each string may have a separate connection with the sound box, whereby the giving way of one string or its support will not change the tone of other strings. A further object is to provide a plurality of sound boxes, one for each string or group of strings so that in the preferred form of instrument each string or group of strings has an independent sound box to which it is or they are directly connected and by which the resultant tone is augmented.

I will explain the invention with reference to the accompanying drawings which illustrate instruments embodying the invention, and an understanding thereof will enable others to adopt and use the invention. In the various claims the essentials of the invention and novel features of construction and novel combinations of parts for which protection is desired are summarized.

In said drawings:

Fig. 1 is a side view of one musical stringed instrument, the horn being broken away.

Fig. 2 is a sectional view on the line 2—2 Fig. 1, looking in the direction of the arrow.

Fig. 3 is a detail top plan view of Fig. 1 partly broken away, and showing a sectional bridge.

Figs. 4 and 5 are detail views illustrating two forms of sectional bridges.

Fig. 6 is a top plan view of a musical instrument having four sounding boards and a bridge with four sections.

Fig. 7 is a section on the line 7—7 Fig. 6.

Fig. 8 is a detailed view showing different position of the horn.

The instrument shown comprises a body which may be of any suitable material, preferably of wood, and in or to this body a sounding box or sounding boxes are formed or attached, and from this body extends a finger board which may be provided with the usual keys for the strings. In the drawings I have indicated a musical instrument of the violin type using four strings but the invention is adaptable for violins, cellos, bass viols, banjos, guitars; and other stringed musical instruments.

As shown in Figs. 1 to 3 the body 1 has two sound chambers 2 and 3 on opposite sides, which are provided with diaphragms 2^a and 3^a, and from these chambers extend passages or ducts 2^b, 3^b leading through the wall of the body 1 to a common outlet open-

ing 1^d, to which a horn 10 may be connected if desired. The outer opening 1^d may be arranged at any desired portion of the body 1, and the size and form of the body may be greatly varied within the scope of the invention.

The bridge 5 is preferably made of wood but may be of other suitable material, and is supported by thin supports 6 which may be strips or blades formed of wood or other suitable material, and which blades are arranged parallel with the strings and at right angles to the bridge, and are disposed substantially perpendicular edgewise to the average plane of the series of springs S; by this means the bridge 5 is suspended from but above the body, that is it has no fulcrum point or bearing upon the body and can vibrate laterally without rocking or tilting.

The bridge as shown in Figs. 1 to 3 is formed of one section which supports all the strings and is provided at its opposite ends with depending arms 5^a and 5^b which depend on opposite sides of the body and exterior to the sound boxes 2 and 3. The lower end of the arm 5^a is directly connected to the center of the diaphragm 2^a, and the lower end of the arm 5^b is directly connected to the center of the diaphragm 3^a. As shown arm 5^a is shorter than arm 5^b because the boxes 2 and 3 are of obviously different size. The invention is not limited to boxes of any particular relative sizes or locations nor to any particular length of the bridge arms; these would materially vary according to the size and arrangement of the boxes or the body. The lower end of each bridge arm is connected to the related sounding box by preferably a non adjustable and firm connection, such as a wooden pin 7 which may be glued to the arm and to the center of the diaphragm.

Preferably after the strings have been tensioned to the approximate pitch desired so as to exert full pressure upon the bridge, a wedge 7^a is inserted between the end of the arm 5^a and the pin 7 attached to the center of the disk 2^a the wedge being previously glued so that when the glue hardens there is a permanent connection established between the end of the bridge arm 5^a and the diaphragm 2^a. Similarly there is a permanent connection formed by a wedge 7^a and pin 7 between bridge arm 5^b and the diaphragm 3^a. By having the bridge arms thus permanently connected with the diaphragm any movement of the bridge will be directly transmitted to the diaphragm without any possibility of lost motion, or any rubbing or sliding motion therebetween.

It will be seen from the drawings (Figs. 1 and 2) that the bridge is in direct contact with the body yet is very firmly and strongly suspended by the laterally resilient blades 6. These blades 6 support the bridge firmly under the pressure of the strings because they are arranged vertically edgewise in planes substantially parallel to the strings and substantially perpendicular to the average plane of the series of strings but the blades being very narrow and thin will permit the bridge to vibrate laterally of the body, but prevent the bridge rocking or oscillating, and I have found by this arrangement excellent tones can be produced, equal to the tones of expensive violins and other stringed instruments.

The rear or outer ends of the blades 6 are rigidly fastened in any suitable manner to the rear part 1^e of the body 1 as shown in Figs. 1, 3, 6, and 8. Suspending the bridge in this manner is most important in tone results and I have found it most objectionable to have the bridge oscillate or rock upon a bearing on the body or to have a support which would serve as a lever or fulcrum upon which the bridge could rock. Direct regular vibrations are highly desirable but irregular vibrations would be caused by any rocking motion of the bridge, such rocking being objectionable and undesirable. While obviously one supporting member or blade as described arranged beneath each string would suffice to support a bridge or bridge section, I preferably use a plurality of such blades, especially where more than two strings rest upon the same bridge or bridge section, to prevent any possibility of torsional twist of the blade permitting a slight rocking or oscillatory motion of the bridge or bridge section which I particularly wish to avoid.

The form shown in Figs. 1 and 2 in which the bridge is made in one piece is practical and gives excellent results. In this case of course all the strings lie over the same bridge and the vibrations of each string is transmitted to the same sound box or boxes. In order to increase the resonance and to lessen the liability of the tone being impaired by possible conflict between simultaneous vibrations of two strings, I prefer to make the bridge in sections. As shown in Figs. 3 and 4 the bridge is made in two sections 5^c and 5^d and each of these parts is attached to the body by means of parallel supporting members 6^a corresponding to the member 6. The bridge section 5^d carries the arm 5^b which is connected to the diaphragm 3^a of sound box 3 as in Fig. 2; and the bridge section 5^c carries the arm 5^a which is connected to the diaphragm of the sound box 2 as in Fig. 2.

In some cases, particularly where the instrument is to be used as a cello, or double base I prefer to make the bridge in sections one for each string as in Figs. 5 to 7, where the instrument has four strings and the bridge four sections 5^e, 5^f, 5^g and 5^h. Each

of these sections is supported on the body 1 and is connected by means of the parallel strips 6^b as shown so that they are securely held in proper relation to each other. In this case I provide two additional sound boxes such as 8 and 9 which may be connected to the body 1 by hollow arms 8^c, 9^c, the passages in the arms connecting with the opening 1^d. The section 5^f carries the arm 5^a which is connected to the diaphragm 2^a of box 2 as above described. The section 5^g carries the arm 5^b which is connected to the diaphragm 3^a of box 3 as above described. The sound box 8 is disposed opposite the sound box 2 and has a diaphragm 8^a which is connected by pin 7 and wedge 7^a with lower end of arm 5^i on the bridge section 5^c. The sound box 9 is arranged opposite the sound box 3, and is connected by pin 7 and wedge 7^a to the lower end of the arm 5^j on the bridge section 5^a in the manner above described.

It will be seen in this construction each string has an individual sound box and an individual support; and the letting down or breaking of one string will not affect the tone of the other strings; and each string having its own individual sound box most perfect tones can be obtained.

In the construction shown the sections of the bridge are all in the same plane, so are their arms, but obviously the body bridge and sections and arms might be so arranged that the arms will properly extend to the sound boxes located in positions different from that illustrated in the drawings; their location depending upon the choice of the maker or design of the body, and therefore I do not consider the invention restricted to having the bridge sections or arms all in the same plane or planes or to having the centers of all the sound boxes in the same plane. The positioning of the sound boxes on the body and any consequent variation in the relative positions or lengths of the arms on the bridge sections is a mere matter of design or choice on the part of the maker of the instrument and does not involve any departure from the essential features of the invention.

The horn 10 could be arranged at any desired place. In Fig. 8 it is shown as arranged to project below or outside the finger fret board 1^a, which is a convenient position for practice instruments, or for soft toned instruments. Also in some cases one arm may be dispensed with but in every case the novel means and method of supporting the bridge should be adhered to.

What I claim is:

1. A stringed musical instrument having a sound box provided with a diaphragm and a bridge supporting the strings having an arm connected to the diaphragm of the sound box by a pin and wedge forming a jointless direct connection between the arm and diaphragm, substantially as described.

2. In a stringed musical instrument, a body having a plurality of sound boxes provided with diaphragms and a bridge having a plurality of arms each arm fixedly connected with the diaphragm of one of the sound boxes by a pin and wedge forming a jointless direct connection between the arm and diaphragm, substantially as described.

3. A stringed musical instrument having a sound box, and a bridge supporting the strings and connected with the sound box, and a support for the bridge rigidly connected at its rear to the body of the instrument and at its front to the bridge and permitting only lateral vibrations of the bridge.

4. A stringed instrument having a sound box a bridge supporting the strings, a direct nonadjustable connection between said bridge and the sound box, and a support for the bridge permitting lateral vibration of the bridge but preventing vertical play or rocking motion thereof.

5. A stringed musical instrument having a plurality of sound boxes, and a bridge supporting the strings and capable of lateral vibrations only, said bridge having arms each connected to a different sound box.

6. A stringed musical instrument having a plurality of sound boxes having diaphragms, a bridge supporting the strings and capable of lateral vibrations, said bridge having arms each connected to the diaphragm of a different sound box; and a support for the bridge so connected to the body as to permit lateral vibration of the bridge but preventing vertical play or rocking motion thereof.

7. A stringed musical instrument having a sound box, a bridge supporting the strings and connected with the sound box; and a blade arranged in a plane substantially parallel to the strings and perpendicular to the average plane of the series of strings, and supporting the bridge at one end and connected to the body at the other end to permit lateral vibration of the bridge but prevent other movements thereof.

8. A stringed musical instrument having sound boxes; and a bridge supporting the strings and connected with the sound boxes; and blades each arranged in a plane substantially parallel to the strings and perpendicular to the average plane of the series of strings to the strings and supporting the bridge at one end and connected to the body at the other end to permit lateral vibration of the bridge but prevent rocking motion thereof.

9. In a stringed musical instrument, a body having a plurality of sound boxes provided with diaphragms and a bridge having a plurality of arms each arm fixedly con-

nected with the diaphragm of one of the sound boxes, the bridge being capable of lateral vibration only.

10. In a stringed instrument, a body having a plurality of sound boxes provided with diaphragms, a bridge having a plurality of arms each arm fixedly connected with the diaphragm of one of the sound boxes, and means for supporting the bridge above the body in such manner that the bridge is capable of lateral vibration but incapable of vertical or rocking motion.

11. In a stringed musical instrument, a body having a plurality of sound boxes at each side provided with diaphragms, and a bridge composed of a plurality of sections each having an arm directly connected with the diaphragm of the related sound box; each section of the bridge being independently supported so as to be capable only of lateral vibration, substantially as described.

12. In a stringed musical instrument; a sound box, a bridge supporting the strings, a connection between said bridge and the sound box, and a support for the bridge permitting lateral vibration of the bridge but preventing vertical and rocking motions thereof.

13. A stringed musical instrument having a sound box, a bridge having an arm connected with the sound box, and a support for the bridge permitting lateral vibration of the bridge while preventing vertical and rocking movements thereof.

14. A stringed musical instrument having a sound box, having a diaphragm, a bridge supporting the strings, a direct non adjustable connection between said bridge and the diaphragm of the sound box, and a support for the bridge permitting lateral vibration of the bridge but preventing vertical and rocking motions thereof.

15. In a stringed musical instrument, a body having a plurality of sound boxes provided with diaphragms, a sectional bridge having arms each arm being connected to a different sound box, and a support for each section of the bridge permitting lateral movement of the section but preventing vertical or rocking motion thereof.

16. In a stringed musical instrument, a body having a plurality of sound boxes, a sectional bridge each section having an arm connected with a related sound box, a thin blade like member supporting each section of the bridge and arranged in a plane substantially parallel to the strings and perpendicular to the average plane of the series of strings relative to the string and connected at one end to the bridge and at its other end to the body in rear of the bridge, substantially as described.

17. In a stringed musical instrument, a body having a plurality of sound boxes having diaphragms, a bridge composed of a plurality of sections each having an arm connected with the diaphragm of a related sound box; and pairs of thin blade like members each arranged in a plane substantially parallel to the strings and perpendicular to the average plane of the series of strings, relative to the string and connected at one end to a bridge section and at its other end to the body in rear of the bridge, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature.

LOREN C. BOND.