C. CHUDZIKOWSKI.

SOUNDBOARD.

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1,273,459.

Patented July 23, 1918.

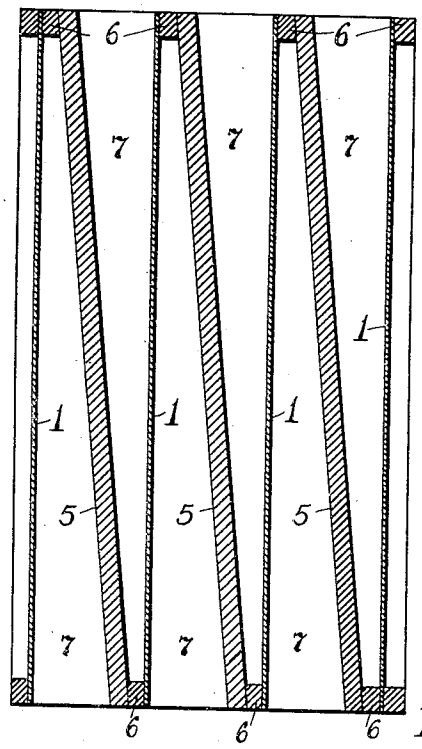


Fig. 1

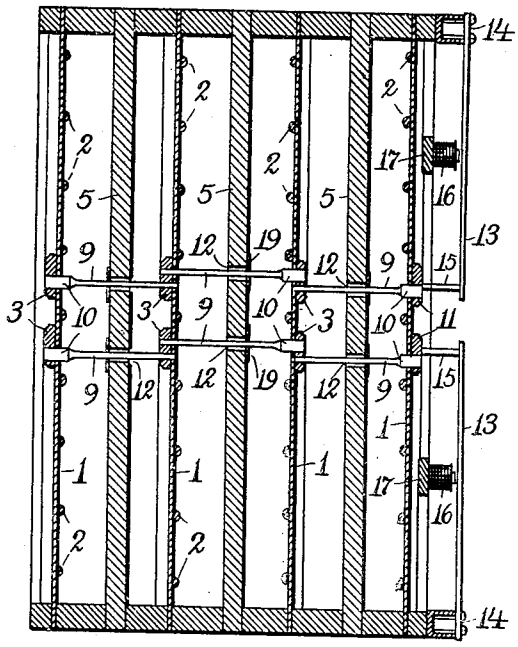


Fig. 2

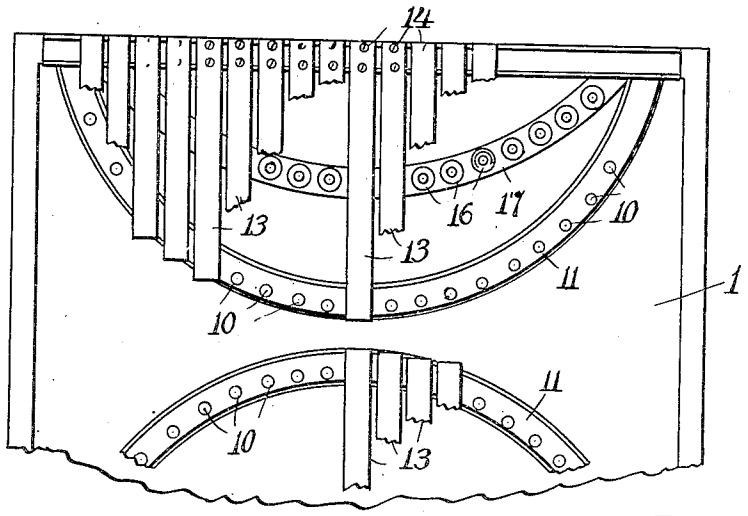


Fig. 3

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UNITED STATES PATENT OFFICE.

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SOUNDBOARD.

1,273,459. Specification of Letters Patent. Patented July 23, 1918.

Application filed December 15, 1914. Serial No. 877,438.

To all whom it may concern:

Be it known that I, CHARLES CHUDZIKOWSKI, a subject of the Emperor of Austria-Hungary, and a resident of Cambridge, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Soundboards, of which the following is a full, clear, and exact specification.

The object of this invention is the construction of improved means for reinforcing acoustic vibrations, for telephones, phonographs, musical instruments and other sound-emitting devices, but the invention is particularly shown as applied to musical instruments wherein sonorous bodies are vibrated.

Previous to my invention attempts have been made in this direction by the formation of multiple sound boards parallel with but spaced from each other. After considerable experiment with such sound boards, I discovered that by introducing a non-sonorous partition between each pair of sound boards, there was eliminated the interference with each other of the sound waves from the two facing surfaces of adjacent sound boards, and a marked increase in volume secured.

Referring to the drawings which form part of this specification, Figure 1 is a horizontal section of a sound board made in accordance with my invention. Fig. 2 is a central vertical section of the same. Fig. 3 is an elevation of a part thereof, the sound board illustrated being designed for use in connection with a musical instrument having sonorous bodies electromagnetically vibrated.

As shown in Figs. 1 and 2, the sound board comprises a suitable number, as four, of sound board units 1 each made very thin and provided with strengthening ribs 2 and bridges 3. In each inter-board space is located a partition 5 composed of preferably one-inch stock, and extending from near one lateral edge of one sound board to the opposite edge of the other sound board unit 1. The partitions do not contact with the sound board units at the edges, but a narrow separating strip 6 is introduced between.

For transmitting the sonorous vibrations from the source to the units 1, I prefer to run slender wooden rods or dowels 9 transversely through the same, as shown in Fig. 2. As a matter of convenience in manufacture, I do not run the rods in a continuous length from the front to the back of the structure, but break each up into separate sections, one extending from the front unit to the second, the next from the second to the third unit, and the last from the third to the fourth unit.

In order the easier to introduce these rods as the sound board is being built up, one end of each rod is made larger than the other, as by a head 10. Each end of these rods is rigidly fastened to a sound board unit 1 by being tightly driven into and glued in the same and in the bridge 3 secured to the unit. The holes 12 in the partitions through which the rods pass are made larger than the rods, both for the purpose of preventing the partitions from damping the vibrations being transmitted through the rods, and for permitting unequal shrinkage or warping of the partitions and sound-board units. As the sound-board is designed to reinforce sound-emitting vibrations, some means for producing such vibrations is of course required, and I have shown such means in one of many variable forms in Figs. 2 and 3. This type is selected for the reason that it is one well designed for musical instruments, for which the sound-board or reinforcing device is primarily intended.

The illustrated means is designed for the production of musical vibrations and comprises metal bars 13 rigidly held at their ends 14 and having their opposite ends pressed strongly against the outer bridges 11 through short struts 15. At the mid-length of each bar is an electromagnet 16 supported by the plate or frame members 17, and designed to receive electric impulses corresponding to the pitch to which the bar is tuned.

The vibrations imparted to these bars 13

by the electromagnets 16 are transmitted through the rods 9 to all the sound board units 1, and from the trumpet-like spaces 7 the vibrations issue both from right and left of the instrument in largely augmented volume.

I prefer to surround each rod 9 where it penetrates a partition 5, with a soft washer 19, as of felt or leather, fastened to the partition over the hole 12 thereat, for the purpose of keeping the vibrations from one unit 1 from passing through and interfering with the vibrations in a neighboring space 7.

Ribs 2 shown in Fig. 2 are fastened to the units for the purpose of strengthening the same and maintaining the slight curvature usually found desirable.

The above described rods, ribs and bridges are omitted in Fig. 1, for the sake of giving a better showing to the arrangement of sound board units and partitions.

For the form of musical instrument illustrated, this sonud board is made many times larger than shown, but for banjos and the like, and for phonographs, loud-speaking telephones and the like, it need not be much larger than shown in the drawings.

It is evident that the amplitude of vibration produced by electromagnetic means is quite limited, and the only other means for increasing loudness of musical tones consists in enlarging the area of the sound board. This also has its practical limitations. The only remaining recourse is therefore the multiplication of the sound boards, and the provision of means for simultaneously transmitting the vibrations to all of them and for permitting the unimpeded exit of the atmospheric vibrations, as accomplished by the improvements above set forth.

What I claim is:

1. In combination with means for producing sound-emitting vibrations, a resonant device comprising a plurality of parallel spaced sound-boards, and a plurality of partitions, each partition being between two adjacent sound boards, but not parallel therewith.

2. In combination with means for producing sound-emitting vibrations, a resonant device comprising a plurality of parallel spaced sound-boards, and a plurality of partitions, each partition being between two adjacent sound boards but out of parallel therewith, with one edge of the partition in close connection with an edge of one of the sound boards, and the other edge of the partition in close connection with an edge of the other souned board.

3. In combination with means for producing sound-emitting vibrations, a resonant device comprising a plurality of parallel spaced sound boards, and a plurality of partitions, each partition being between two adjacent sound boards and composed of a material less resonant than that of the sound boards.

4. In combination with means for producing sound-emitting vibrations, a resonant device comprising a plurality of parallel spaced sound boards, and a plurality of partitions, each partition being between two adjacent sound boards, with one of its edges in close connection with one sound board and the other edge in close connection with the other sound board, the partitions being of a less resonant material than the sound boards.

5. In combination with means for producing sound-emitting vibrations, a resonant device comprising a plurality of rectangular parallel spaced sound boards entirely inclosed on two opposite sides, and a plurality of partitions each located between two adjacent sound boards with one of its edges in close connection with one sound board and the other edge in close connection with the other sound board, said edges being at the non-inclosed sides of the resonant device, whereby there is a wedge-shaped space between each partition and a sound board, said spaces opening to alternately opposite sides of the resonant device.

6. A resonant device comprising a plurality of parallel spaced sound boards, means for imparting vibrations to one of the outermost sound boards, and rods extending from each sound-board to the next and directly connecting said sound boards, whereby vibrations imparted to said outermost sound board will be communicated to each of the others.

7. A resonant device comprising a plurality of parallel spaced sound boards, partitions each of which is located between two adjacent sound boards, means for imparting sonorous vibrations to one of the outermost sound boards, and rods sonorously connecting each sound-board with the next, each rod passing through a partition out of sonorous engagement therewith.

8. A resonant device comprising a plurality of spaced sound board units, partitions located between said units, means for imparting vibrations to one of the units, and rods passing through the partitions and connecting the units, the partitions having openings for the passage of the rods materially larger than the rods, and non-resonant washers surrounding the rods about said openings.

9. A resonant device comprising a plurality of spaced sound board units, partitions located between said units, means for

imparting vibrations to one of the units, and rods passing through the partitions and connecting the units, each rod terminating in adjacent units and having a head at one end.

10. In combination with means for producing sound-emitting vibrations, a resonant device in the form of a rectangular box open on two opposite sides, and having several sound-boards whose edges are coterminous with the sides of the box.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 10th day of December, 1914.

CHARLES CHUDZIKOWSKI.

Witnesses:

EDWARD S. CROCKETT,

A. B. UPHAM.