Feb. 11, 1930. H. A. SIMPSON 1,746,289

SPEAKER

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Fig. 1.

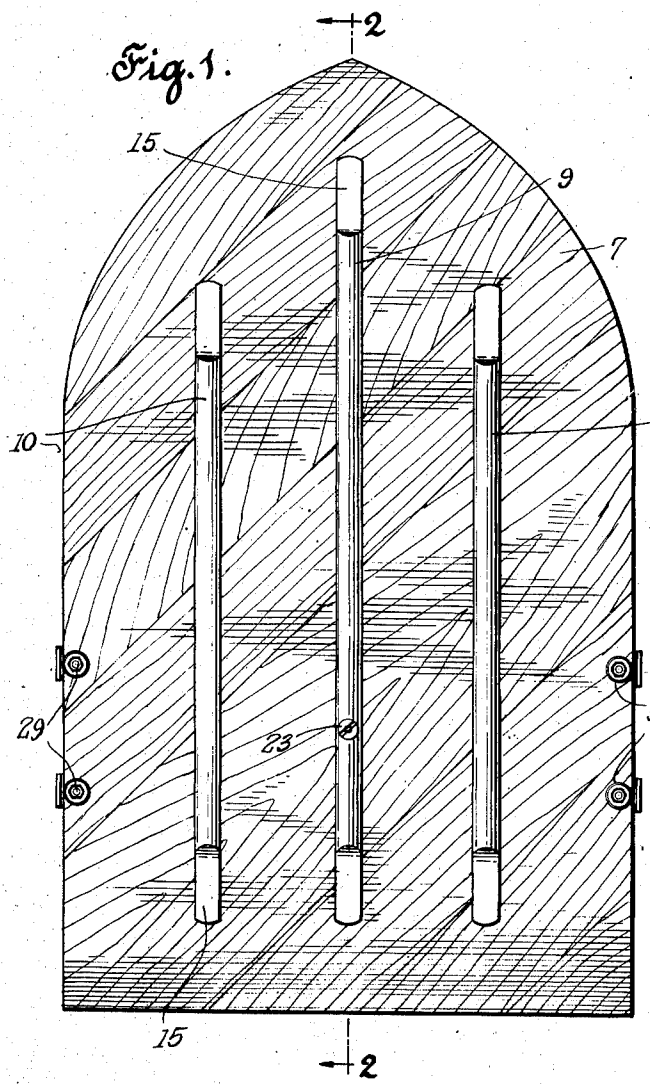


Fig. 2.

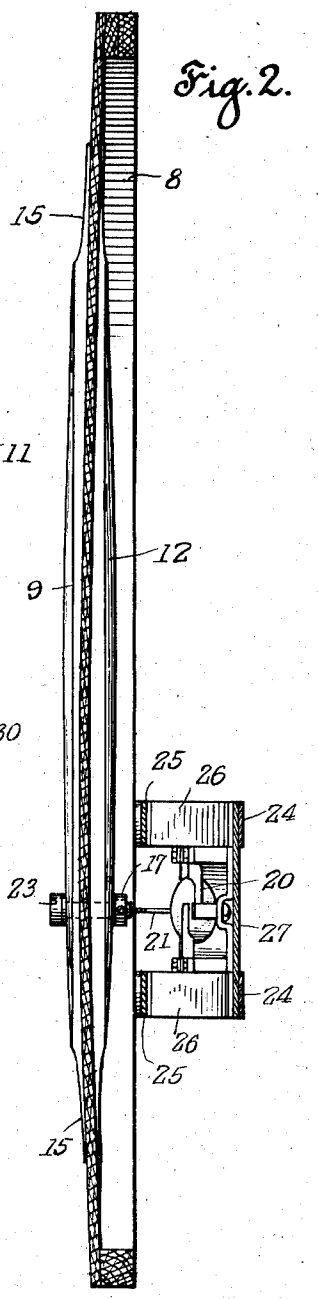
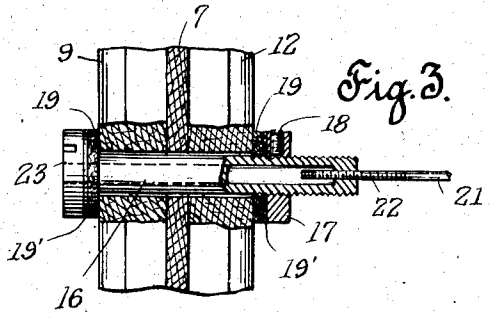


Fig. 3.



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Fig. 4.

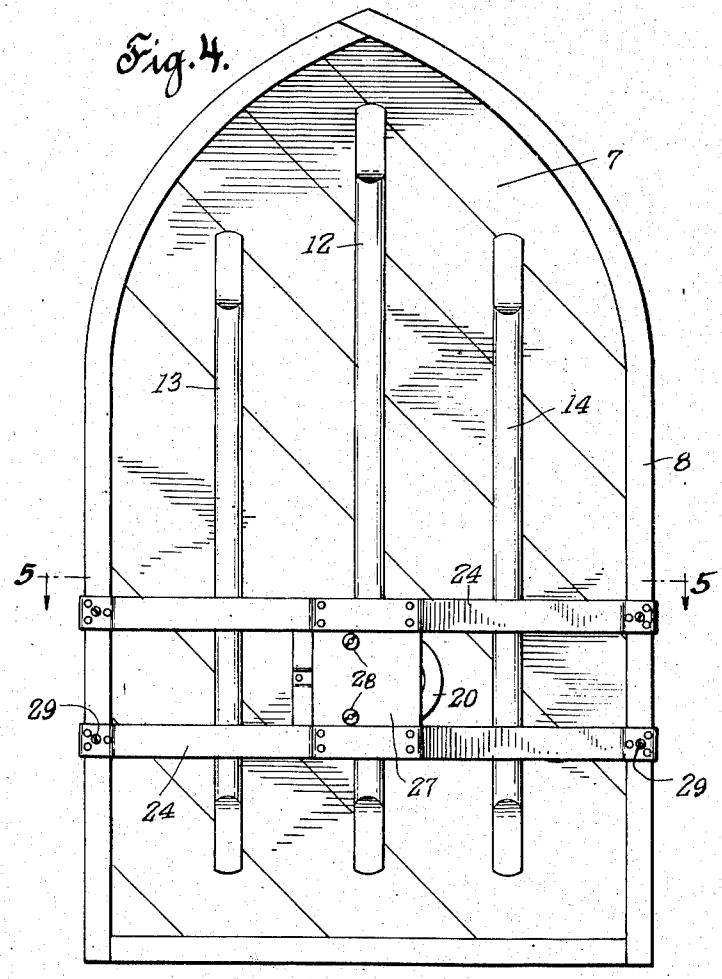


Fig. 6.

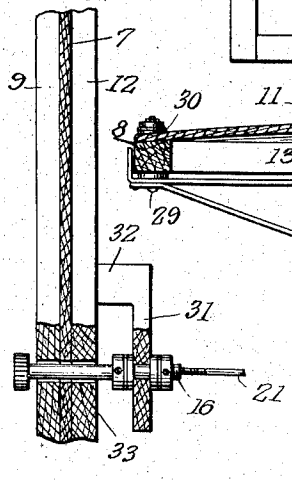
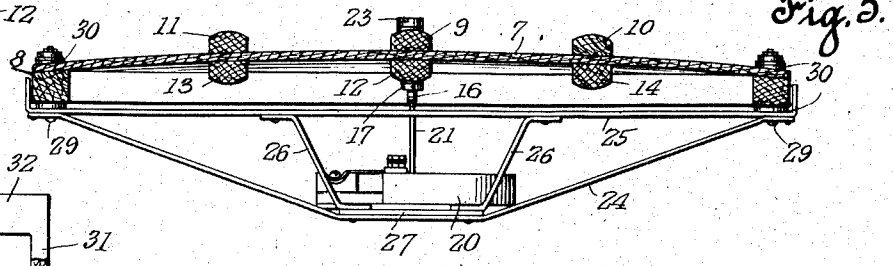


Fig. 5.



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UNITED STATES PATENT OFFICE

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SPEAKER

Application filed December 16, 1926. Serial No. 155,218.

This invention relates to what are generally known as loud speakers.

The objects of the invention are to improve the tonal qualities of this class of devices, to provide a speaker which will reproduce faithfully the tone values ranging from the lowest through the highest of the audible scale, which speaker will be artistic in appearance as well as in the musical sense, and furthermore, be of relatively simple, inexpensive design and structure.

The foregoing and other desirable objects are attained in part by the provision of a novel form of sounding board constructed after the manner of a piano sounding board and actuated by a telephonic unit connected with the board at a special point.

The invention comprises a number of other novel features, combination and relation of parts as will be clear from the following specification.

The drawings accompanying and forming part of this specification illustrate one practical embodiment of the invention. It should be understood, however, that the structure may be modified and changed in certain respects without departure from the broad spirit and scope of the invention as hereinafter defined and claimed.

Figure 1 is a front or face view of the complete speaker.

Figure 2 is an enlarged vertical sectional view of the same as on substantially the plane of line 2—2 of Figure 1.

Figure 3 is a further enlarged broken sectional detail of the connection between the actuating unit and the diaphragm or sounding board.

Figure 4 is a rear view of the speaker.

Figure 5 is an enlarged horizontal sectional view as on the plane of line 5—5 of Figure 4. Figure 6 is a detail illustrating a form of resilient connection with the board.

The sound wave creating member is herein disclosed as a wooden sounding board 7, widest at the bottom and tapered to a point at the top, in the general shape of a "Gothic arch". This board is shown as made up of diagonally laid thin strips of spruce or the like secured in integrally united edge to edge relation on a correspondingly shaped frame 8. These strips may be of the same or of different widths but some advantages follow from the use of wider strips at the lower end and central portion of the board and narrower strips toward the top of the board, as indicated in the illustrations.

In making up the board the strips are secured under compression and the board in its final form is held by the frame under a certain amount of compression, rendering it "alive" or particularly sensitive to vibrational forces. The shape of the board, widest at the base, and narrowing toward the top imparts to it the desired tonal characteristics, the lower portion bringing out the bass notes and the intermediate and upper portions bringing out the treble or high notes. This compressive force has a tendency to buckle the board outwardly, as indicated clearly in Figures 2 and 5.

The board is braced and further unified in the illustration by two systems of ribs, a central long rib 9 and two shorter side ribs 10, 11 on the face thereof and corresponding central and side ribs 12, 13, 14 on the back and immediately opposite the first set. These ribs may be secured by gluing or otherwise and they are shown shaped in the manner of trusses, tapered toward their opposite ends and as having materially reduced flattened or thin end portions 15 forming in effect flexible tongues. These ribs, it will be noted, terminate an appreciable distance inward from the frame and the flexible tips are of appreciable length. The length and spacing of these ribs, it will be noted in Figures 1 and 4, is such as to define a braced central portion of the board of substantially the same outline as the complete board and spaced inwardly an equal distance from all edges of the board. The length of the ribs determines the natural tone of the board and the board is preferably "tuned" in this fashion to "C natural" in the intermediate scale, as when so tuned it reproduces faithfully the notes running from the lower up through the higher ranges.

The electric telephone unit for actuating the board is shown as connected with the in-

termediate diaphragm portion outlined or defined by the ribs and at a point equal distances inward from the sides and the lower end of the same. This connection is shown as made by a headed screw stud 16 extending through the two central ribs 9, 12 and held clamped to the board by a nut 17 which can be fixed in adjusted relation by set screw 18. Beneath the head of the stud and the nut 17, cork washers 19 are interposed to prevent any localized vibrations and thin fibre washers 19' prevent abrasion.

The stud is shown as connected with the actuating unit 20 by an impulse transmitting rod 21 and in order that the relation of the board and unit may be readily adjusted this rod is shown as having a fine screw thread 22 entered in the end of the stud and the head of the stud is shown as slotted at 23 so that the same may be readily turned with a screw driver to bring the board and unit into proper relative position.

The unit is suitably mounted to actuate the board. In the present instance it is shown as carried by a bridge attached at its ends to the sides of the frame. In Figures 4 and 5 this bridge is shown as made up of arched strips 24 overlying and connected with the tension strips 25 by inclined struts 26. Attached to the arches beneath the struts 26 is a supporting plate 27 to which the operating unit is secured by screw means 28. This construction provides a light but rigid bridge. This bridge is shown secured to the frame by through screws 29. Washers 30 of rubber or other suitable material are shown provided at the opposite ends of these securing screws.

The bridge for supporting the unit may be of cast metal or may be of wood. In the latter case the same may be secured rigidly to the frame without the interposition of any insulating washers.

The actuating unit may be supported separate and apart from the board and its frame, for example, by means of a cabinet or enclosing structure, when the board is mounted in a cabinet. The cabinet may be constructed as a sound chamber for the board and the board be fixedly mounted in the cabinet. The connection of the unit with the board at a central point approximately one-third the height of the board appears to utilize the full properties of the board to the best effect. The bass tones may be increased by thinning the ends of the ribs more and this, with the regulation of the length and number of the ribs provide a method of control for securing different desired effects.

The use of the cork washers at the point of connection with the board enables the board to be properly gripped without choking off the sound values. These washers interpose a certain degree of resiliency and this resiliency may be further increased by employing a construction such as illustrated in Figure 6 where the connection with the board is made through the agency of a somewhat flexible tongue 31 secured in spaced relation to the back of the main rib by a block 32, this tongue being gripped between the cork washers as before and the shank of the stud 16 projecting freely through a bore 33 provided clear through the board and ribs. .

What is claimed is:

1. A speaker comprising a wooden board under compression and having the general shape outlined by a Gothic arch and an actuating unit connected with the median portion of the board at a point substantially one-third the distance from the base to the peak of the arch.

2. A speaker comprising a wooden board under compression and having the general shape outlined by a Gothic arch and an actuating unit connected with the median portion of the board at a point substantially one-third the distance from the base to the peak of the arch, said board having a central rib and the connection for the unit being made with said rib.

3. A speaker comprising a wooden board under compression and having the general shape outlined by a Gothic arch, an actuating unit connected with the median portion of the board a a point substantially one-third the distance from the base to the peak of the arch, said board having a central rib and the connection for the unit being made with said rib, a frame for the board and a bridge across said frame and forming a mounting for the actuating unit.

4. A speaker comprising a wooden board under compression and having the general shape outlined by a Gothic arch, an actuating unit connected with the median portion of the board at a point substantially one-third the distance from the base to the peak of the arch and resilient means interposed at the connection between the unit and board.

5. A speaker comprising a wooden board under compression and having the general shape outlined by a Gothic arch, an actuating unit connected with the median portion of the board at a point substantially one-third the distance from the base to the peak of the arch and a resilient tongue interposed at the connection between the unit and board, said tongue being secured in spaced relation to the board.

6. A speaker comprising a thin wooden board under compression tapering in width toward one end and having a reinforcing rib of less than the full length of the board and a telephonic unit connected with said board.

7. A speaker comprising a thin wooden board under compression tapering in width toward one end and having a reinforcing rib of less than the full length of the board and a telephonic unit connected with said board through the agency of said rib.

8. A speaker comprising a thin wooden board under compression tapering in width toward one end and having a reinforcing rib of less than the full length of the board, a telephonic unit connected with said board and a resilient element interposed at the connection between the unit and the board.

9. A speaker comprising a thin wooden board under compression tapering in width toward one end and having a reinforcing rib of less than the full length of the board, a telephonic unit connected with said board and a resilient cork-like medium interposed at the connection between the unit and board.

10. A speaker comprising a thin wooden board under compression tapering in width toward one end and having a reinforcing rib of less than the full length of the board and a telephonic unit connected with said board, the connection between board and unit including screw means adjustable to vary the relation between the two, said screw means having a rotatably cushioned mounting on the board.

11. A speaker comprising a frame, a wooden board supported by said frame, a bridge secured to the frame and extending across the board and a telephonic unit mounted on said bridge and having a variable connection with an intermediate portion of the board.

12. A speaker comprising a board, a telephonic unit having an actuating rod with a fine screw thread, a stud having a screw seat for said screw threaded rod and means for adjustably clamping said stud to the board, including resilient cork-like washers interposed between the board and opposite end portions of the stud.

13. A speaker comprising a board, a screw stud extending through said board with a head at one side of the board, a nut on the screw stud at the opposite side of the board, cork-like washers beneath said nut and the head of the stud, a telephonic unit having an actuating rod and a fine pitch screw connection between the stud and said rod.

14. A speaker comprising a board, a screw stud extending through said board with a head at one side of the board, a nut on the screw stud at the opposite side of the board, cork-like washers beneath said nut and the head of the stud, a telephonic unit having an actuating rod and a fine pitch screw connection between the stud and said rod, said stud being rotatable in the board to adjust the connection with the rod and friction reducing washers between the head of the stud and the cork-like washer at one side of the board and between the nut and the cork-like washer at the other side of the board.

15. A speaker comprising a relatively rigid supporting frame, a flexible sounding board carried by said frame, a bridge carried by and extending across said frame and a telephonic speaker unit having a variable connection with an intermediate portion of said sounding board.

16. A speaker comprising a relatively rigid supporting frame, a flexible sounding board carried by said frame, a bridge carried by and extending across said frame and a telephonic speaker unit having a variable connection with an intermediate portion of said sounding board, said sounding board being applied over and secured to one face of the frame and the bridge being applied over and secured to the opposite face of the frame.

17. A speaker comprising a thin flexible wooden board, a bridge construction extending in spaced relation across the face of said board, a telephonic speaker unit mounted on said bridge and a variable operating connection from said speaker unit to an intermediate portion of said board and including a driving rod connected with the board so as to positively vibrate the same.

In witness whereof, I have hereunto set my hand this 29th day of November, 1926.

HOBART A. SIMPSON.