A. S. KESZTHELYI & F. HOUSE.

SOUND BOX.

APPLICATION FILED SEPT. 22, 1913. RENEWED JUNE 2, 1915.

1,166,602. Patented Jan. 4, 1916.

Fig. 1.

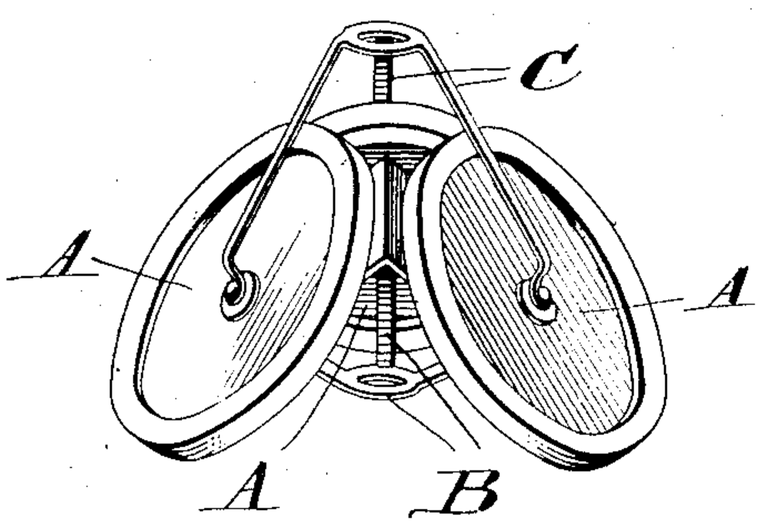


Fig. 2.

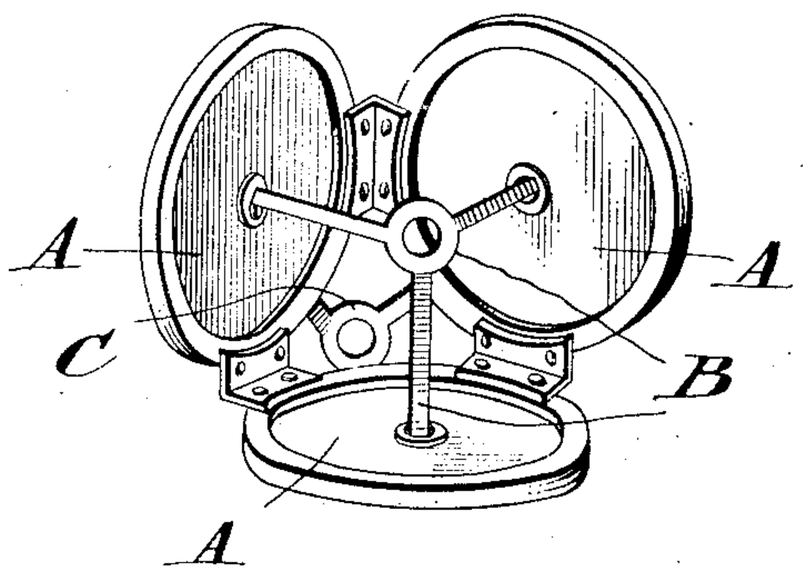
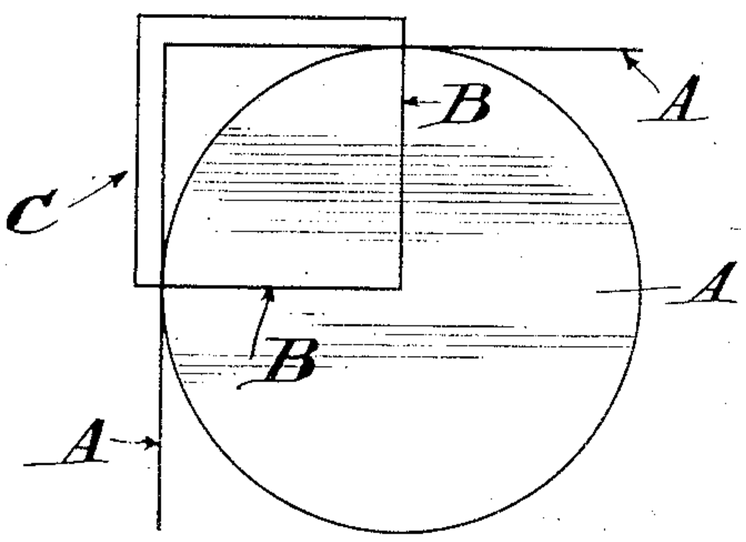


Fig. 3.



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SOUND-BOX.

1,166,602. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed September 22, 1913, Serial No. 791,260. Renewed June 2, 1915. Serial No. 31,661.

To all whom it may concern:

Be it known that we, ALEXANDER S. KESZTHELYI, a citizen of Hungary, and FRANK HOUSE, a citizen of the United States, both residing in Los Angeles, in the county of Los Angeles and State of California, have jointly invented new and useful Improvements in Sound-Boxes, of which the following is a specification.

This invention relates to improvements in sound boxes utilized in recording and reproducing sounds or sound vibrations, such sound boxes being employed in standard practice in telephony and phonography. In such sound boxes as heretofore customarily constructed a single diaphragm or vibratory member has been employed to receive sound vibrations prior to the recordation thereof, and to reproduce sound vibrations under the action of a suitable mechanism. Such single diphragm operates vibratorily, principally on a line or in a path of vibration at right angles to its surface. We have determined by experimentation that the true sound wave form comprises motions propagating in all directions, rectangularly related, in fact in the three dimensions of space. In other words, such sound waves are propagated by vibrations in a path at any angle to the surface of the vibrating member, and also in other paths at angles each to the others and parallel with and at angles to the surface of the vibratory member or diaphragm. This propagation of vibration in paths other than a directly radial or rectilinear one, has been established with respect to other forces or manifestations of energy, such as magnetism and light, in which propagation transversely to a rectilinear path has been found to occur. With respect to the propagation of sound waves, our contentions as above stated are supported not only by the results which we have obtained in consonance with such theory, but by many authorities, such as Daniell on Physics with particular reference to pages 433 and 448.

Having determined that sound waves comprise the three directions of motion above pointed out, we determined to reorganize sound boxes so that the structures thereof might agree in performance with the theory stated. To that end, we have produced a sound box comprising three, or a multiple of three diaphragms, membranes or vibratory members, all set in equal angular relation each to the other, and preferably or approximately in rectangular relation each to the other, whereby such compound and complex motion comprised in the sound wave activity may be sensitively and accurately utilized for a clearer and more full recordation or reproduction of sound combined with better quality thereof. Such plurality or battery of vibratory members, constitutes a working unit, all of the vibratory members being positively or rigidly connected together for rigid connection to a common stylus, carbon button or other electrical or electro-magnetic element, or the like, for joint action and service in recordation and reproduction of sound. In its broad aspects, the invention is not concerned in the character and relative arrangement and construction of the means of receiving from or transmitting to the vibratory members the motion incident to recording or reproducing sound. We have devised certain elements of this nature particularly adapted for the practice of our invention, but the same do not enter into the broad invention under present treatment. The several vibratory members are rigidly held in a suitable sound box frame, in the angular relations set forth. And because of the utilization of all the three angularly related motions of a true wave form, we are enabled, as above stated, to truly record and truly reproduce sounds without the many defects, distortions and blurs incident to use of sound boxes as customarily produced. It will be manifest that many kinds and qualities of vibratory members may be employed, and many kinds and qualities of connections between the same, both mechanical and electrical, may be employed, within the broad scope of the invention, which contemplates the provision of a plurality of jointly operating or inter-related vibratory members attuned or responsive respectively to the component motions or phases of motion of sound waves.

In another application filed later by Alexander S. Keszthelyi, of us, certain modifications, elaborations and pertinent features

are disclosed and claimed, such application being for sound-boxes, filed February 24, 1914, Serial Number 820,580.

With respect to the connections between or among the several vibratory members and the motion receiving or imparting elements operating the same or operated by the same, in reproduction and recordation, it is at times found preferable, such as when using magnetic motion translators or producers, to use non-magnetic material for such connections.

In the drawing, in which we have illustrated without attention to immaterial detail, and also diagrammatically, the embodiment of our invention in certain primitive although operative forms, Figure 1 is a perspective view of certain sound box features embodying the invention; Fig. 2 is an angularly different view of Fig. 1; and Fig. 3 is a diagrammatic view, illustrating the interrelation of features or elements shown in Figs. 1 and 2.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawing, A in each instance designates a diaphragm, B designates rigid or positive connections between or among the several diaphragms or vibratory members, and C. designates a further rigid or positive connection of the same kind, such connections being respectively with opposite faces of the diaphragms and being adapted for rigid or positive connection with a common stylus, electrical or electromagnetic element, or the like. It will be understood that the number of these connections will be dependent upon the service to which the sound box is subjected, both being used for instance when a number of the groups of diaphragms are combined.

In the drawings, specifically, we have shown the diaphragms as mounted in rigid frames rigidly connected together, the connections B. and C. springing from the central portions of the diaphragms at right angles thereto. The members A. are of the same construction and operative extent, and have equal freedom of motion. It will be noted that the three diaphragms in Fig. 1 are rectangularly related each to the other, as are the three diaphragms in Fig. 2, in order that all the directions of motion of the sound waves may be accurately utilized, as above set forth, in recording and reproducing sound. It will of course be understood that slight or even material variations from this strict rectangular relation between the vibratory members will result in better sound recordation and reproduction than in the use of sound boxes having a single diaphragm. Therefore, within the scope of our invention, in addition to a wide range of equivalent and substitute features and parts, it is to be understood that the provision of the plurality of diaphragms or vibratory members in equal angular relation each to the other, irrespective of the specific nature of such angular relation, is to be included.

Having thus disclosed our invention, we claim and desire to secure by Letters Patent:

1. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and positive means of connection between said vibratory members.

2. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and positive means of connection between said vibratory members; said means of connection being adapted for the accommodation of a motion producing or translating element.

3. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and means of rigid connection among the members.

4. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and means of positive connection among the members, all of said vibratory members being similarly constructed and having equal freedom of motion.

5. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and rigid connections between said vibratory members rectangularly springing from the central portions thereof.

6. In a recording or reproducing sound box, three vibratory members in equal angular relation each to the others, and rigid connections between said vibratory members at the central portions thereof; and means holding said vibratory members rigidly together at their marginal portions.

7. In a recording or reproducing sound box, three vibratory members mounted each at right angles to the other two and positive means of connection between the members.

8. In a recording or reproducing sound box, three vibratory members mounted in equal rectangular relation each to the other two, and means of rigid connection among the members.

9. In a recording or reproducing sound box, three vibratory members mounted at their marginal portions in rectangular relation each to the other two, and means of positive connection among the members; all of said members having equal freedom of motion.

10. In a recording or reproducing sound box, three vibratory members rectangularly mounted each to the other two, and a posi-

tive connection from each vibratory member to accommodate a motion producing or translating element.

11. In a recording or reproducing sound box, three vibratory members rigidly mounted at their marginal portions each at right angles to the other two and rigid connections from each vibratory member springing at right angles from the central portions thereof.

12. In a recording or reproducing sound box, three vibratory members mounted with their marginal portions in rectangular relation each to the other two and a positive connection among the vibratory members, and means for holding said vibratory members rigidly together at their peripheries.

13. In a recording or reproducing sound box, three vibratory members rigidly mounted and connected each at right angles to the other two, to accommodate a connection to a source of motion, to build a correctly formed sound wave.

14. In a recording or reproducing sound box, three vibratory members rigidly mounted and connected each at right angles to the other two, and means to accommodate a source of motion for the building of a true wave form.

15. In a recording or reproducing sound box, three vibratory members rigidly mounted and fastened at their marginal portions in planes at right angles each to the other two, and a connection from each vibratory member to accommodate a source of motion.

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