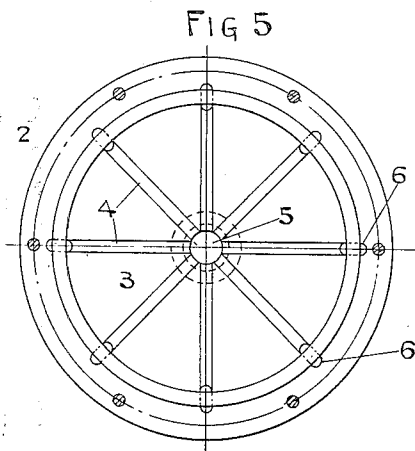
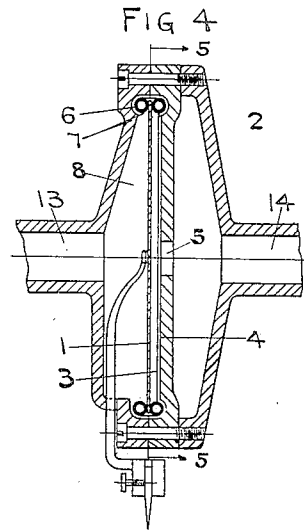
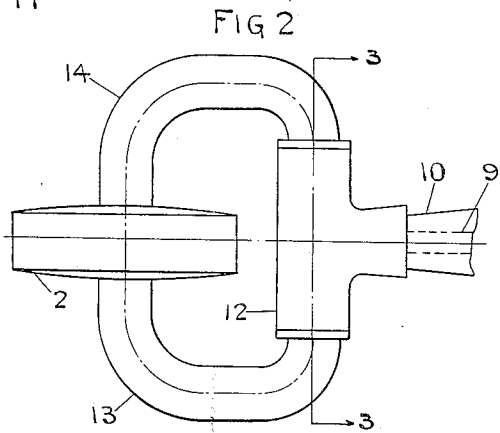
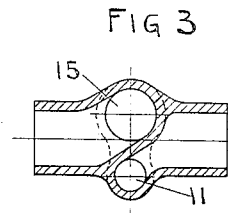
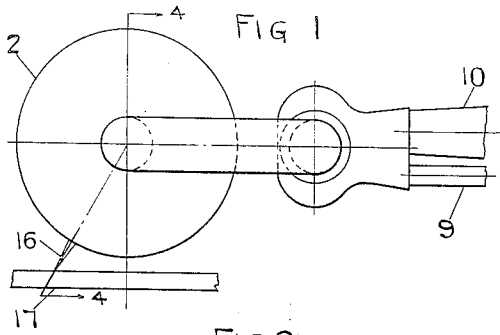


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SOUND REPRODUCING MACHINE.
APPLICATION FILED MAR. 18, 1909.

965,329.

Patented July 26, 1910.



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SOUND-REPRODUCING MACHINE.

965,329.

Specification of Letters Patent. Patented July 26, 1910.

Application filed March 18, 1909. Serial No. 434,267.

To all whom it may concern:

Be it known that I, SYDNEY I. PRESCOTT, a citizen of the United States, residing at Camden, county of Camden, in the State of New Jersey, have invented a new and useful Sound-Reproducing Machine, of which the following is a specification.

This invention relates to improvements in sound reproducing machines.

Heretofore, there have been in use two distinct types of sound reproducing machines, both of which utilized a record of sound vibrations. In one type, the stylus operating in connection with the record vibrated a diaphragm which set up corresponding sound impulses. In the other type, the stylus operated a valve which controlled a flow of air under pressure, the sound impulses being generated in this case by the interruption of the flow of the air. In the diaphragm type of machine, the impulses were produced by compressing the air between the diaphragm and a compression surface in close proximity thereto, the impulses escaping through an outlet port in the compression surface. When the diaphragm was moved toward the compression surface, the air in the space between the two was slightly compressed and this resulted in a slight flow of air through the outlet port. When the diaphragm moved in the opposite direction; that is to say, away from the compression surface, the tendency was to create a partial vacuum between the diaphragm and the compression surface, and draw back into this space the air which had just been forced out. Thus was produced an area of rarefaction following the area of compression. In view of the fact that the diaphragm exerted a force during the rarefaction period equal to the force exerted during the compression period, what was done during the compression period was partially undone during the rarefying period. The result was the partial obliteration of the sharp line of demarcation between the successive areas of compression and rarefaction. The absence of a sharp line of demarcation between the area of compression and the area of rarefaction which together form what is commonly known as an air vibration, results in a sound which is more indistinct than it should be, and the higher the pitch and the greater the volume of the sound, the greater

is the loss. What is known as "blasting" of the tone is partially due to the action above referred to.

It is one of the objects of this invention to provide means whereby the sharp line of demarcation between the successive areas of compression and rarefaction shall not be affected by the means employed for imparting sound impulses.

A further object of the invention is to provide means for conducting a continuous flow of air to the impulse or compression surface, so that there will be no tendency of the impulse imparting means to retard the propagation of the successive areas of compression and rarefaction.

Another object of the invention is to provide means for conducting a continuous flow of air to and across the compression surface in a plurality of streams so that there will be no uneven action while sound impulses are imparted to the air covering the compression surface.

With these and other objects, not specifically mentioned, in view, the invention consists in certain constructions and combinations which will hereinafter be fully described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a side elevation of a device constructed in accordance with the invention; Fig. 2 is a plan view of the structure illustrated in Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a section on the line 4—4 of Fig. 1; and Fig. 5 is a detailed view.

In sound reproducing machines when sound impulses are imparted to the air, it is desirable that the line of demarcation between the successive areas of compression and rarefaction be kept sharply defined, particularly when notes of high pitch or great volume are reproduced, for unless this is done there is danger of the note being blasted. In carrying the present invention into effect, therefore, means are provided for maintaining the sharp line of demarcation between the successive areas of compression and rarefaction, before diffusion in the atmosphere, and this means may vary within wide limits. While in some constructions

other means may be employed for this purpose, in the best constructions the desired result will be effected by conducting a continuous flow of air to the means for imparting sound impulses, so that there will be no tendency of the sound imparting means to partially obliterate the sharp line of demarcation above referred to, by a reflex action.

While other means for imparting sound impulses may, in some constructions, be used, in the best constructions this means will include a diaphragm and a cooperating compression surface, both of which may vary within wide limits. When a compression surface is used, a continuous flow of air will be conducted to and across it, preferably in a plurality of streams converging radially toward a common center, so that the impulse imparted to the air covering the compression surface will be conducted evenly to the common center. As shown, there is provided a diaphragm 1 mounted, in a manner well known in the art, in a sound box 2. In close proximity to the diaphragm 1 is a compression surface 3. The compression surface 3 is provided with a series of radial channels 4 crossing its face, these channels forming means for conducting a continuous flow of air to and across the surface. In the device selected to illustrate the invention, the compression surface is flat and circular, although it will be readily understood that other forms may, in some constructions, be used. The compression surface is provided with an outlet port 5 which is, or may be, centrally located, and the channels 4, before referred to, are in communication with this outlet port. When the diaphragm moves toward the compression surface, the impulse set up escapes through the outlet port 5 in the same manner as it does in many sound boxes well known in the art; that is to say, the air compressed between the diaphragm and the compression surface moves outwardly through the outlet port 5. When the diaphragm moves away from the compression surface, a larger space is formed between it and the compression surface, and this space must be filled with air. Air is conducted through the channels 4, before referred to, to take the place of the air expelled through the outlet port 5, so that there is no reflex action or partial obliteration of the sharp line of demarcation between an area of compression which has just passed through the outlet port 5 and the following area of rarefaction. In order to supply a continuous flow of air to the channels 4, there is provided a series of by-passes 6, one for each channel, around the gaskets 7 and edge of the diaphragm 1, and in communication with a chamber 8 within which the diaphragm is mounted. These by-passes provide means for conducting a continuous flow of air from the opposite side

of the diaphragm to the compression surface. It will be readily understood that since the distance from the diaphragm to the base of the channels 4 is very much greater than the distance from the diaphragm to the impulse field or compression surface, that there will be no interruption to the continuous flow of the air through the channels for there will be little or no compression of the air within the channels. The impulse set up between the diaphragm and compression surface will, however, be imparted to the air within the channels.

The continuously flowing air may be obtained from any suitable source of supply. In the device selected to illustrate the invention, the air will come from a suitable source of supply, not shown, through a pipe 9 mounted on the under side of a sound conducting tube 10 forming a part of the reproducing apparatus, and the construction of which is well known in the art. The air pipe 9 is in communication with a channel 11 formed in a T-coupling 12 on the end of the sound conducting tube 10. The channel 11 is in turn in communication with a bent tube 13 one end of which is connected with the sound box 2, its interior being in communication with the chamber 8. The outlet port 5, before referred to, is in communication with a bent tube 14, one end of which is in communication with a channel 15 formed in the T-coupling 12 and which discharges into the interior of the sound conducting arm 10. A more detailed description of this part of the device is deemed unnecessary to an understanding of the invention and is, therefore, omitted in the interest of brevity and clearness. The diaphragm 1 is connected in the usual manner with a stylus 16 which operates in conjunction with a record disk 17. A detailed description of the connections between the diaphragm 1 and the stylus 16, and of the record 17 and its operating mechanism, not being necessary to an understanding of the present invention, is omitted in the interest of brevity and clearness.

In view of the foregoing, a detailed description of the operation of the device is considered unnecessary.

Changes and variations may be made in the structure by which the invention is carried into effect. The invention, therefore, is not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. In a sound reproducing machine, the combination with a compression-surface, of means for conducting a continuous flow of air to and across said surface in a plurality of streams, substantially as described.

2. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of

air to and across said surface in a plurality of converging streams substantially as described.

surface in plurality of streams, and a diaphragm for imparting sound impulses to the air covering the compression surface, substantially as described.

3. In a sound reproducing machine, the combination with a circular compression surface, of means for conducting a continuous flow of air to and radially across said surface in a plurality of streams, substantially as described.

12. In a sound reproducing machine, the combination with a circular compression surface having a plurality of radial channels, of means for conducting a continuous flow of air to and through said channels, and a diaphragm for imparting sound impulses to the air covering the compression surface, substantially as described.

4. In a sound reproducing machine, the combination with a circular compression surface having a plurality of radial channels, of means for conducting a continuous flow of air to and through said channels, substantially as described.

13. In a sound reproducing machine, the combination with a chamber, of a diaphragm within the chamber, a compression surface on one side of the diaphragm, and means for conducting a continuous flow of air from the opposite side of the diaphragm to the compression surface, substantially as described.

5. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to and across said surface in a plurality of streams, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

14. In a sound reproducing machine, the combination with a chamber, of a diaphragm within the chamber, a compression surface on one side of the diaphragm, and means for conducting a continuous flow of air in a plurality of streams from the opposite side of the diaphragm to the compression surface, substantially as described.

6. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to and across said surface in a plurality of converging streams, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

15. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to the surface, a diaphragm for imparting sound impulses to the air covering the compression surface, the compression surface being provided with an outlet port for the sound, substantially as described.

7. In a sound reproducing machine, the combination with a circular compression surface, of means for conducting a continuous flow of air to and radially across said surface in a plurality of streams, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

16. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to the surface, a diaphragm for imparting sound impulses to the air covering the compression surface, the compression surface being provided with a centrally located outlet port for the sound, substantially as described.

8. In a sound reproducing machine, the combination with a circular compression surface having a plurality of radial channels, of means for conducting a continuous flow of air to and through said channels, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

17. In a sound reproducing machine, the combination with a compression surface having an outlet port for the sound, of means for conducting a continuous flow of air to and across the compression surface to the port, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

9. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to and across said surface in a plurality of streams, and a diaphragm for imparting sound impulses to the air covering the compression surface, substantially as described.

18. In a sound reproducing machine, the combination with a compression surface having a centrally located outlet port for the sound, of means for conducting a continuous flow of air to and across the compression surface to the port, and means for imparting sound impulses to the air covering the compression surface, substantially as described.

10. In a sound reproducing machine, the combination with a compression surface, of means for conducting a continuous flow of air to and across said surface in a plurality of converging streams, and a diaphragm for imparting sound impulses to the air covering the compression surface, substantially as described.

19. In a sound reproducing machine, the combination with a compression surface having an outlet port for the sound, of

11. In a sound reproducing machine, the combination with a circular compression surface, of means for conducting a continuous flow of air to and radially across said

means for conducting a continuous flow of air to and across the compression surface to the port, and a diaphragm imparting sound impulses to the air covering the compression surface, substantially as described.

20. In a sound reproducing machine, the combination with a compression surface having a centrally located outlet port for the sound, of means for conducting a continuous flow of air to and across the compression surface to the port, and a diaphragm imparting sound impulses to the air covering the compression surface, substantially as described.

21. In a sound reproducing machine, the combination with a chamber, of a diaphragm within the chamber, a compression surface on one side of the diaphragm, and a bypass for conducting a continuous flow of air from the opposite side of the diaphragm to the compression surface, substantially as described.

22. In a sound reproducing machine, the combination with a chamber, of a diaphragm

within the chamber, a compression surface on one side of the diaphragm, and a plurality of by-passes for conducting a continuous flow of air in a plurality of streams from the opposite side of the diaphragm to the compression surface, substantially as described.

23. In a sound reproducing machine, the combination with a chamber, of a diaphragm within the chamber, a compression surface on one side of the diaphragm and having a plurality of radial channels, and a plurality of by-passes for conducting a continuous flow of air in a plurality of streams from the opposite side of the diaphragm to the channels in the compression surface, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

SYDNEY I. PRESCOTT.

Witnesses:

FRANK B. MIDDLETON, Jr.,
ETHEL M. WHITEHEAD.