

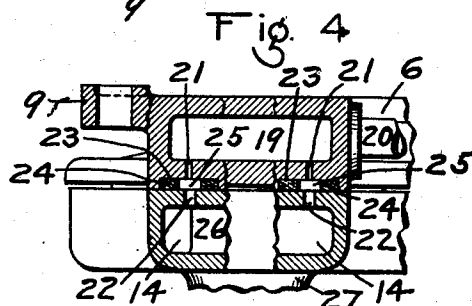
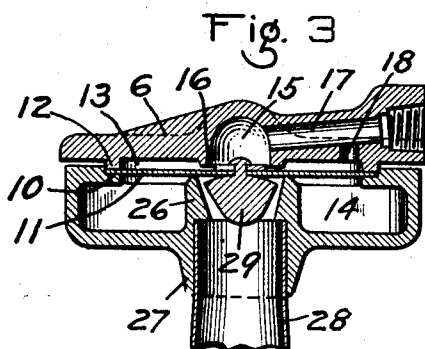
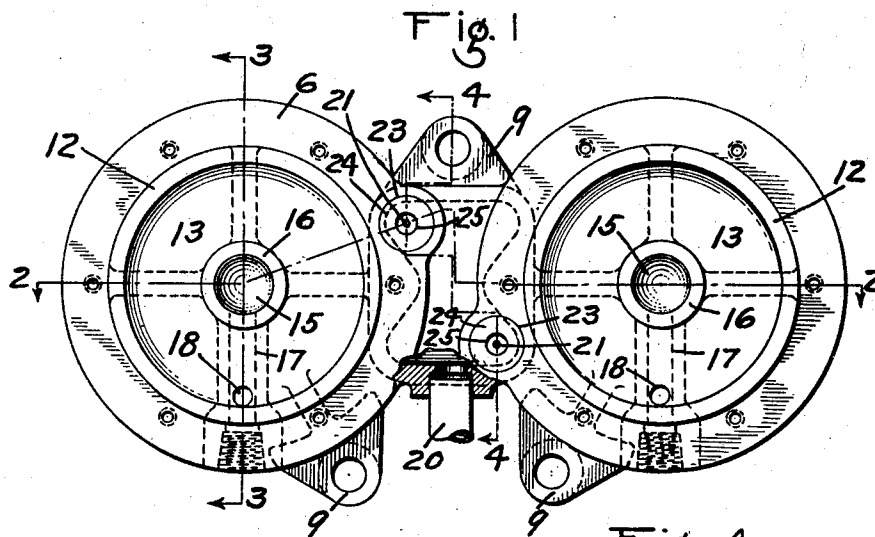
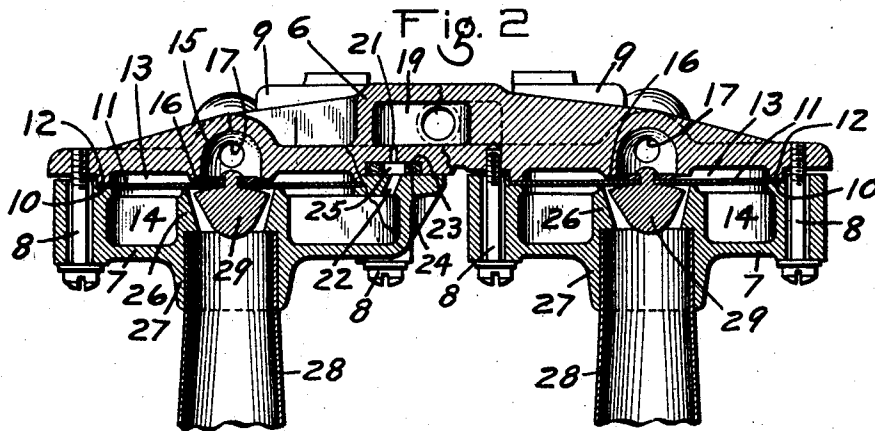
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PNEUMATIC HORN

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PNEUMATIC HORN

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This invention relates to sound producing devices, and more particularly to the type employing a vibratory diaphragm.

An object of the invention is to provide an improved fluid pressure operated sound producing device of the above type, in which a plurality of sound producing elements are mounted in parallel on a single base to which the fluid supply conduit is connected for simultaneously operating the sound producing elements.

Another object of the invention is to provide a sound producing device having a chamber adapted to be supplied with fluid under pressure for causing a flexible sound producing member to vibrate, in which means are provided for limiting the vibration of the flexible member in both directions.

Another object of the invention is to provide a sound producing device having a fluid pressure operated diaphragm which is normally seated against a sound tube, in which means are provided for limiting the movement of the diaphragm away from the tube.

Another object of the invention is to provide an improved sound producing device of the character mentioned which is simple in construction, and reliable and exact in function under all conditions of service.

The invention also comprises certain new and useful improvements in the construction, arrangement and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

In the accompanying drawing: Figure 1 is a plan of the base of a sound producing device embodying the invention; Fig. 2 is a section taken on the line 2—2 of Fig. 1 showing the completely assembled device; Fig. 3 is a section taken on the line 3—3 of Fig. 1, and Fig. 4 is a section taken on the line 4—4 of Fig. 1.

It has heretofore been proposed to provide fluid pressure operated sound producing devices in which a diaphragm is caused to vibrate against the end of a sound element in such a manner as to produce the sound desired. It has also been proposed to group a

plurality of independent sound producing devices so that a single source of fluid supply can be utilized for operating the same.

By the present invention, a single base member is provided so that the fluid is supplied from a chamber in the base to a plurality of sound producing elements, to simultaneously operate the same. The sound producing elements may be mounted on one face of the base in such a manner that their horns will project the several sounds in the same general direction. If so desired, the individual sound producing devices which are mounted on the single base member, may be so constructed that each will produce a different tone. These multiple tones may thus be blended to produce a sound having the desired pitch.

Referring to the drawings, the device may comprise a base 6 adapted to receive two or more casings 7 which are clamped to the base by screws 8. For the purpose of readily and conveniently securing the device in operative position, the base is provided with a plurality of perforated ears 9.

Each casing 7 may comprise an annular body, the rim of the peripheral side wall of which is formed with an internal recessed portion to provide a seat 10 for receiving the marginal edge of a diaphragm 11 which is clamped against an annular rib or bead 12 formed on the base 6.

The portion of the base 6 within the rib 12 is depressed to provide a shallow chamber 13, while within each casing 7 there is a chamber 14. The chambers 13 and 14 are separated by the diaphragm 11.

Concentrically of each of the chambers 13, the base 6 is formed with a cavity 15 which is separated from each chamber 13 by an annular rib or bead 16. The rib 16 is constructed of less height than the rib 12 so that the adjacent face of the diaphragm 11 will be spaced therefrom, as shown in Fig. 2, when the device is inactive. On the other hand, when the device is operated, the rib 16 provides means for limiting the movement of the diaphragm in one direction, as will be described.

The outer portion of the base 6 is formed

with passages 17, which lead from each cavity 15, to the end wall of the base. The chambers 13 are connected to the passages 17 by ports 18. In this way means are provided whereby the outer face of each diaphragm 11 will remain at atmospheric pressure at all times.

In the present instance the base 6 is shown as carrying two casings 7, which are mounted side by side on one face of the base. It is to be understood, however, that the device may be provided with any number of casings 7 desired, which casings may be grouped on one face of the base 6 and be secured thereto in the manner shown and described.

When the base 6 is constructed to receive two casings 7, the chambers 13 are spaced apart a suitable distance, and the outer face of the base is centrally formed with a cavity to provide a chamber 19, to which is connected a pipe 20 leading from a suitable source of fluid supply.

The wall of the base 6 between the chamber 19 and the adjacent portion of each casing 7 is provided with a passage 21 which registers with a passage 22 formed in the adjacent wall of each casing and leading to the chamber 14.

For the purpose of providing a fluid tight joint between the contiguous portions of the device which are provided with the said passages, the wall of the base is recessed around each passage 21 to provide a seat 23 for receiving a gasket 24. The gasket 24 is perforated to provide an opening 25, which opening registers with the passages 21 and 22.

The outer wall of the casing 7 is concentrically formed with a tubular boss which projects inwardly of the casing, as at 26, and also outwardly therefrom, as at 27. The inner end of the portion 26 of the boss is adapted to engage the diaphragm 11, while a suitable amplifying bore 28 is mounted in the outer portion 27 of the boss.

Secured to the central portion of the diaphragm 11 and extending into the open end of the portion 26 of the boss is a weight 29.

In operation, when fluid under pressure is supplied through pipe 20 to chamber 19, fluid flows through the restricted passages 21 into each chamber 14 and the fluid in chambers 14 builds up so that the diaphragms 11 are moved outwardly.

In moving out, communication is opened from chambers 14 to the space within the tubular bosses. The pressure in the chambers 14 is then quickly reduced, since the rate of flow through the restricted passages 21 is considerably less than the rate of flow from chambers 14 to the tubular bosses. The pressure on the diaphragms 11 being thus relieved, said diaphragms return to their positions engaging the ends of the bosses. The opening movement is then repeated.

The diaphragms 11 are thus caused to vibrate and thereby produce sounds which are

amplified by the usual operation of the horns 28.

The addition of the weighted member 29 to each diaphragm 11 makes it necessary for the fluid pressure to be built up to a higher point before the diaphragms will move from engagement with the end of each of the tubular bosses, than would be the case with an unweighted diaphragm, but when the diaphragms do move, the higher pressure causes a greater movement of the diaphragms and consequently, a greater amount of potential energy is stored up. In order to limit this outward movement of the diaphragms, so as to prevent fracture thereof which may be caused by too great a movement away from the end of the tubular bosses, the ribs 16 are provided. When the diaphragms engage the ribs they rebound in such a way that the return movement is effected more forcibly and a tighter engagement with the ends of the tubular bosses is the result. A more positive opening and closing movement of each diaphragm is thus assured, since the vibration thereof is limited to the space separating the face of each diaphragm and the rib 16.

Inasmuch as the casings 7 are juxtaposed on one face of the base 6, when fluid under pressure is supplied to the chamber 19 in the base, the fluid will immediately flow through the sets of aligned passages 21, 25 and 22 to the chambers 14, with the result that each sound producing element will be simultaneously operated.

It will be noted that the cost of manufacturing the present device is minimized, since a single base 6 is used for supporting a plurality of the sound element casings 7. The chamber 14 in each of the casings is so connected to the central chamber 19 in the base that fluid under pressure for operating the diaphragms 11 will be uniformly supplied to cause a simultaneous operation of the device as a whole. It should further be noted that no gaskets are utilized at the joints between the marginal edges of the diaphragms and the adjacent portions of the casings and base respectively, but in order to prevent loss of fluid under pressure being supplied from chamber 19 to each of the chambers 14, the small gaskets 24 are provided at the joints between the passages 21 and 22.

While one illustrative embodiment of the invention has been described in detail, it is not my intention to limit its scope to that embodiment or otherwise than by the terms of the appended claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A sound producing device comprising a base, a casing detachably secured to said base and having a pressure chamber, a flexible diaphragm subject to the pressure in said chamber, a fluid supply passage leading from said

base to said chamber and including a recess opening at the joint between the casing and the base, and a gasket in said recess to prevent leakage from said passage at the joint between the base and the casing.

2. A sound producing device comprising a base, a casing detachably secured to said base and having a pressure chamber, a flexible diaphragm subject to the pressure in said chamber, a fluid supply passage leading from said base to said chamber and including a circular recess opening at the joint between the casing and the base, and a gasket in said recess to prevent leakage from said passage at the joint between the base and the casing.

3. A sound producing device comprising a base, a casing having a metal to metal joint connection with said base having a pressure chamber, a flexible diaphragm subject to the pressure in said chamber, an air supply passage leading from said base to said chamber and including a recess, and a gasket in said recess forming a leak tight joint surrounding said passage to prevent leakage from said passage at the joint between the base and the casing.

4. A pneumatic horn comprising a base, a plurality of casings mounted on one side of the base, each of said casings having a chamber, a flexible diaphragm in each casing subject on one side to the pressure of fluid in the corresponding casing chamber, said base having a supply chamber at the opposite side of said diaphragm, and fluid pressure supply passages leading from said supply chamber to each casing chamber.

5. A pneumatic horn comprising a base, a casing mounted on one side of the base, a tube open to the atmosphere and extending into said casing, a flexible diaphragm normally seating against the inner end of said tube and controlling communication from the interior of the casing to said tube, and an annular rib on the base concentric with and of a lesser diameter than the inner end of the tube for limiting the movement of the diaphragm away from the end of the tube.

6. A sound producing device comprising a base having a hollow casing attached thereto and adapted to be supplied with fluid under pressure, a tube extending into said casing, a flexible diaphragm interposed between the casing and the base and normally engaging the inner end of said tube and subject to the pressure of fluid in said casing, and an annular rib on the base concentric with and of smaller diameter than the inner end of the tube for limiting the movement of the diaphragms in one direction.

7. A sound producing device comprising a base having a chamber adapted to be supplied with fluid under pressure, one side of said base having a plurality of hollow casings adapted to be supplied with fluid under pressure from said chamber, and sound producing

means within the casings adapted to be operated by the fluid supplied to the casings.

8. A sound producing device comprising a base having a chamber adapted to be supplied with fluid under pressure, a plurality of casings mounted on one side of said base, each casing having a chamber adapted to be supplied with fluid from said base chamber, and a flexible diaphragm interposed between each casing and the base and subject to the pressure of fluid in the casing chamber.

9. A device of the class described comprising a base having a plurality of chambers open to the atmosphere, each chamber having a rib formed concentrically therein, a casing mounted over each of said chambers, said casing having a chamber adapted to be supplied with fluid under pressure, a tube extending into each casing and open to the atmosphere at its outer end, and a flexible member separating each chamber in the base from the chamber in each casing and normally seating against the end of said tube and being spaced from the rib in each base chamber.

10. A device of the class described comprising a base, one side wall of which is formed with a plurality of chambers, each chamber being open to the atmosphere, a depression formed in each chamber, each depression being also open to the atmosphere, a rib extending around each depression, a flexible diaphragm mounted over each chamber, the face of said diaphragm being disposed at a distance from said rib, a casing mounted over each diaphragm, said casing having a chamber adapted to be supplied with fluid under pressure, and a tube extending into said casing chamber and terminating at the opposite face of said diaphragm.

11. A sound producing device comprising a base having a chamber adapted to be supplied with fluid under pressure and also having a plurality of chambers open to the atmosphere, a plurality of casings mounted on one side of the base, said casings overlying said atmospheric chambers, each casing having a chamber adapted to be supplied with fluid under pressure from said base chamber, and sound producing means disposed in the chamber of each casing.

12. A device of the class described comprising a base having a plurality of chambers open to the atmosphere, said chambers being disposed only on one side of the base, a casing mounted over each base chamber, each of said casings having a chamber adapted to be supplied with fluid under pressure, a tube extending into each casing and open to the atmosphere, and a flexible diaphragm mounted between each casing and the base.

13. A pneumatic horn comprising a base having a plurality of diaphragm seats formed on one side thereof, a chamber adapted to be supplied with fluid under pressure formed in the base, a plurality of casings containing

diaphragms mounted on the base, the diaphragm in each casing being clamped to the adjacent seat on the base, means for supplying fluid from the base chamber for vibrating each of said diaphragms, and means in each casing for exhausting the fluid supplied thereto to the atmosphere.

14. A pneumatic horn comprising a base having a plurality of diaphragm seats formed on one side thereof, a chamber adapted to be supplied with fluid under pressure formed in the base, a plurality of casings containing diaphragms mounted on the base, the diaphragm in each casing being clamped to the adjacent seat on the base, means for supplying fluid from the base chamber for vibrating each of said diaphragms, means in each casing for exhausting the fluid supplied thereto to the atmosphere, and means on the base for limiting the vibratory movement of each diaphragm.

In testimony whereof I have hereunto set my hand this 14th day of May, 1929.

CLYDE C. FARMER.

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