Oct. 10, 1950 H. HORNE 2,525,134

MUSICAL INSTRUMENT

Filed May 9, 1946

Fig 1

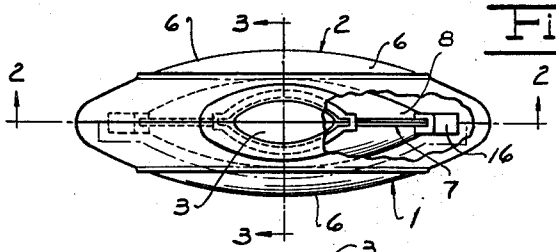


Fig 2

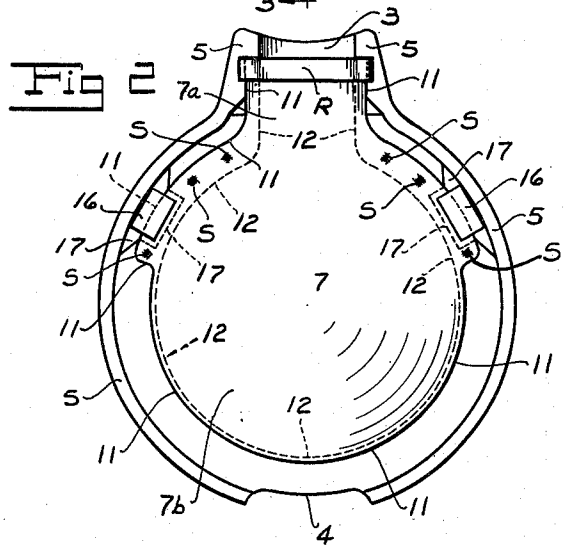


Fig 3

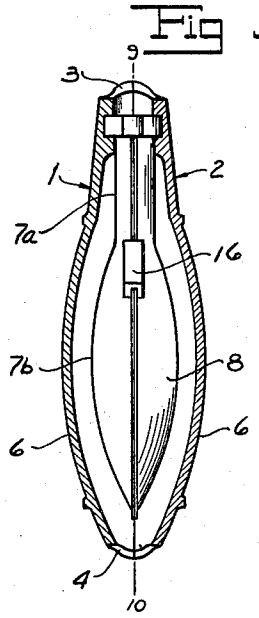


Fig 4

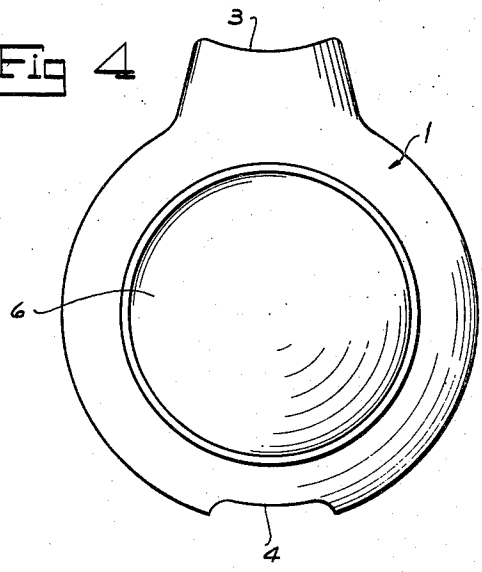
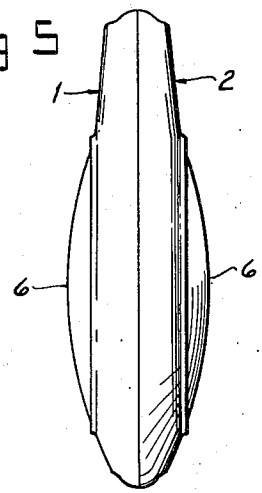


Fig 5



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UNITED STATES PATENT OFFICE

2,525,134

MUSICAL INSTRUMENT

Hal Horne, New York, N. Y.

Application May 9, 1946, Serial No. 668,384

1 Claim. (Cl. 46—182)

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My invention relates to a new and improved sound-producing or sound-modifying instrument of the type disclosed in U. S. Patent No. 2,274,897, dated March 3, 1942.

One of the objects of my invention is to provide a sound-producing or sound-modifying instrument which has improved tone and resonance characteristics. When the user hums into the mouth of an instrument of this type, a modified sound is produced.

Another object of my invention is to provide a sound-producing or sound-modifying instrument which has a hollow body which comprises two outer shells, and an internal diaphragm located in said hollow body, said internal diaphragm being preferably a multiple diaphragm. One or both of said shells may be resonant, and said diaphragm is resilient and resonant.

Another object of my invention is to provide an instrument of this type which can be easily manufactured and assembled at low cost.

Other objects of my invention are stated in the annexed description and drawings which illustrate a preferred embodiment thereof.

Fig. 1 is a front vertical elevation of the instrument, taken at its front mouth opening.

Fig. 2 is an internal view on the line 2—2 of Fig. 1. This is an inner or bottom plan view of the upper shell and of the bottom diaphragm member.

Fig. 3 is a vertical section on the line 3—3 of Fig. 1.

Fig. 4 is a bottom plan view of the bottom shell of the body.

Fig. 5 is an end elevation of the assembled device.

In this embodiment, the hollow body or outer casing of the device comprises two identical shells 1 and 2.

As shown in Fig. 2, each shell has a front mouth or inlet 3 and a rear outlet 4. Between said inlet 3 and said outlet 4, each shell has a planar mating surface 5, at which it abuts the other shell. The respective shells 1 and 2 abut and are joined to each other in any suitable manner at said planar mating surfaces 5. The shells 1 and 2 can be made of plastic or any other suitable material, and they can be joined in any suitable manner. If made of plastic, said shells 1 and 2 can be cemented or adhesively connected to each other at their planar mating surfaces 5. One or both of the shells 1 and 2 may be resilient and resonant; or both shells 1 and 2 may be rigid and non-resonant.

Each said shell 1 and 2 is of general arched

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formation, being arched both longitudinally and transversely, and each said shell is provided with a central arched part 6, which may be of greater curvature than the remainder of the respective shell. This difference in curvature, if any, may be very slight. Each said central arched part 6 is defined at its base by a reinforcing rib.

In this embodiment, I provide a multiple diaphragm which comprises two identical respective diaphragm members. These diaphragm members are identified by the reference numerals 7 and 8. The diaphragm member 7 has a neck-part 7*a* which is of semi-elliptical cross section, in a transverse plane which is perpendicular to the longitudinal plane of the device. This longitudinal plane is identified by the line 9—10 in Fig. 3. This transverse plane is identified by the section line 2—2 of Fig. 1. This neck-part 7*a* is arched, only in said transverse plane. Inwardly of its neck-portion 7*a*, the main body 7*b* of each diaphragm is arched both longitudinally and transversely, so as to provide a cup-shaped body 7*b*, whose longitudinal and transverse surface elements are substantially semi-elliptical.

Each said diaphragm member 7 and 8 has a planar mating surface at which it abuts the other diaphragm section. The outer edge of each diaphragm member is defined by the line 11 in Fig. 2. The inner contour line of the respective planar mating surface is defined by the broken line 12 in Fig. 2. The respective diaphragm members 7 and 8 abut each other at their mating surfaces 11—12. The ends of the neck-portions of these diaphragm sections fit snugly in a gasket or ring R which is made of resilient and compressible rubber or other suitable resilient and compressible material. This ring R has an elliptical cross-section. The ends of the neck-portions of the respective diaphragm members 7 and 8 are connected to the internal wall of said ring R, by cementing or by a tight frictional fit or in any other suitable manner. The diaphragm members 7 and 8 are made of any suitable metal or alloy or other resilient and resonant material. The mating surfaces of the diaphragm members 7 and 8 are fixed to each other at spaced points, as by spot-welding at the points or small areas S. The two diaphragm members 7 and 8 can thus be connected to each other and then assembled with ring R as a sub-unit.

Inwardly of their neck-portions, the diaphragm members 7 and 8 are also connected to slotted suporting members 16 which are made of rubber or other suitable material, which is preferably compressible and resilient. These mem-

bers 16 are longitudinally slotted, and the planar mating edges of the diaphragm sections fit snugly in the slots of said members 16, which are connected to the diaphragm members 7 and 8 by cementing or by a tight frictional fit or in any other suitable manner.

Each shell 1 and 2 is provided with two seat portions 17, each of which is provided with a notch or recess for receiving one-half of the respective supporting member 16.

Hence, when the two outer shells 1 and 2 are fixed to each other and to the members 16, the supporting members 16 can be fixed in their seated positions, and the diaphragm sections are thus held against shifting relative to the outer shells 1 and 2. The entire diaphragm, which comprises the members 7 and 8, is thus supported internally of the shells 1 and 2 by these supporting members 16 and the ring R.

The diaphragm members are free to vibrate relative to each other, inwardly of the inner spot-welded areas S. The resiliency of the diaphragm members biases them normally to abut each other at their mating surfaces 11—12, inwardly of the areas S. Hence said diaphragm members normally enclose an internal chamber of the body, said internal chamber having a neck which registers with the inlet neck of the body.

When a sound wave enters said internal chamber through its inlet neck, the diaphragm members vibrate inwardly of the inner areas S, thus separating their mating edges intermittently, inwardly of the inner areas S.

The sound waves thus pass rearwardly out of the hollow body, through the outlet 4.

The sound waves are thus impressed upon the air column between the inner faces of the shells 1 and 2 and the outer faces of the diaphragm members.

The drawings are to scale and reference is made thereto for additional features of the invention. This construction makes it possible to use two rigid and non-resonant shells 1 and 2, or to have one or both of said shells resilient and resonant.

The gasket R may be slightly compressed between the shells 1 and 2, when said shells are fixed to each other.

I have described a preferred embodiment of my invention, but numerous changes and omissions can be made without departing from its scope.

I claim:

A musical instrument which comprises a hollow body, said body comprising two sections, said sections being fixed to each other at their edge-portions, said sections being shaped to provide said body with a front inlet mouth and a rear outlet, a diaphragm located within said body, said diaphragm comprising two diaphragm members, said members being shaped to provide a diaphragm chamber which is normally closed save at a front inlet throat thereof, at least one of said diaphragm members being resilient and resonant, said diaphragm members being fixed to each other at their edge-portions adjacent said front inlet throat and being separable from each other at separable edge-portions which are located rearwardly of said front inlet throat, said front inlet throat being alined with said inlet mouth, said diaphragm members being connected to said hollow body by connecting means which are spaced forwardly of said separable edge-portions, said diaphragm members being spaced from the inner wall of said hollow body rearwardly of said inlet throat, the free end portion of said inlet throat being located in a gasket which is made of compressible material, said gasket being located between said sections, and said connecting means comprising supporting members which are located rearwardly of said inlet throat, said supporting members being seated in respective recessed portions of said sections.

HAL HORNE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,274,897	Horne	Mar. 3, 1942