June 24, 1930. R. D. BUELL 1,767,740

HORN

Filed May 18, 1929

Fig. 1.

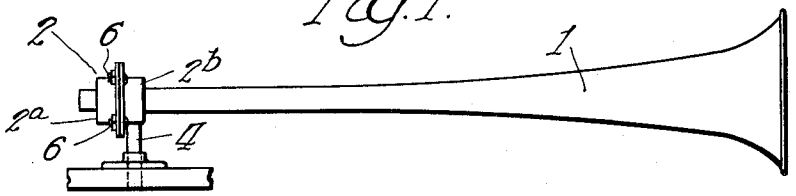


Fig. 2.

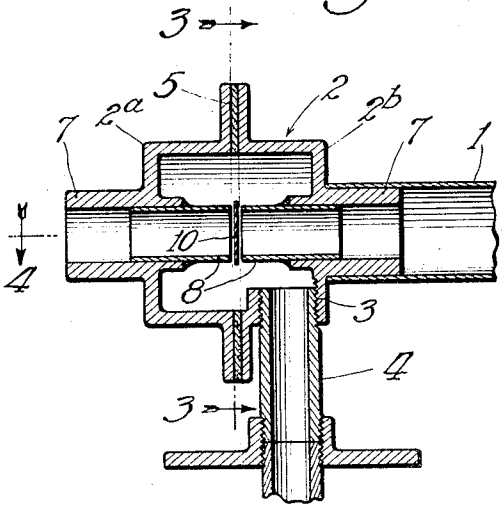


Fig. 3.

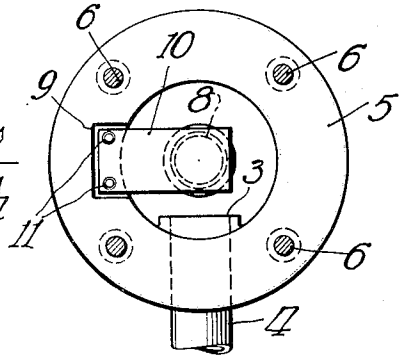
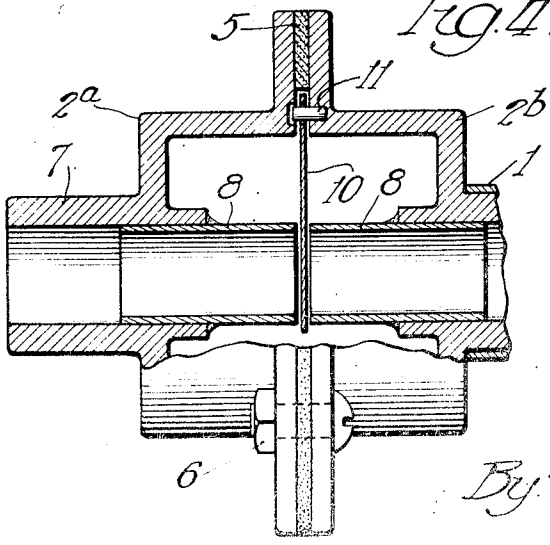


Fig. 4.



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UNITED STATES PATENT OFFICE

ROY D. BUELL, OF CHICAGO, ILLINOIS

HORN

Application filed May 18, 1929. Serial No. 364,122.

My invention aims to provide a signaling or warning horn of improved character for use on automobiles, motor boats, and other conveyances. An illustrative embodiment of the invention is shown in the accompanying drawings, by reference to which the nature of the invention will be readily understood.

In said drawings:

Fig. 1 is a side elevation of an automobile horn embodying the invention;

Fig. 2 is an enlarged longitudinal vertical section taken through the actuating portion of the horn, omitting the major portion of the horn proper;

Fig. 3 is a cross-section on the line 3—3 of Fig. 2, looking in the direction of the arrows and showing an inner face view of a casing member and associated gasket constituting part of a chamber for operating fluid employed in the illustrative device;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 2.

The horn proper or sound-emitting body of the illustrative instrument is designated in the drawings by the numeral 1. This may be of any appropriate form and dimensions according to the character and tone of the note or notes to be sounded. For producing a musical tone of pleasing quality and one which is especially distinctive for automobile signaling, I prefer to employ a form of horn similar to that of the ordinary slide trombone, in which the musical tone is produced by the bell part of the horn.

As shown in Fig. 1, the horn is attached to and extends from a small casing 2 communicating with the interior of the horn. For actuating or blowing the horn, operating fluid such as air or gas under pressure may be admitted to the casing through an inlet opening indicated at 3 in Fig. 2. In this instance the casing is shown affixed on the upper end of a vertical pipe 4 which serves as a supporting standard for the horn and also to supply the operating fluid. It will be understood that the horn may be mounted under the hood or on the running-board of an automobile or other suitable part of any conveyance, and in practice may be operated by pressure from any suitable source, for example from the engine exhaust, or from a compressed air tank, or from the engine compression through the cylinder head. It will also be understood that the pipe connection between the source of pressure and the casing 2 of the horn will include a suitable valve controlled by the motorist in any convenient way for admitting the operating fluid to the horn at will, or for so long as it is desired to sound the horn. The pipe connection with the source of fluid pressure and the controlling valve in the pipe are unnecessary to illustrate, as they are well known or standard features for use with automobile horns of the gas or air operated type.

The casing 2, in the preferred construction illustrated, is composed of two similar circular castings 2^a and 2^b, bolted together face to face, there being in this instance an interposed gasket 5. These castings or complemental half parts of the casing, are suitably shaped to provide an enclosed pressure chamber, and are formed with comparatively wide flat-faced flanges abutting against the gasket 5 and tightly bolted together by the bolts 6. In one of the castings is the interiorly screw-threaded pressure inlet opening 3, into which the end of the pressure supply pipe 4 is screwed. Both castings are formed or provided with central or axial tubular passages open at both their inner and outer ends. In this instance the said passages are provided by the tubular bosses 7 and the internally projecting tubes 8 which may be swaged or welded into place.

The horn proper or tubular sound-emitting member 1 of the instrument is in this instance rigidly secured on the boss 7 of the casting 2^b by drive fit or by soldering, and the said boss and tube 8 therein may be considered as the inner end of the horn proper. Said parts 1, 7 and 8 could of course be integral. The construction typifies a casing for fluid pressure with a horn or sound-emitting body extending therefrom and having an inlet tip protruding into the casing.

It will be observed that the confronting inner ends of the tubes 8 are comparatively

close together. They are preferably flush or in the same planes with the confronting flat faces of the flanges of the castings 2^a and 2^b. Thus the inner ends of the tubes 8 are in this preferred construction spaced apart the same distance as the flanges of the castings, that is, the distance allowed by the gasket 5. The function of said gasket in the form of casing shown is to provide a slight spacing, as well as to afford an airtight joint between the casing members in view of the two-part construction employed. Said gasket may be of cardboard, wood, leather, or other material suitable for the purpose.

A portion is cut out from the inner side of the gasket providing a recess therein at 9. In this cut-away portion of the gasket is loosely fitted the outer end of a reed 10, shown as a thin, flat metal strip or leaf. A pair of pins 11 project from the face of the casting member 2^b, passing loosely through holes therefor in the reed and into registering holes in the face of the casting 2^a, whereby the reed is loosely secured in place. This reed extends between the inner ends of the tubes 8 and is adapted to be vibrated therebetween by the passing of the compressed air or other operating fluid through the casing. The reed is of slightly less thickness than the distance between the inner ends of the tubes 8, so as to provide a slight clearance to allow the vibration of the reed, which in vibration will strike against and close the openings of said tubes in alternation. In practice, when employing a metal reed which is preferred, I make the reed twenty-thousandths of an inch thinner than the gasket 5, which provides sufficient clearance for vibration between the pressure outlet openings.

The vibration of the reed is due to the fact that as fast as the reed is moved against one of the outlet openings, the release of the pressure through the opposite opening and the rushing of the compressed air or gas therethrough causes the reed to be pulled away from the first-mentioned opening and pushed against said opposite opening. In other words, the reed is subjected to what may be termed a push and pull action in rapid repetition, causing a rapid and forceful vibration of the reed so that the compressed air or gas enters the passage to the sound emitting body by a very quick succession of brusque discharges, with highly efficient sound generating results.

The reed should be very freely vibratable, and, therefore, while it could be resiliently or hingedly mounted, it is preferable to mount it loosely in the manner hereinbefore described and shown in the drawings, so that the reed as a whole may be bodily vibrated and there will be no tendency for it to spring toward one of the openings. The reed may be of any suitable material, including metal, celluloid or other material appropriate for the purpose.

The means described is characterized by pronounced efficiency from the standpoint of volume of sound produced, whereby with the pressure available with automobile pressure systems a sound of soft, musical tone, as for instance a trombone note, may be emitted with sufficient volume of sound for effective warning purposes. Blowing with the mouth into the inlet 3 of the illustrative horn will produce a sound that can be heard quite some distance; and with the energy of the motor behind it, a powerful warning may be sounded. The horn will operate at pressures from a few ounces to several hundred pounds, showing merely an increase in tone volume or loudness with increase of pressure. Among other advantages, no adjustment is required for reed clearance for different operating pressures.

It will be understood that the invention is not limited to the particular embodiment illustrated, and that, while I have referred to the invention more particularly as a signal or warning horn, it is susceptible of other uses.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. A horn comprising a tubular sound-emitting body, a casing from which said body extends, said casing having an inlet for air or gas under pressure and opposite outlets and being interiorly undivided, there being communication between the casing and tubular sound-emitting body through one of said outlets, and a vibratory reed arranged between and which by its vibrations strikes against and alternately closes said outlets.

2. A horn comprising a tubular sound-emitting body, a casing from which said body extends, said casing having an inlet for air or gas under pressure, tubes projecting into the casing providing outlet passages for the operating fluid, one of said passages communicating with the interior of the sound-emitting body, said tubes having confronting inner ends, and a vibratory reed arranged between said ends, there being a slight clearance between the reed and said ends of the tubes, whereby the flow of air or gas introduced under pressure to the casing will vibrate the reed by forcing it rapidly against the ends of said tubes in alternation.

3. A horn provided with a chamber to receive air or gas under pressure, said chamber having an outlet to the sound-emitting passage of the horn and another outlet, and a vibratory reed exposed in but not dividing said chamber which by its vibrations strikes against and closes the said outlets in alternation, there being a slight clearance between the outlets and said reed, and the ar-

rangement being such that the closing of either outlet is accompanied by the opening of the other, so that under the action of the operating fluid the reed will be forced rapidly against the outlets in alternation.

4. A horn having operating means including a vibratory reed and a seat therefor having an opening controlled by the reed, through which opening air or gas under pressure may pass to the sound-emitting passage of the horn, there being a receiving chamber for the operating fluid in which said reed is exposed but which is not divided thereby, said reed adapted to strike said seat and close said opening under pressure of the operating fluid, and the instrument embodying another pressure outlet controlled by the reed so as to be opened for releasing the pressure concomitantly with the closing of said opening and to be closed for preventing such independent release concomitantly with the uncovering of said first mentioned opening.

5. A horn having a vibratory reed comprising a free leaf and an undivided chamber in which the reed is enclosed having a pressure inlet and opposite pressure outlets between which the reed vibrates under the action of air or gas admitted to the chamber under pressure, said action causing the reed to strike against and close the said outlets in alternation.

6. A horn having a vibratory reed and an undivided chamber in which the reed is enclosed having an outlet to the sound-emitting passage of the horn and another outlet, said reed adapted to vibrate against and close the said outlets in alternation under the action of air or gas admitted under pressure to the chamber.

7. A horn having a vibratory reed and an undivided chamber in which said reed is enclosed having a tubular outlet passage to the sound-emitting passage of the horn and an opposite tubular outlet passage, the reed being arranged between the inner ends of said outlet passages and adapted to be vibrated by forcing air or gas through said chamber.

8. An operating device for a horn comprising a casing having a pressure inlet opening and opposite pressure outlet openings and being interiorly undivided, and a vibratory reed between said outlet openings vibrated by forcing air or gas through the casing, the vibration of the reed causing it to close the outlets in alternation, said reed comprising a flat leaf loosely supported for free vibration.

9. An operating device for a horn comprising a casing having a pressure inlet opening and opposite pressure outlet openings and being interiorly undivided, and a vibratory reed between said outlet openings vibrated by forcing air or gas through the casing, the vibration of the reed causing it to close the outlets in alternation, said casing comprising complemental members having inwardly protruding tubes providing the said outlet openings and having flanges secured together, a gasket between the flanges, there being a recess in the inner side of the gasket, and the said reed being loosely supported in said recess.

10. An operating device for a horn comprising a casing having a pressure inlet opening and opposite pressure outlet openings and being interiorly undivided, and a vibratory reed between said outlet openings vibrated by forcing air or gas through the casing, the vibration of the reed causing it to close the outlets in alternation, said casing having a recess in which one end of the reed is loosely fitted, there being a pair of pins extending from one wall of said recess and passing loosely through apertures in said end of the reed.

11. A horn comprising a casing having a pressure inlet opening and pressure outlet openings and being interiorly undivided, and a vibratory reed controlling said outlet openings, said reed vibrated by forcing air or gas through the casing and arranged so that in vibration it will close the outlet openings in alternation and cause the operating fluid to exhaust alternately through the different openings, and a tubular sound-emitting body in communication with said casing through one of said outlet openings.

12. A horn embodying a freely vibratable reed and an opening controlled thereby through which air is emitted to the sounding passage of the horn, and means including a release passage controlled by said reed whereby the reed is rapidly vibrated by the flow of air, the admission opening to the sounding passage being thereby rapidly opened and closed.

13. A horn embodying a freely vibratable reed controlling the admission of air to the sounding passage of the horn and vibrated by the flow of air with the same periodicity as the vibrating air column in the sounding passage.

14. A horn having a chamber provided with an inlet and with adjacent confronting outlets including an admission opening to the sounding passage of the horn, and an interposed freely vibratable reed vibrated by the flow of air and by its vibrations rapidly opening and closing the said outlets in alternation.

In testimony whereof, I have signed my name to this specification.

ROY D. BUELL.