W. SPARKS.

COMBINED ELECTRIC AND PNEUMATIC HORN.

APPLICATION FILED OCT. 20, 1910.

Patented Apr. 27, 1915.

2 SHEETS—SHEET 1.

1,137,239.

Fig. 1.

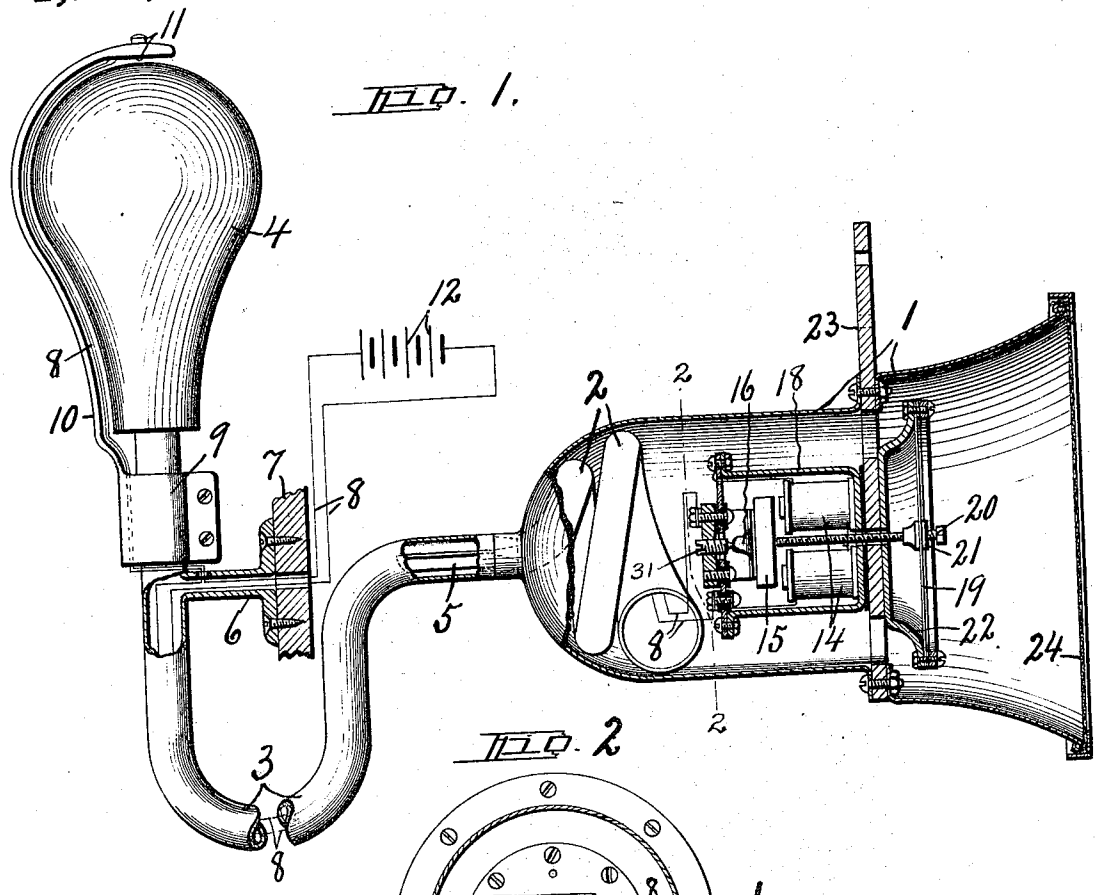


Fig. 2.

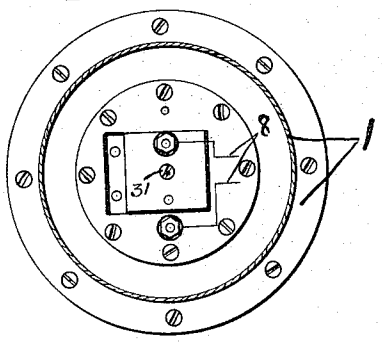


Fig. 3.

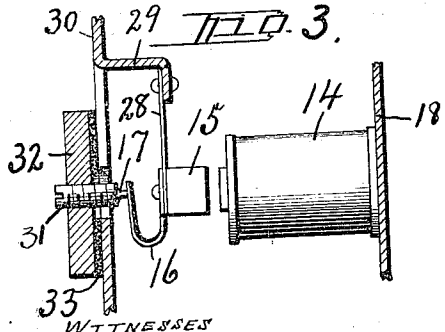
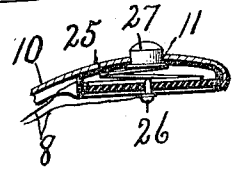


Fig. 4.



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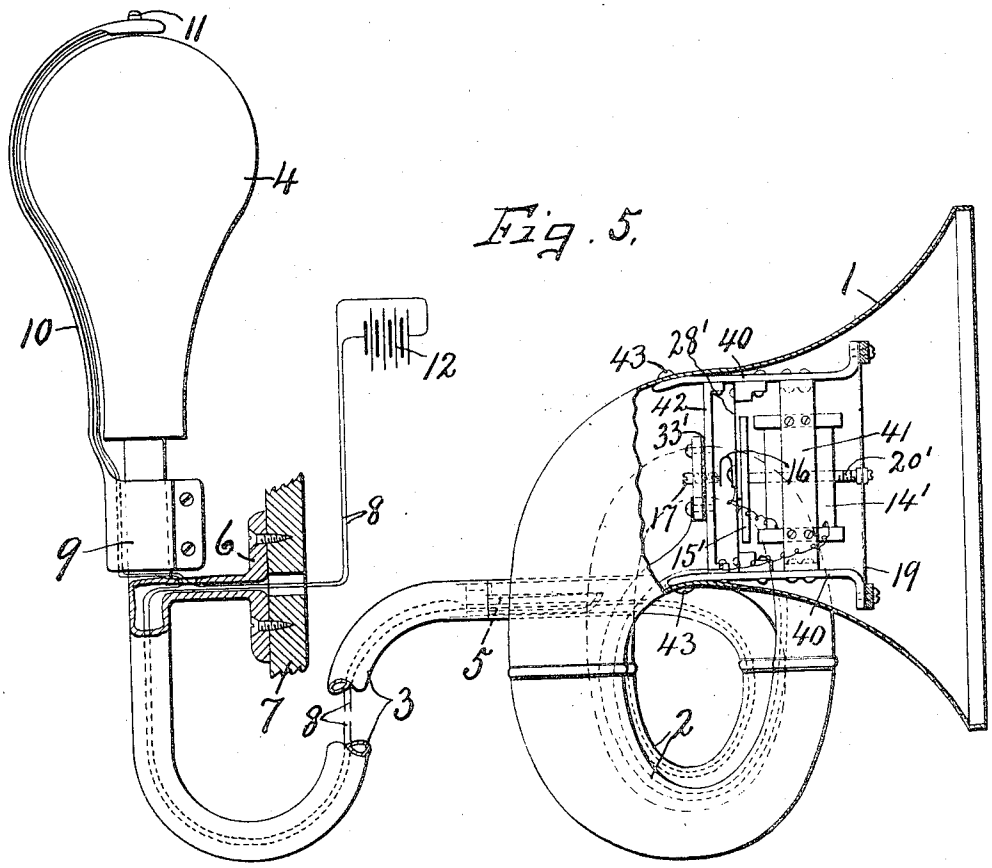
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2 SHEETS—SHEET 2.

Fig. 5.



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COMBINED ELECTRIC AND PNEUMATIC HORN.

1,137,239. Specification of Letters Patent. Patented Apr. 27, 1915.

Application filed October 20, 1910. Serial No. 588,127.

To all whom it may concern:

Be it known that I, WILLIAM SPARKS, of Jackson, in the county of Jackson, in the State of Michigan, have invented new and useful Improvements in Combined Electric and Pneumatic Horns, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in combined electric and pneumatic horns, for automobiles, motor boats and other uses to which such an instrument may be applicable for producing audible signals.

The main object is to combine in a single instrument pneumatic and electric sound producing devices, each capable of operation independently of the other or simultaneously as may be desired.

Another object is to locate these sound producing devices in such relative position as not to interfere with the free exit of the sound waves from either and at the same time permitting the blending of the sound waves at the exit of the horn when both sound producing devices are operated simultaneously.

Other objects and uses relating to specific parts of the instrument will be brought out in the following description.

In the drawings, Figure —1— is a side elevation, partly in section, of a sound producing instrument embodying the various features of my invention. Fig. 2 is a transverse sectional view through the casing taken on line 2—2, Fig. 1. Fig. 3 is an enlarged detail sectional view of the electric vibrator and its adjusting means, showing also the electro-magnet in elevation. Fig. —4— is an enlarged sectional view of the circuit closer and adjacent portion of its supporting arm. Fig. —5— is a side elevation similar to Fig. —1— of a slightly modified form of horn and electric sound producing device.

As shown in the drawings, this instrument comprises a casing —1— containing an electric sound producer and a portion —2— of a pneumatic sound producer having a flexible tube —3— to which is connected a pneumatic bulb —4—, adapted to be operated or compressed by hand, to produce currents of air through the tube —3— and casing —1—.

A reed —5— shown by dotted lines in Fig. —1— is inserted in the tube —3—, preferably at the junction of said tube with the casing and is adapted to be operated by a current of air produced by the compression of the bulb —4—. The bulb —4— is held in a conveniently accessible position upon the machine by a bracket —6— which, in this instance, is secured to a part —7— of the automobile or other machine with which the instrument is adapted to be used, and is preferably hollow for the reception of electric circuit connections or conductors —8— for the electrical sound producing device presently described. A clamp —9— is also secured to the tube —3— between the bracket —6— and bulb —4— and is provided with an upwardly projecting arm —10— extending along and following the contour of one side of the bulb —4— and terminating directly over or in close proximity to the head of said bulb where it is provided with any well known form of circuit closer or electric switch —11—

The circuit wires or conductors —8— are connected to a source of electric energy as a battery —12—, portions of the conductors being extended upwardly between the arm —10— and adjacent side of the bulb —4— and are connected to the circuit closer —11—. These circuit wires or conductors are also extended through the tube —3— past the reed —5— and into the casing —1— and are connected to an electric vibrator which is located within said casing and comprises an electro-magnet 14, armature —15— and make and break contact terminals —16— and —17— all of which parts are properly installed within a separate housing or case —18—. This electrical vibrator is arranged to impart its vibratory movement to a diaphragm —19— through the medium of a connecting rod —20— which consists of a screw having one end engaged with the armature —15— and its opposite end connected by clamping devices —21— to said diaphragm for the purpose of producing additional sound waves which are further magnified by an amplifier forming one end of the casing —1—. This diaphragm is stretched across and secured to the open end of a cup-shaped frame —22— within and at substantially right angles to the axis of the amplifier, from which it is spaced apart to allow the exit of the sound waves.

The electrical vibrator and diaphragm together with a helical portion —2— of the sound conducting tube —3— are inclosed within the casing —1— which latter is preferably made in sections secured coaxially to a suitable support —23— capable of being attached to a part of the machine with which the horn is associated, the outer end of the amplifier being covered by a suitable screen —24— to further protect the interior mechanism from intentional or accidental injury from external objects and at the same time allow the free exit of the sound waves.

The diaphragm support —22— and housing —18— within which the electric vibrator is secured are also secured to the support —23— which extends transversely across the intermediate portion of the amplifier and is suitably apertured to permit exit of the sound waves produced by the pneumatically operated reed —5—, the helical portion of the tube —3— opening into the casing —1—.

The circuit closer or switch —11— is mounted within and upon the upper terminal end of the arm —10— directly over the head of the pneumatic bulb —4— where it may be operated with the hand in the same position as required for pressing the bulb, said switch consisting of normally separated terminals —25— and —26— in the circuit —8— one of which terminals as —25— is self-opening and adapted to be brought into contact with the terminal —26— by a push-button —27— in the upper side of the arm.

The circuit wires leading from the switch —11— are passed through the tubular conduit —3— and connected to the terminals —16— and —17— of the electric vibrator, the terminal —16— and armature —15— being mounted upon a spring vibrating arm —28— which in turn is secured to an inwardly offset portion —29— on the head —30— of the housing —18— while the terminal —17— forms a part of a screw —31— which is screwed to a suitable support —32— on the head —30—, said support —32— and terminal screw —31— being insulated from the terminal —16— and housing —18— by insulation —33— as best seen in Fig. —3—. The terminal screw —31— serves the purpose of adjusting the terminal —17— to properly contact with the terminal —16— while the screw —20 —may be adjusted to maintain proper relation between the diaphragm —19— and apertures —15— so as to transmit vibratory movement from the electric vibrator to the diaphragm.

In the modification shown in Fig. —5— the electromagnet and vibrator with other parts of the electric signal are mounted upon a skeleton frame work comprising in this instance opposite lengthwise bars or arms —40— and cross bars —41— and —42—, the arms —40— having their inner ends secured by suitable fastening means, as screws —43—, to the inner sides of the horn —1—, while their outer ends project into the flaring mouth of said horn and are spaced apart therefrom. An electromagnet —14'— is secured in an upright position to the cross bar or bars —41— centrally within the horn and is electrically connected in series with terminals —16— and —17—.

Associated with the magnets, preferably at the inner sides of the pole pieces, is an upright armature —15'— which is mounted upon and secured to an axially movable supporting rod —20'—, the latter extending some distance beyond the outer sides of the magnet.

A diaphragm —19— is stretched across and secured to the outer ends of the arms —40— and is also centrally secured to the outer end of the rod —20'— to move therewith as the aperture —15'— and its supporting rod —20'— are reciprocated by the action of the vibrator. Another vibratory member —28'— is stretched between and secured to the opposite arms —40— at the inner side of the magnet —14'— and is centrally secured to the armature —15'—.

By placing the electric switch —11— in juxtaposition to the pneumatic bulb —4— the electric and pneumatic sound producing devices may be operated independently or simultaneously as may be desired without changing the position of the hand and in either case the sound is amplified by the same amplifier. For example, by compressing the bulb —4— a current of air is projected through the tube —3— and pneumatic reed —5— and thence through the helices —2— into one end of the casing while on the other hand if it is desired to operate the electric sound producing device, it is simply necessary to press the button—27— thereby closing the electric circuit through the electric vibrator which in turn by reason of its rapid make and break action imparts similar movement to the diaphragm —19— thereby producing not only the buzzing sound of the electric vibrator but also producing a more intense sound through the medium of the diaphragm —19— and if it is desired to further compound the tones or to increase the sound both the electrically operated and pneumatically operated sound producing devices may be actuated simultaneously.

The structure set forth in the drawings, particularly in Figs. —1— to —4— inclusive are illustrative of the preferred form of my invention and while Fig. —5— shows a modification of the parts constituting the electrically operating sound producing device it is evident that other modifications may be made without departing from the spirit of my invention and therefore I do

not limit myself to the precise construction and arrangement shown and described.

What I claim is:

1. A signaling device comprising a casing having an amplifier on one end, an electric sound producing device within the amplifier and spaced apart therefrom to allow the passage of sound waves through said space, and a pneumatic sound producing device communicating with the opposite end of the casing.

2. A combined electric and pneumatic sound producing signal comprising a hollow casing having an amplifier on one end and a pneumatic sound producing device attached to its opposite end and provided with a sound conducting tube opening thereinto and an electric sound producing device within the casing provided with a diaphragm within and spaced apart from the amplifier to allow the sound waves from the pneumatic sound producing device to pass through said space.

3. In a combined electric and pneumatic horn, a tubular shell having a pneumatic bulb connected to one end and a sound amplifier connected to its opposite end, a diaphragm within the amplifier and spaced apart therefrom to allow the passage of sound waves through such space, electrical means for vibrating the diaphragm and a pneumatic sound producing device within the shell between the diaphragm and bulb and operated by compression of said bulb.

4. A signaling device comprising a casing having an amplifier on one end, a tube having one end attached to and opening into the opposite end of the casing, a bulb secured to the opposite end of the tube, a reed within the tube between the bulb and casing, an electric sound-producing device within the casing, a circuit closer supported in proximity to the bulb and circuit connections between the electric sound-producing device and circuit closer passing through the tube.

5. In a signaling device, a base member, a hollow casing secured upon one side thereof, an amplifier secured upon the other side, a pneumatic sound producing device discharging into said casing, and means of communication between the casing and the amplifier for the transfer of air vibration.

6. In a signaling device, a supporting member, a hollow casing secured upon one side thereof, an amplifier secured upon the other side, a pneumatic sound producing device discharging into said casing, said supporting member having an opening allowing communication between said casing and the amplifier.

7. In a signaling device, a supporting member, a hollow casing secured upon one side thereof, an amplifier secured upon the other side, a pneumatic sound producing device discharging into said casing, said supporting member having an opening allowing communication between said casing and the amplifier, a diaphragm having means of support in connection with said supporting member, and an electrically operated means for vibrating said diaphragm.

In witness whereof I have hereunto set my hand on this 4th day of Oct., 1910.

WILLIAM SPARKS.

Witnesses:
LILLIAN WUNDERLECH,
FRANK A. RODGERS.