

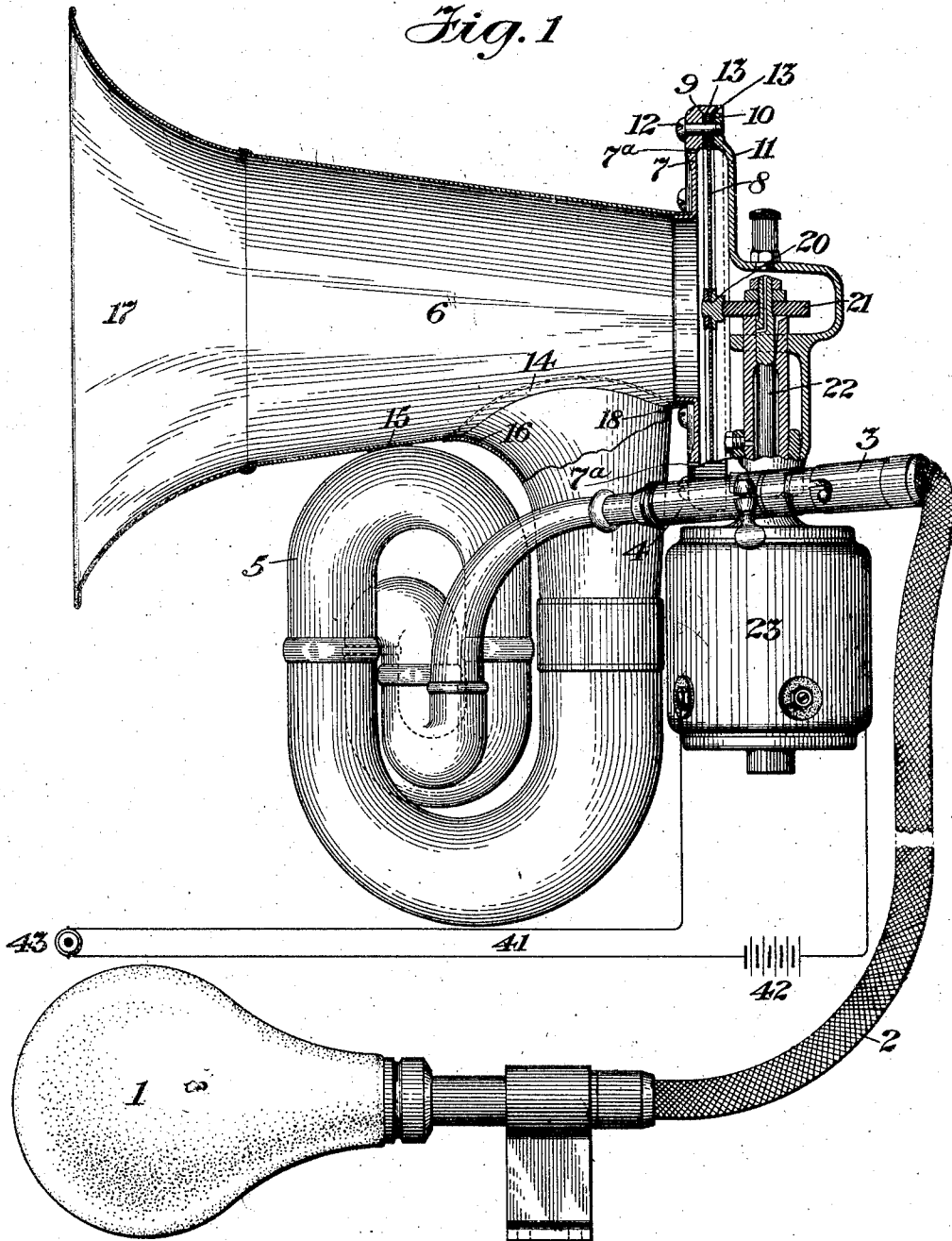
M. R. HUTCHISON.
COMBINATION ALARM DEVICE.
APPLICATION FILED MAY 4, 1910.

1,043,704.

Patented Nov. 5, 1912.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig. 2

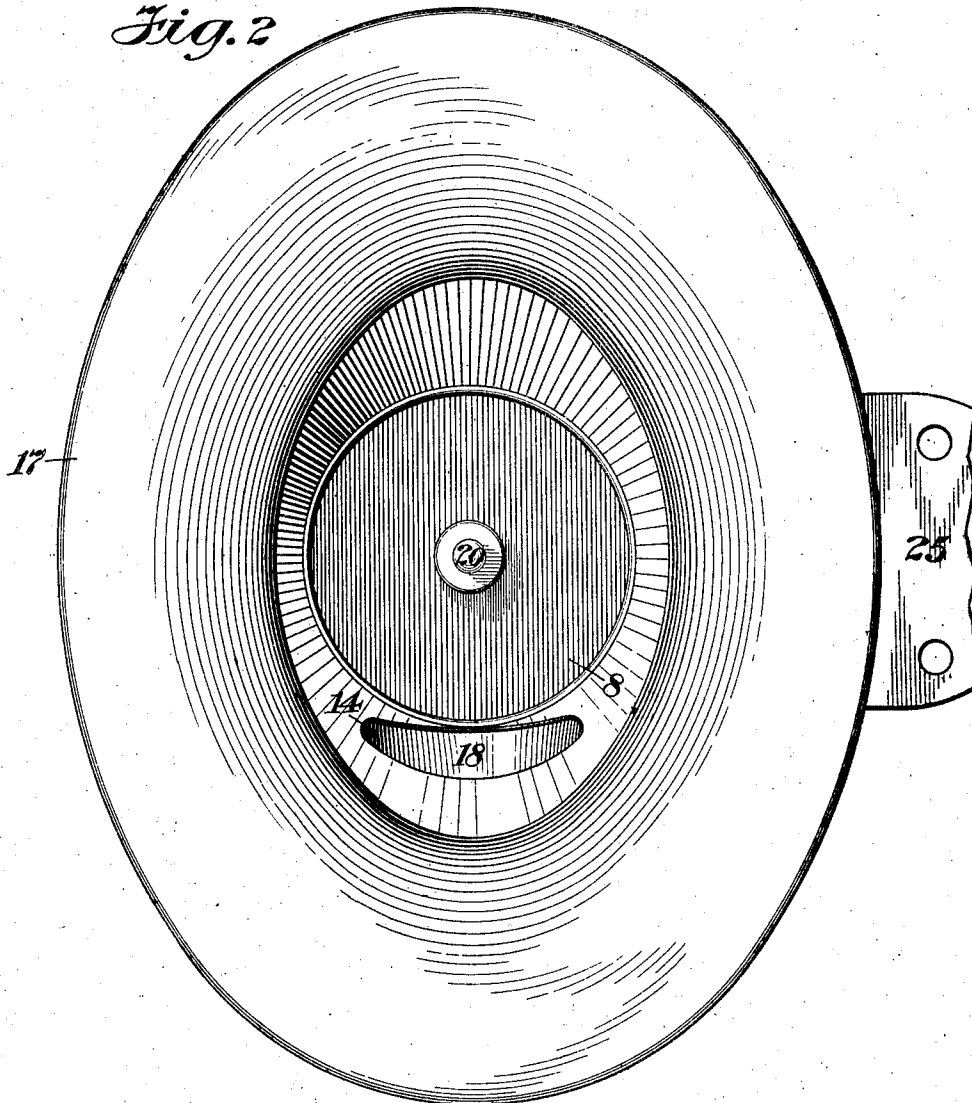


Fig. 3



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MILLER REESE HUTCHISON, OF NEW YORK, N. Y.

COMBINATION ALARM DEVICE.

1,043,704.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed May 4, 1910. Serial No. 559,330.

To all whom it may concern:

Be it known that I, MILLER REESE HUTCHISON, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Combination Alarm Devices, of which the following is a specification.

My present invention relates to signal devices adapted for use on automobiles, launches, and elsewhere; and contemplates a device whereby the user may be enabled at will to produce a variety of signals, the volume and intensity and alarming quality of which may be selected to suit the conditions of use.

The ordinary bulb operated reed horn such as is commonly used on automobiles, has a note which is of less volume and carrying power than is desirable in a horn intended for alarm purposes. On the other hand the mechanically operated diaphragm horns covered by Hutchison patents, as for instance, Nos. 923,048, 923,049 and 923,122, of which the well known Klaxon is a commercial form, are most desirable and efficient for signaling over considerable distances and for preventing accidents by producing instant alarm in cases of great emergency in crowded city streets. There are many occasions, however, particularly where an automobile is proceeding slowly through city streets when it is desirable to employ a signal less alarming than that of the Klaxon horn yet louder than the ordinary note of the ordinary bulb operated reed horn. In short, a reed horn modified so as to have an improved note of greater carrying power and arranged so as to be available for instant use alternatively or simultaneously with the Klaxon is a very desirable combination for general use on vehicles.

With these considerations in view I have devised an improved modification of the bulb operated reed horn whereby the volume of the sound is increased, is projected in advance of the vehicle with greater efficiency, and is caused to have a more penetrating quality.

My improvement involves substituting for the ordinary bell mouth commonly used on such reed horns, a preferably straight projector terminating at the forward end in a bell mouth and having an acoustic diaphragm at the base or rear end. The tubular portion of the reed horn preferably

opens into the projector transversely, through the side or bottom, at a point between the diaphragm and the bell mouth. When thus arranged there is an amplifying effect due to the diaphragm at the base of the projector coöperating with the projector to increase the volume and the efficiency of projection of the sound, and to improve the alarm quality thereof. This combination of bulb, reed and trumpet with a transverse projector having an acoustic diaphragm at the base, is especially desirable for the reason that the diaphragm may be of steel or other metal and hence if desired may be in all respects similar to those employed for electrically or mechanically actuated diaphragm horns. In such case a simple diaphragm and projector may be excited in either of two ways, that is, either by air waves from the reed horn, applied to the front side of said diaphragm or by an electro-magnet or cam which may be located on the back side of the diaphragm, in a position where it will not interfere with or break up the acoustic waves produced by the reed and trumpet on the front side thereof. This makes the combination peculiarly adaptable to the special form of projector, diaphragm, rotary cam and electric motor found in the Klaxon as now commonly used on automobiles and as specially set forth in my application Serial No. 494,120 filed May 5th, 1909. When used in this combination the diaphragm has a particularly effective action in sharpening the quality of the note from the reed. This is especially marked in cases where the rotary cam comes to rest after use either in contact with or very close to the wear piece of the diaphragm so that the vibration of the diaphragm set up by the acoustic waves from the reed and trumpet causes actual tapping or chattering between the contact surfaces on the diaphragm and on the cam tooth adjacent thereto.

It will be noted that in one aspect my invention involves the utilization of intangible non-interfering means for exciting vibration of the diaphragm from the front side thereof, the means being the acoustic waves applied to the projector intermediate the ends thereof. This is of great advantage as compared with any solid body or operating mechanism which in such location tends to break up and destroy the efficiency of the acoustic waves and the resonance thereof by

impeding or blocking the resonant air column.

My present invention also includes certain novel features of the construction and relative arrangement of parts of the reed horn and trumpet thereof with respect to the projector and with respect to the depending case containing the motor used to supply the power for mechanically displacing the diaphragm.

The general organization of parts as well as the details of construction will be more fully understood by reference to the accompanying drawings in which,—

Figure 1 is a side elevation partly in vertical section showing a reed horn and trumpet combined with the projector of a diaphragm horn. Fig. 2 is a front elevation of the projector and Fig. 3 is a detail view showing the reed employed in the construction shown in Fig. 1.

Referring to Fig. 1 it will be seen that the improved reed horn comprises the bulb 1, flexible tube 2, detachable coupling 3, reed chamber 4, trumpet 5, and the projector 6 with diaphragm case 7 and acoustic diaphragm 8. The latter is clamped between suitable surfaces 9 and 10 formed respectively on the diaphragm case 7, and the case 11 for the operating mechanism, the clamping being effected by screw bolts 12 through the medium of cushioning washers 13, 13, of cork or other suitable material. In practice this combination may be constructed from an ordinary bulb operated reed horn of good quality by removing the bell mouth of the trumpet and spinning the parts to fit the contour of a projector of a Klaxon horn adjacent the base thereof, cutting a hole of corresponding shape in the wall of the projector and securing the trumpet thereto as at 14, preferably by brazing.

In the specific forms shown the trumpet is secured quite close to the base of the projector adjacent the diaphragm and a convolution of the trumpet is brazed or soldered to the outside of the projector as at 15 so as to mutually strengthen and brace the projector with respect to the trumpet. As shown the portion of the open end of the trumpet at 16 curves toward the open end 17 of the projector while the rear portion 18 is approximately perpendicular to the axis of the projector and hence parallel with the diaphragm.

In some cases the trumpet is designed so that the total length from the reed to the mouth of the projector 17 is the same as the distance from the reed to the mouth of the trumpet in the original reed horn, but accuracy in this respect is not required because the reed will accommodate its own vibration to the acoustic length of the combined trumpet and projector even when such precaution is not observed.

It will be obvious to those skilled in the art that when used in such a combination the trumpet serves to smooth out and impart a musical quality to the note excited by the vibration of the reed. The acoustic waves generated therein are propagated through the projector to the outer air both directly and by reflection from the diaphragm. The diaphragm itself is excited to vibration both by such impact and also by the reflex or stationary wave which tends to establish itself in the projector by resonance thereof.

The various reactions and resonant effects produced by the above combination result in a note of greater volume projected more forcibly and having a sharper or more alarming quality than the note produced from a similar reed operated trumpet having an ordinary bell mouth. The acoustic vibration and reaction of the diaphragm and of the thin air space between the diaphragm and front case wall contribute to this effect.

In the peculiar combination shown in the drawings where there is a cam piece adapted to contact with the rotary cam on the armature shaft of a motor contained in motor case 23, the rotary cam frequently comes to rest in contact relation with the wear piece and in such case the vibration of the diaphragm set up by the acoustic vibrations from the reed trumpet may add a distinctly sharper and more alarming quality to the note.

The preferred horn of the projector is shown in Fig. 2. In said figure the opening at the base of the projector is circular and the walls of the body portion diverge preferably along straight lines and preferably the divergence is greater vertically than laterally, the side walls being nearly parallel or only slightly diverging. This results in a body portion having an oval mouth which curves into an oval bell mouth having its major axis substantially vertical. The device is preferably provided with a laterally extending bracket 25 whereby it may be attached to a vertical support as for instance one side of the dash-board of an automobile. The various advantages of this form of projector and the details of the construction of the cam and operating means are more fully set forth in my application above referred to.

Fig. 3 shows in detail the usual form of reed which is contained in the case 4, Fig. 1. This form of reed will accommodate itself to the acoustic changes caused by substituting the transverse projector for the ordinary bell mouth of the reed trumpet but as a matter of fact, when the device is made as above described there seems to be very little change in the pitch of the note, the noticeable change being the above described increase in the carrying quality of the note.

By arranging the reed operated trumpet

in the vertical plane containing the major diameters of the resonator and especially by arranging it in the lower portion of said plane adjacent the downwardly projecting motor case a compact convenient combination structure is secured.

The manner of the use of the device will be evident to those skilled in the art. The instrument is secured in any desired location, as for instance, at the right hand side of the dash-board of an automobile and circuit connections 41 lead through a suitable battery 42 to a circuit closer 43 which may be located at any desired point on the vehicle but preferably upon the steering wheel. The bulb 1 may be located either on the steering wheel or at the side of the driver's seat. With this outfit the driver may manipulate the circuit closer 43 with a finger of the left hand without removing the hand from the steering wheel. The right hand may be used to squeeze the bulb 1 to sound the reed trumpet note and these acts may be performed simultaneously, alternately or selectively as the emergency may require. The wires of the controller circuit of horn motor may be carried through the tube 2 and if desired the circuit closer may be arranged in the bulb 1. In the latter case, an ordinary squeeze on the bulb will first sound the reed horn note, and then if the squeeze be prolonged the pressure will come on the circuit closer which will cause the Klaxon note to sound. Usually, however, the Klaxon note alone will be relied upon for long distance signaling and for producing the maximum alarm in cases of emergency while the bulb operated reed horn may be used for ordinary warnings in city streets, improvement in the alarm quality of the note by reason of the reaction of the diaphragm and projector being of especial advantage inasmuch as it adds a certain imperative quality to the otherwise too permissive quality of the reed horn note.

It will be noted that the case 7 is provided with drain holes 7^a 7^b such as described in my prior Patent No. 956,898 and more specifically in my Patent No. 957,161. Supplemental drainage may be supplied for the trumpet 5 at the lowermost point of the convoluted and if desired the opening may be normally closed by a screw cap or by a spring pressed or other automatic valve adapted to open upon accumulation of water pressure in the trumpet. In many cases, however, it is desirable to prevent water entering the projector from finding its way into the reed trumpet and in the present combined reed trumpet, projector and diaphragm it is possible, just as in my commercial form of Klaxon described in my above mentioned application to unbolt the front case section 7, which carries the pro-

jector 6, rotate the latter about the longitudinal axis of the projector to an angle of 180° and again bolt the same in place. This brings the reed trumpet and the opening thereof on the upper side of the projector. In this case water is not likely to find its way into the reed trumpet even when driven by hose into the open end of the projector since the trumpet opening is above and moreover the point of splashing of the whole stream will be at the diaphragm which is considerably in the rear of said opening.

It will be obvious that instead of arranging the entire reed trumpet on the lower side of the projector as shown in the drawing or on the upper side as just described, the convolutions of the trumpet may be arranged on the lower side of the projector and the open end carried around and secured over an opening in the side or in the top of the projector.

While I have herein fully shown and described, and have pointed out in the appended claims certain novel features of construction, arrangements, and operation which characterize my invention, it will be understood by those skilled in the art that various omissions, substitutions and changes in the forms, proportions, sizes, and details of the device and of its operation, may be made without departing from my invention.

I claim:

1. In a device of the class described, a reed and trumpet in combination with a projector in communication with the open end of said trumpet, said projector having an open mouth at one end and having the other end closed by an acoustic diaphragm located in such proximity to the open end of the trumpet as to affect the sound waves emerging from said open end.

2. In a device of the class described, a reed and trumpet in combination with a projector in communication with the open end of said trumpet, said projector having an open mouth at one end and having the other end closed by an acoustic diaphragm located in such proximity to the open end of the trumpet as to affect the sound waves emerging from said open end.

3. In a device of the class described, a reed and trumpet in combination with a projector arranged transversely of the open end of said trumpet and in communication therewith, said projector having walls diverging to an open bell mouth at one end and having the other end closed by an acoustic diaphragm located in such proximity to the open end of the trumpet as to affect the sound waves emerging from said open end.

4. In a device of the class described, a reed and trumpet in combination with a projector arranged transversely of the open end of said trumpet said projector having an open mouth at one end and having the other end

closed by an acoustic diaphragm located in such proximity to the open end of the trumpet as to affect the sound waves emerging from said open end, a convolution of said trumpet being secured to said projector.

5 5. In a device of the class described, a reed and trumpet in combination with a projector arranged transversely of the open end of said trumpet said projector having an open
10 mouth at one end and having the other end closed by an acoustic diaphragm located in such proximity to the open end of the trumpet as to affect the sound waves emerging
15 from said open end, a convolution of said trumpet being secured to said projector at a point between the open end of said trumpet and the open mouth of said projector.

6. In a device of the class described, a reed and trumpet in combination with a projector
20 arranged transversely of the open end of said trumpet said projector having an oval bell mouth at one end and having the other end closed by an acoustic diaphragm located in such proximity to the open end of the
25 trumpet as to affect the sound waves emerging from said open end, a convolution of said trumpet being secured to said projector in the rear of said bell mouth in the plane of the major diameter thereof.

30 7. In a device of the class described, an acoustic diaphragm, a diaphragm case and a resonant projector secured over an opening in said case, in combination with means for exciting relatively feeble vibration of
35 said diaphragm by energy applied to the front side thereof and means for causing relatively powerful vibration thereof by energy positively applied at the rear side thereof.

40 8. In a device of the class described, an acoustic diaphragm, a diaphragm case having a front wall spaced away from said diaphragm, a resonant projector secured over an opening in said case, in combination with
45 means for exciting relatively feeble vibration of said diaphragm by energy of regularly recurring acoustic waves from a musical source, applied to the front side thereof and means for causing more violent vibration
50 thereof by energy applied at the rear side thereof.

9. In a device of the class described, an acoustic diaphragm, a diaphragm case and a resonant projector secured over an opening
55 in said case, in combination with a trumpet communicating with said projector adjacent said diaphragm for propagating and introducing intermediate the ends of said resonant projector and immediately adjacent to
60 said diaphragm, regularly recurring acoustic vibrations constituting a note.

10. In a device of the class described, an acoustic diaphragm, a diaphragm case having a front wall spaced away from said diaphragm, a resonant projector secured over an

opening in said case, in combination with means for generating and introducing intermediate the ends of said resonant projector and adjacent the front faces of said diaphragm, regularly recurring acoustic vibrations constituting a note.

11. In a device of the class described, an acoustic diaphragm, a diaphragm case having a front wall spaced away from said diaphragm and a projector secured over an opening in said case, in combination with means for exciting relatively feeble vibration of said diaphragm by acoustic waves applied at the front side thereof and a cam for positively forcing violent vibration thereof by energy positively applied at the rear side thereof.

12. In a device of the class described, an acoustic diaphragm, a diaphragm case having a front wall spaced away from said diaphragm and a protector secured over an opening in said case, in combination with a reed and trumpet communicating with said projector adjacent said diaphragm for generating and introducing intermediate the ends of said projector and in operative proximity to the front of said diaphragm, regularly recurring acoustic vibrations constituting a note.

13. In a device of the class described, an acoustic diaphragm, a diaphragm case having a front wall spaced away from said diaphragm, a resonant projector secured over an opening in said case, in combination with a reed horn having a trumpet formed in convolutions and arranged with its open end secured over an opening in the wall of said projector adjacent the front side of the diaphragm; a rotary cam in operative relation to the rear side of the diaphragm, and a motor shaft carrying a depending motor for the rotary cam, said motor and the convolution of said trumpet being arranged below the axis of the projector and in substantially the same vertical plane therewith.

14. In a device of the class described, a substantially straight projector, a suitable case, a vibratory diaphragm, a motor depending at the rear of said diaphragm substantially at right angles to the axis of the projector, and a reed horn having a trumpet formed in convolutions arranged in the angle between the projector and motor, said trumpet being in open communication with said projector at a point in such proximity to the said diaphragm as to allow said diaphragm to affect the sound waves emerging from said trumpet.

15. In a device of the class described, a substantially straight projector, a suitable case, a vibratory diaphragm, a motor depending at the rear of said diaphragm substantially at right angles to the axis of the projector, and a reed horn having a trumpet

formed in convolutions arranged in the angle between the projector and motor, and having its open end communicating with the interior of said projector at a point near the front side of the diaphragm.

16. In a device of the class described, a diaphragm horn in combination with a reed horn, the trumpet of which communicates with the interior of the projector of the diaphragm horn at a point immediately adjacent to the front of the diaphragm.

17. In a device of the class described, a diaphragm horn comprising a diaphragm, a casing for said horn, a substantially straight projector secured to the casing on the forward side of the diaphragm, an actuating cam, located in the casing on the rear side of the diaphragm, and a motor depending at the rear of the diaphragm at substantially

right angles to the axis of the projector for operating said cam, in combination with a reed horn, having a trumpet formed in convolutions, arranged in the angle between the projector and the motor and in substantially the same plane as the motor and with its open end communicating with the interior of the projector at a point immediately adjacent to said diaphragm, the portion of the trumpet connected to said diaphragm, projecting substantially parallel to the diaphragm.

Signed at New York city, in the county of New York and State of New York, this 26th day of April A. D. 1910.

MILLER REESE HUTCHISON.

Witnesses:

GEORGE C. DEAN,
IRVING M. OBRIEGHT.