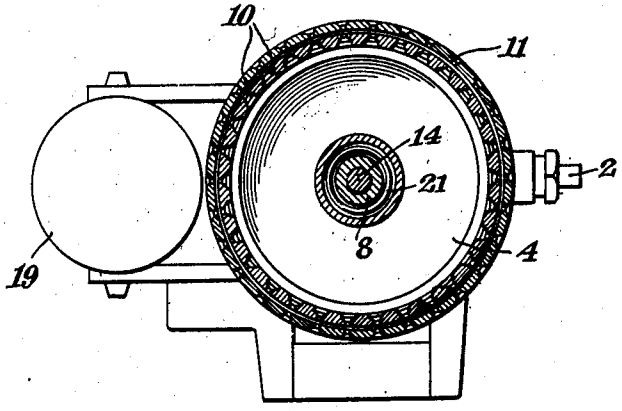
Jan. 1, 1935. B. SETTEGAST 1,985,954

SIREN FOR THE PRODUCTION OF SHARP CUT TONES OF SHORT DURATION

Filed Nov. 6, 1933

Fig. 1.



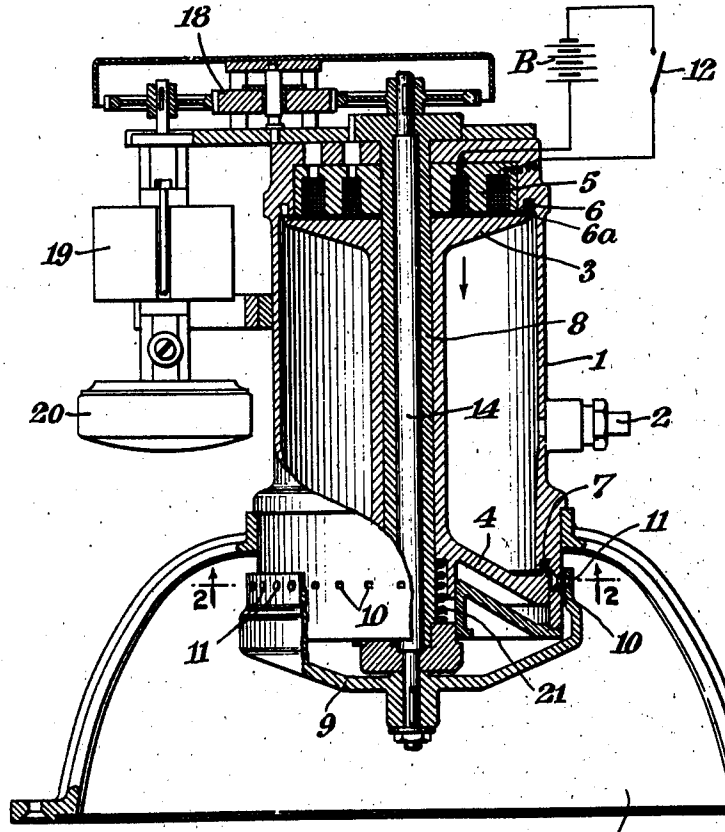
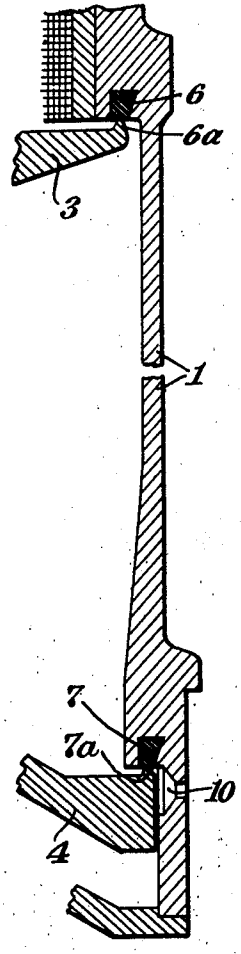


Fig. 2.

Fig. 3



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SIREN FOR THE PRODUCTION OF SHARP CUT TONES OF SHORT DURATION

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In Germany November 2, 1932

3 Claims. (Cl. 177—8)

The invention relates to a sound transmitter operated by compressed air which is particularly suited for the production of short tones which set in at full strength and are of large amplitude and very short duration, as are used in particular for echo sounding in air. The characteristic mode of action in this type of sound transmitter is obtained by the direct incorporation of the tone generating member with a special compressed air container, which without any intermediate conductor, supplies its content of pressure gas directly to the tone generating member. The control of the inlet constructed as a differential valve through which the compressed air acts on the tone generating member, is effected preferably electromagnetically, in which case one of the valve plates is designed in the form of a magnet armature.

In the transmitter according to the invention a siren serves as the tone generating member, in which the inset and the end of the tone are particularly sharp, and above all by the aid of which much larger amplitudes may be obtained than in other types of tone generators and which remain absolutely constant during the tone period.

The construction and mode of action are discussed in the following, with reference to the drawing in which

Fig. 1 represents a cross-section through the tone generating member on the line 2—2 in Fig. 2;

Fig. 2 represents a longitudinal section through the tone transmitter, and

Fig. 3 represents an enlarged sectional view of the right-hand upper and lower sectional wall portion of cylinder wall 1 in Fig. 2.

The casing 1 of the tone transmitter is constructed in the form of a closed hollow cylinder. Through the tube connection 2 is effected the supply of compressed gas, for example, compressed air from a convenient container. An electromagnet 5 is incorporated in the one end of the hollow cylinder. Inside the hollow cylinder a double seat valve is arranged axially displaceable on the hollow axle 8. The valve plates 3 and 4 are constructed such that the diameters or surface areas are somewhat different from one another. In such an arrangement it is well-known that to close the valve it is only necessary to overcome the difference between the pressures acting on the different valve plates. For this purpose the one valve plate 3 is constructed as, or combined with, a magnet armature. The closing of the valve is effected against the differential pressure by the electromagnet energized from a battery and controlled by switch 12. The edges of the two valve plates are accommodated in annular valve seatings 6 and 7 which are lined with rubber and afford a particularly tight seal of the inside of the casing against the outer air by the rims 6^a and 7^a respectively of the valve plates 3 and 4.

The tone generating member of the tone transmitter is constructed in the form of the known sirens. It consists of a bell shaped rotation body 9, the cylindrical rim of which extends over the lower end of the hollow cylinder 1. In this rim are provided a convenient number of openings 11 which are disposed opposite to an equal or a smaller number of peripherally spaced rectangular discharge openings 10 provided in the periphery of the hollow cylinder 1. The rotation body is carried on a spindle 14 and is driven by an electric motor 19 over a gearing 18. By means of a special regulator 20 on the electric motor (not shown in detail), provision is made for maintaining constant the speed of rotation throughout the duration of the signal.

The opening of the valve or the starting of the tone is effected by the de-excitation of the electromagnet 5 by opening the switch 12 of a circuit including battery B. The double seat valve then moves under the differential pressure suddenly downwards in the direction of the arrow and uncovers the openings 10. The compressed air inside the casing is suddenly released through the openings 10 and is intermittently discharged through openings 11 in the rotating body 9, thus producing a tone in well-known manner. The pitch of the tone is determined by the number of openings and the speed of rotation. In this manner extremely precise tone impulses of well defined duration and of an almost explosive character can be emitted.

The return of the double seat valve into its position of rest is effected under the influence of a spring 21 and the attractive force of the above mentioned electromagnet 5 when energized. If extremely short signals are to be given the duration of which does not exceed one hundredth of a second, then it is necessary to open the switch 12 only for a very short time. In this case the remanent magnetism of magnet 5 assists the closing of the valve.

For tones of short duration it is preferable to make the cross-section of the supply tube smaller than the total area of the openings in the siren.

The form of the discharge openings 10 in the hollow cylinder and the openings 11 in the rota-

tion body has some influence on the purity of the tone. For generating a sinusoidal tone, it is necessary that the periodic pressure fluctuations in the air should follow a sine function. It has been found by calculation that this requirement is satisfied if the openings are of rectangular shape.

The transmitter is embraced by a sound funnel 22 which is so disposed on the hollow body that the sound is radiated in the axial direction. The rim of this sound funnel is provided with a flange which serves for securing the sound transmitter in a wall, for example, in the fuselage of an aircraft.

This type of transmitter is suited for the generation of Morse signals of a very small duration. The production of the signals is effected by the aid of the switch 12 which in that case should be constructed as a Morse key. On account of the large consumption of air, however, the cross-section of the supply conduit 2 must be made larger than in the case where separate tones are emitted at large intervals of time.

I claim:

1. A sound transmitter for producing tones of explosion-like precision and intensity by means of a siren, comprising a pressure tank for storing the pressure medium actuated by the siren, and having peripherally spaced perforations at its lower end forming the stator of the siren, a rotor and means for continuously operating it, said rotor surrounding said stator and having peripherally spaced perforations disposed to intermittently register with said stator perforations during the continuous operation of the rotor, and a differential pressure valve in said container disposed to directly control the stator perforations and tending to expose the stator perforations directly to the interior of the pressure tank under a given differential pressure exerted against the valve by the operating medium, and controllable means for normally holding said valve in closing position against said differential pressure, whereby the tank can be suddenly discharged through the siren perforations when the valve is opened.

2. A sound-transmitter for producing tones of explosion-like precision and intensity by means of a siren, comprising a pressure tank for storing the pressure medium actuated by the siren, and having peripherally spaced perforations at its lower end forming the stator of the siren, a rotor and means for continuously operating it, said rotor surrounding said stator and having peripherally spaced perforations disposed to intermittently register with said stator perforations during the continuous operation of the rotor, and a differential pressure valve in said container disposed to directly control the stator perforations and tending to expose the stator perforations directly to the interior of the pressure tank under a given differential pressure exerted against the valve by the operating medium, and controllable means for normally holding said valve in closing position against said differential pressure, whereby the tank can be suddenly discharged through the siren perforations when the valve is opened, and a pressure medium supply conduit connected to said tank and having an area smaller than the sum of the stator perforation areas.

3. A sound transmitter for producing tones of explosion-like precision and intensity by means of a siren, comprising a pressure tank for storing the pressure medium actuated by the siren, and having peripherally spaced perforations at its lower end forming the stator of the siren, a rotor and means for continuously operating it, said rotor surrounding said stator and having peripherally spaced perforations disposed to intermittently register with said stator perforations during the continuous operation of the rotor, and a differential pressure valve in said container disposed to directly control the stator perforations and tending to expose the stator perforations directly to the interior of the pressure tank under a given differential pressure exerted against the valve by the operating medium, and controllable electromagnetic means for normally holding said valve in closing position against said differential pressure, whereby the tank can be suddenly discharged through the siren perforations when the valve is opened.

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