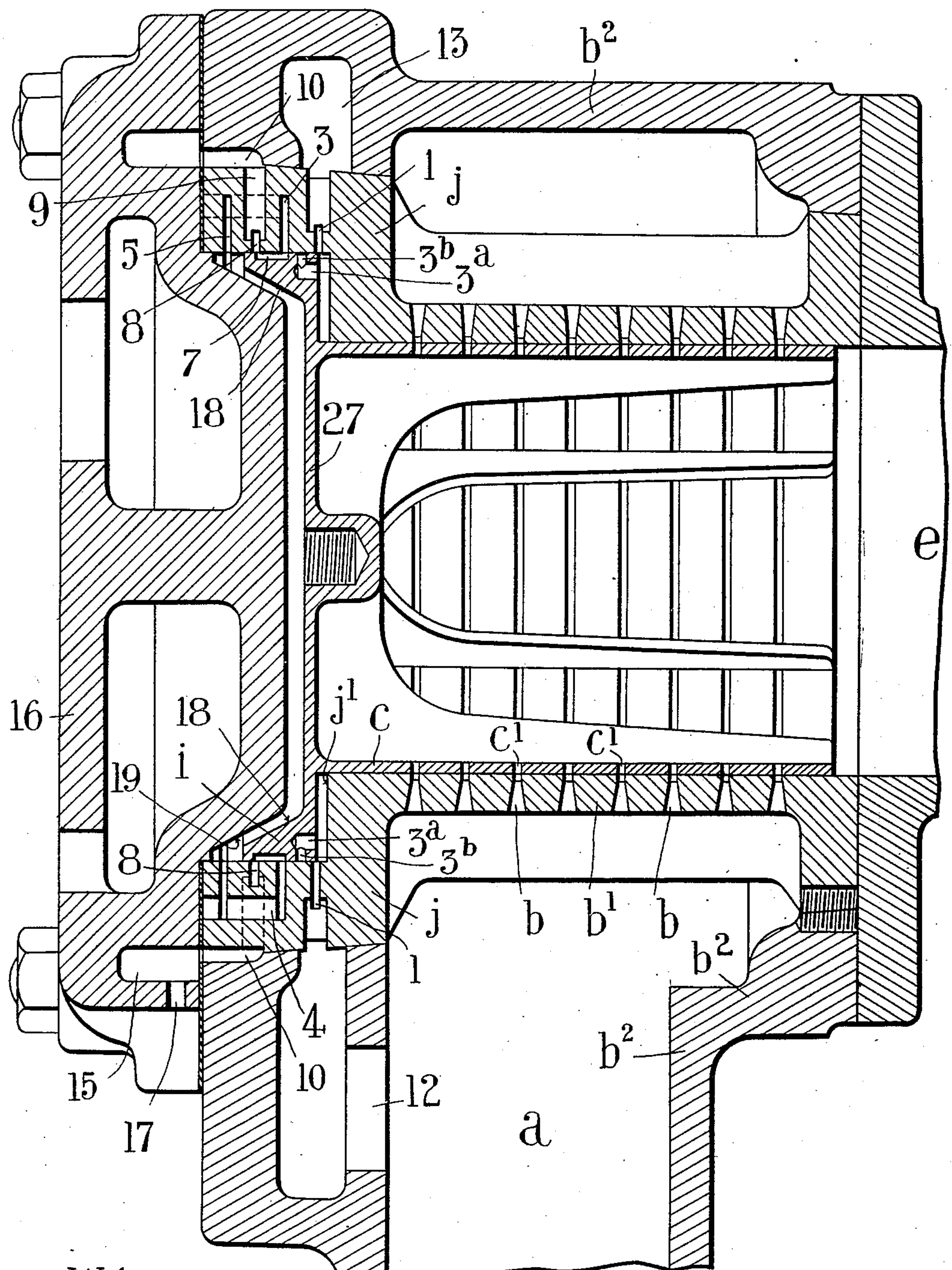
J. P. NORTHEY.

SOUND PRODUCING DEVICE.

APPLICATION FILED MAY 15, 1909.

1,016,087. Patented Jan. 30, 1912.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN PELL NORTHEY, OF TORONTO, ONTARIO, CANADA.

SOUND-PRODUCING DEVICE.

1,016,087. Specification of Letters Patent. Patented Jan. 30, 1912.

Application filed May 15, 1909. Serial No. 496,175.

To all whom it may concern:

Be it known that I, JOHN PELL NORTHEY, a subject of His Majesty the King of Great Britain, residing at the city of Toronto, Province of Ontario, Canada, have invented a new and useful Improvement in Sound-Producing Devices, of which the following is a specification.

This invention relates to sound producing devices of a character suitable for fog signaling, position locating or the like of the type in which a slotted part is moved within a slotted fixed part or cylinder, the exterior of which is supplied with steam or air, such movable part being reciprocated by a piston or piston head combined with it and working in a separate cylinder hereinafter referred to as a chambered head and preferably separately supplied with steam or air, the exhaust of which has in some instances been discharged into the sound producing steam or air and sometimes through the head or piston into the atmosphere. According to the present invention the exhaust of this operating portion of the sound producing part is discharged entirely free of the piston so that it neither passes to the note producing air which (except with special devices) is harmful to the note, nor passes into or through the piston, as heretofore, which causes the latter as one objection to be difficult to construct. The invention does not include broadly this arrangement in all kinds of pistons but only of course in connection with a piston or piston head carried by a reciprocating sound producing part in an apparatus of the type referred to as it enables such apparatus to be both more easily constructed and better worked.

In the accompanying drawing there is shown an example of the apparatus of the type referred to constructed according to the present invention, the view being a sectional elevation with the horn or resonator broken away.

In the form shown a is the passage for the sound producing air or steam which passes through slots b in a wall or cylinder b' suitably held in a casing b^2. After passing through the slots b the air passes through slots c' in a movable part c the open end of which terminates in a resonator e through which the air vibrations are discharged. The movable part c has a piston head or piston i which works in a chambered head j of the slotted cylinder b' and forms the operating means for the part c. It is desirable in the case of large instruments to have a separate air or steam supply to this piston i but in the form shown the air or steam supply used is the same as that employed for producing the note, the fluid passing through an opening 12 from the passage a into an annular chamber 13 in the casing b^2. This chamber 13 communicates by a series of openings 1, with the front of the piston i and between it and a shoulder j' forming the rear wall of the chambered head j. In the piston i are a number of horizontal ports or holes 3^a communicating with radial ports or passages 3^b, and there is also an annular space or passage 7, while in the head j are inlet ports 3 and 5 communicating with each other by horizontal passages 4. There is also a series of exhaust ports 8 communicating with a series of exhaust passages 9 which in turn communicate with an annular exhaust passage 10, the latter in the form shown communicating with an annular passage 15 in a cover or head 16, which passage 15 has a series of exhaust openings 17 out of same.

It will be seen that one end of the movable part c is closed by a wall 27 which forms the outer working face of the enlarged piston i the rest of same being made up of a peripheral wall or flange 18 which carries the ports referred to, so that the piston i is cup-shaped or open ended, the closing wall 27 of the movable part forming the pressure receiving wall of the piston.

The peripheral wall or flange 18 is preferably frusto-conical and the cover or head 16 has a portion 19 formed as a frustum of a cone, which enters the open ended piston i, a space for the fluid being left between the two.

In the operation of the instrument a portion of the fluid passes from passage a into the chamber 13 thence by way of opening 1 in front of the piston and between it and the shoulder j' which is opposite to it. This forces the piston back until the radial passages 3^b are opposite to the ports 3 through which the fluid passes by way of horizontal passages 4 and ports 5 to the rear of the piston which is thus, owing to the larger area of its end closing wall 27 forced back until the radial passage 3^b is removed from the port 3 and the latter is put in communication with the space 7, formed peripherally of the piston, which is then opposite to port

8 so that the fluid can exhaust from the back of the piston through ports 5, passages 4, ports 3, ports 8, passages 9, 10 and 15 to the exhaust openings 17 so that the exhaust is taken free of the piston. The piston is cushioned in front and back by the fluid in the spaces in front and at the back of the ports 3 and 5 respectively, but this, and the general operation of the apparatus has been before described by me.

The construction of the piston described is particularly advantageous for this type of instrument owing to the ease with which it can be cast and the passages formed therein it being essential owing to its high rate of reciprocation that it and the part *c* it moves should be formed in one piece.

What I claim is:—

1. A sound producing device comprising a fixed part having orifices and a cylindrically chambered head, adjacent said fixed part, having a double series of ports, connected by horizontal passages, and an intermediate series of exhaust ports for conducting an operating fluid, a cover for said chambered head, a movable part having orifices coacting with said first-mentioned orifices and having a piston operating in said chambered head for reciprocating said movable part, said piston having a peripherally formed annular passage opposite to the cylindrical wall of said chambered head and being provided with communicating radial and horizontal ports, said radial ports opening on the peripheral face of said piston and said horizontal ports opening on the face of said piston adjacent said fixed part, and exhaust passages in said chambered head communicating at one end with said exhaust ports and at their other end with the atmosphere, and means including openings for introducing the operating fluid into said chambered head on the side of the piston having said horizontal ports, whereby the operating pressure fluid for said piston is introduced on one side of said piston, thence conducted to the other side of said piston and finally passes exteriorly of the piston and exhausting to the atmosphere.

2. A sound producing device comprising a fixed part having orifices and a cylindrically chambered head adjacent said fixed part, and having a double series of ports, connected by horizontal passages, and an intermediate series of exhaust ports for conducting a fluid under pressure, a movable tubular part having orifices coacting with said first-mentioned orifices, said tubular part being open at one end and at its other end closed by a wall extending in its own plane beyond said tubular part and terminating in a flanged extension, said wall and flanged extension forming a cup-shaped piston operating in said chambered head and having a peripherally formed annular fluid conducting passage and communicating horizontal and radial ports, said radial ports adapted to communicate with one series of said double series of inlet ports and said horizontal ports being in communication with said chambered head on one side of said piston head, a cover for said chambered head, exhaust passages through the wall of said chambered head communicating with said exhaust ports at one end and with the atmosphere at the other end, and means including openings for introducing the operating fluid into said chambered head on the side of the piston having said horizontal ports.

3. A sound producing device comprising a fixed cylindrical part having surrounding orifices, said fixed cylindrical part being open at one end and at its other end being provided with an annular chambered head of greater diameter than the interior diameter of said cylindrical part, a movable tubular member in said fixed member and having orifices coacting with said first-mentioned orifices, said movable member being open at one end and at its other end provided with a closed wall extending beyond the tubular portion thereof in its own plane and terminating in flanged extensions forming a cup-shaped piston head, the annular wall of said chambered head having a double series of ports, connected by horizontal passages, and intermediate outlet ports therein, and the flanged extension of said piston head having communicating radial and horizontal ports communicating at one end with the interior of said chambered head and at the other end adapted to communicate with one series of said double series of ports, said piston head also having a peripheral passage coacting with said outlet ports and one series of said double series of ports in the wall of said chambered head, means including openings for introducing the operating fluid into said chambered head on the side of the piston having said horizontal ports, and a removable head having a projecting portion entering said cup-shaped piston, the walls of said chambered head and said removable head being provided with exhaust passages leading from said exhaust ports, exteriorly of said piston, to the atmosphere.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN PELL NORTHEY.

Witnesses:
ALLEN PARRY JONES,
EDWARD T. FOSTER.