An air jet with pulsed momentum flux can also be obtained as illustrated in FIG. **2**. Shown is a fan **1**, labelled "FAN", which discharges into manifold **12**. The air flow in the manifold can be partially obstructed by a sheet valve **13** in the form of a perforated cylindrical sheet. The sheet valve carries a voice coil **14** which is situated in the field of a permanent magnet **15**, in the manner of conventional electromagnetic loudspeakers. When no current flows through the voice coil, the sheet valve is held in equilibrium position by springs **16**. In this position, the perforation **17** in the sheet is lined up with the flow passage allowing essentially unimpeded flow through the manifold and out the exit **18**, such as to form a jet **19** in the atmosphere. Sending a current pulse through the voice coil **14** causes the sheet valve to be displayed in the axial direction, thereby partially obstructing the air flow through the manifold. Owing to the low inertia of the sheet valve, the arrangement allows efficient pulse modulation of the jet momentum flux.

A somewhat different modulation system can be obtained with a rotating cylindrical sheet valve that has one or more holes along its periphery, and which is adjacent to a stationary cylindrical shroud that has corresponding holes, so that rotation of the valve causes modulation of the air flow through the holes. The valve is rotated by a stepper motor driven by voltage pulses. The latter are obtained from a generator that is controlled by a tuner.

One can also use direct acoustic wave propagation for inducing the required atmospheric acoustic pulses. It is then advantageous to employ as the source of the waves an acoustic monopole, since for these the acoustic pressure does not fall off as fast with increasing distance as for dipoles. Moreover, at the very low frequencies involved, acoustic pressure shorting across a conventional loudspeaker baffle is very severe. A sealed loudspeaker mounted in an airtight box eliminates this pressure shorting, and radiates acoustic waves with a relatively large monopole component.

An acoustic monopole may also be produced by having a source of pressurized gas vent through an orifice into the atmosphere in a pulsed fashion. The gas may be air. Alternatively, one may have a source of low-pressure air inhale atmospheric air through an orifice in pulsed fashion. These actions are easily achieved by an oscillating or rotating valve. For purposes of discussion it is convenient to introduce the concept of gaseous flux through the orifice, defined as the integral of the normal flow velocity component over an imagined surface that tightly caps the orifice, the normal component being perpendicular to the local surface element, and reckoned positive if the flow is directed into the ambient atmosphere. The gaseous flux has the dimension of m^3/s. For the case with a source of pressurized gas, the gaseous flux is positive and due to gas venting to the atmosphere. For the case with a source of vacuum, the gaseous flux is negative and due to atmospheric air entering the orifice. The strength of the acoustic monopole is expressed as the amplitude of the gaseous flux fluctuation, amplitude being defined as half the peak-to-peak variation. The concept of gaseous flux allows a unified discussion of venting acoustic monopoles that use a source of pressurized gas or a source of vacuum, or both.

The source of pressurized air could be a cylinder with pressurized gas, such as a CO_2 cartridge. For personal use, such a cartridge may last a long time because only very small acoustic monopole strengths are needed for the induction of the required weak acoustic signals. For long term and long range operation, the exhaust port of an air pump may serve as a source of pressurized air, and the intake port could be used as a source of vacuum.

A simple venting acoustic monopole is shown in FIG. **12**, where the source **63** of pressurized gas, which may be air, is connected to a conduit **69** which has an orifice **65** that is open to the atmosphere. A rotating valve **66** labelled "VALVE" controls the gaseous flux through the orifice. The valve is rotated by a stepper motor **67** labelled "MOTOR", driven by voltage pulses from the generator **68** labelled "GENERATOR". The motor speed is determined by the frequency of the voltage pulses. This frequency can be selected by the tuner **70**, which therefore controls the frequency of the acoustic pulses emited by the orifice **65**. For the simple orifice shown, boundary layer separation may occur in the outflow, so that the air pulses emerge in the form of jets. This causes dipole and higher multipole components in the radiated acoustic field. If desired, such radiation components can be avoided or diminished by placing a spherically or dome shaped fine mesh screen over the orifice **65**. Instead of holding pressurized gas, the source **63** may hold a vacuum. In either case, the pulsing of the gaseous flux causes radiation of monopole-type acoustic waves. The source **63** may be replenished by a pump.

Push-pull operation can be achieved in the manner shown in FIG. **3**. An air pump **20**, labelled "PUMP", with flow ports **64**, pressurizes the pressure vessel **21** while drawing a vacuum in the vacuum vessel **22**. A valve **23** is operated by the solenoid **24** such as to alternately admit high and low pressure air to the conduit **26**. The latter vents to the atmosphere through a screen **55** placed across an orifice **27** that is open to the atmosphere. The valve is controlled by an oscillator consisting of the solenoid **24**, which is connected to the pulse generator **6**, labelled "GENERATOR". The frequency of the electric current pulses through the solenoid is determined by the setting of the tuning control **9**. This frequency is to be tuned to the resonance frequency of the sensory resonance that is to be excited. The tuning may be done manually by a user. The conduit **26** is structured as a diffuser in order to avoid boundary layer separation during the exhaust phase; the screen across the orifice **27** inhibits formation of a jet, thereby providing more nearly for a monopole type acoustic wave. During the intake phase the orifice acts as a sink; streamlines **28** of the resulting flow are illustrated. The vessels **21** and **22** smooth the flow fluctuations through the orifice that are due to the flow fluctuations through the pump; they are drawn at a relatively small scale for compactness sake. Instead of the oscillating valve **23**, a rotating valve may be used, driven by a stepper motor powered by voltage pulses from a generator.

Conventional loudspeakers may be used as well as the source of acoustic radiation. An example is shown in FIG. **4**, where the piezoelectric transducer **37** is driven by a simple battery-powered pulse generator built around two RC timers **30** and **31**. Timer **30** (Intersil ICM7555, for instance) is hooked up for astable operation; it produces a square wave voltage with a frequency determined by capacitor **33** and the potentiometer **32**, which serves as a tuner that may be operated by a user. The square wave voltage at output **34** drives the LED **35**, and appears at one of the output terminals **36**, after voltage division by potentiometer **71**. The other output is connected to the negative supply. The output terminals **36** are connected to the piezoelectric speaker. Automatic shutoff of the voltage that powers the timer **30** at point **38** is provided by a second timer **31**, hooked up for monostable operation. Shutoff occurs after a time interval determined by resistor **39** and capacitor **40**. Timer **31** is powered by a 9 Volt battery **41**, via a switch **42**. Optional rounding of the square wave is done by an RC circuit consisting of a resistor **43** and capacitor **44**. An optional