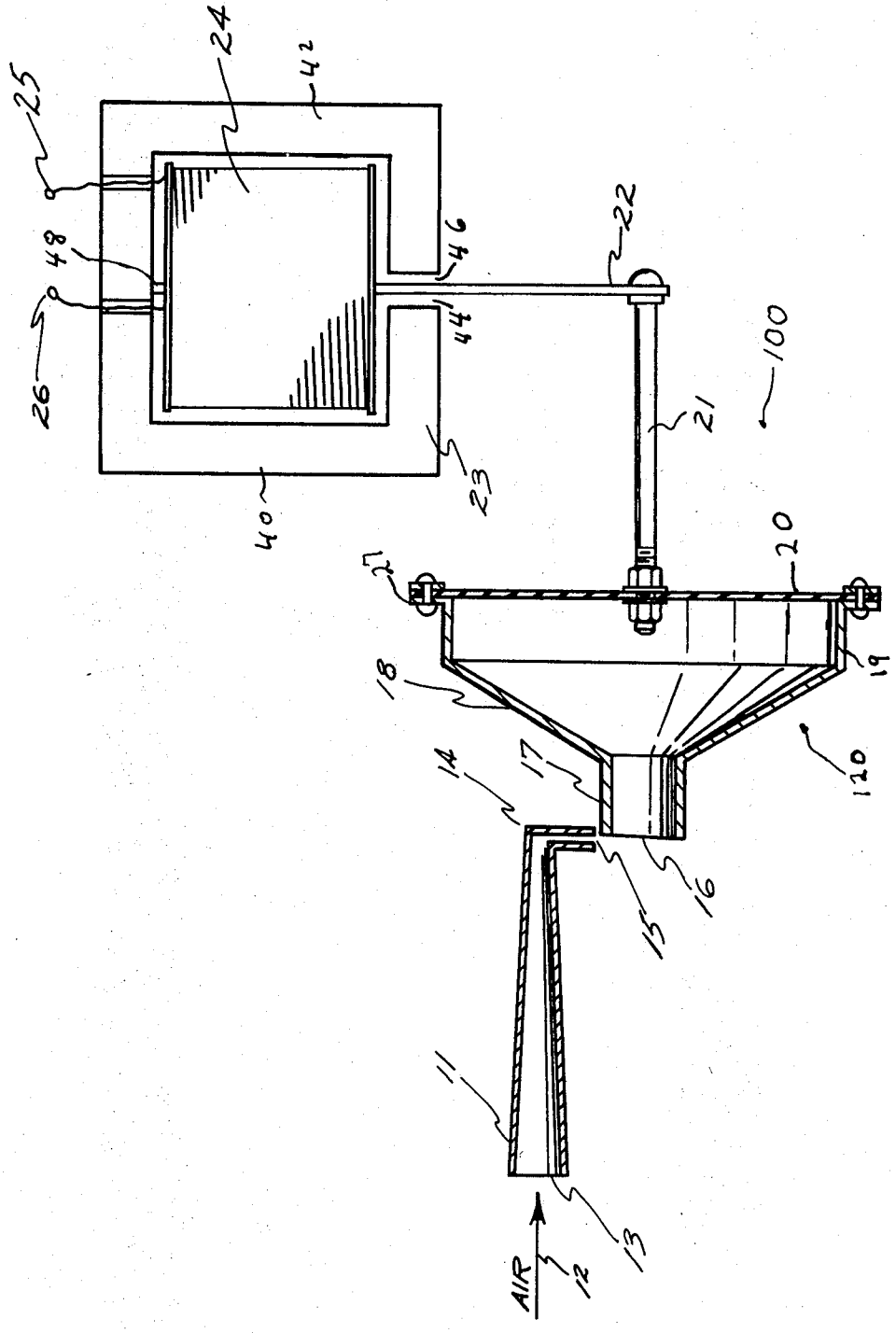
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ELECTRICAL POWER SOURCE

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ELECTRICAL POWER SOURCE

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ABSTRACT OF THE DISCLOSURE

Air is passed through the longer side of an L-shaped hollow tube. The air is discharged from the shorter side of the L-shaped hollow tube and passed parallel to an entrance port of a Helmholtz fluid resonator. One side of the Helmholtz resonator is defined by a diaphragm which has the same resonant frequency as the resonator itself. A connecting rod at one of its ends is joined to said diaphragm and at its other end to a soft iron reed which is surrounded by an electrical coil having two output wires. Surrounding the electrical coil is a permanent magnet. When the pressure of the air discharging from the shorter side of the hollow tube matches the resonant frequency of the Helmholtz resonator, resonance occurs, and the diaphragm is vigorously vibrated and, by the connecting rod, vigorously vibrates the soft iron reed between the poles of the permanent magnet. Since the electrical coil is inside the permanent magnet a voltage is induced across the two output wires of the electrical coil.

This invention relates to electrical generating means, and in particular, to a device that is capable of selectively transforming pressure energy of a certain magnitude into a small quantity of electrical energy.

Prior art devices to convert pressure energy into a low value electrical voltage have in the past been complex and expensive. A typical prior art device to convert a pressure energy signal into a low value electrical voltage was a small air turbine which rotated the armature of an electrical generator. While this device was successful in generating low value electrical voltages it was quite complex in design and tended to produce inconsistant voltages due to changes in the pressure of the working fluid.

It is therefore an object of this invention to provide improved means to convert pressure energy into a low value electrical voltage.

Another object of the present invention is to provide means to convert a pressure signal of a certain magnitude into an electrical voltage.

A further object of the present invention is to provide inexpensive and simple means to convert a pressure signal of a specified magnitude into a low value electrical voltage and to not utilize said pressure signal when the magnitude thereof is above or below said specified magnitude.

Briefly, in accordance with the present invention, air is passed parallel to the entrance port of a Helmholtz resonator. A connecting rod couples a diaphragm, which serves to define one end of the Helmholtz resonator, with a soft iron reed which is surrounded by an electrical coil having two output wires. A permanent magnet having an air gap surrounds the electrical coil. When the pressure of the air matches the resonant frequency of the resonator, resonance will occur, and the diaphragm will vigorously vibrate the soft iron reed by the connecting rod. The vibrating soft iron reed will change the flux in the air gap of the permanent magnet inducing a voltage across the electrical coil. If the pressure of the air passing parallel to the entrance port of the resonator is above or below the resonant value of the resonator there will not be a resonant condition in the resonator and the diaphragm will not vibrate and hence no voltage will be induced across the output wires of the electrical coil.

Other objects and aspects of the invention will be clear from the foregoing specification and drawing in which the figure is a schematic illustration of my invention.

Referring now to the figure an electrical generating means **100** is shown including a hollow L-shaped tube **11**. An entrance port **13** is at one end of the longer side of L-shaped tube **11** while a discharge port **15** is positioned at the end of a shorter side **14** of L-shaped hollow tube **11**. Discharge port **15** is positioned to blow air parallel to an entrance port **16** of a Helmholtz resonator **120**. Helmholtz resonator **120** has a hollow cylindrical section **17** which communicates entrance port **16** with a conically shaped section **18**. Integral with conically shaped section **18** of the Helmholtz resonator is a base portion **19** which consists of a cylindrical section having a constant cross sectional area. A diaphragm **20** having the same frequency as the Helmholtz resonator, is attached to end **27** of section **19** of the resonator. Attached, by conventional means, to the center portion of diaphragm **20** is a connecting rod **21**. A soft iron reed **22** is joined to the opposite end of connecting rod **21** that is attached to diaphragm **20** and is inside an electrical coil **24** and positioned to pivot at end **48** within a permanent magnet **23** which surrounds electrical coil. Permanent magnet **23** has two pole pieces **40** and **42** of opposite polarity and air gaps **44** and **46** are formed between reed **22** and pole pieces **42** and **40**. Output wires **25** and **26** are part of electrical coil **23** and extend through the top of permanent magnet **23**.

In operation air having a velocity vector indicated by arrow **12** is passed through hollow tube **11** by entrance port **13** and discharged from discharge port **15** parallel to entrance port **16** of Helmholtz resonator **120**. If the pressure of the air discharging from discharge port **15** matches the resonant frequency of Helmholtz resonator **120**, resonance will occur with a resulting vigorous vibration of diaphragm **20**. (A discussion of this phenomenon can be found in "Fundamentals of Acoustics," by Kinzer and Frey, published by John Wiley and Sons, 1962). When diaphragm **20** vibrates, soft iron reed **22**, by connecting rod **21**, will vibrate between pole pieces **40** and **42** changing the magnetic reluctance in air gaps **44** and **46** inducing an electromotive force in coil **24** which can be utilized by output wires **25** and **26**. If the pressure discharging from discharge port **15** is above or below the pressure needed to match the resonant frequency of Helmholtz resonator **120**, resonance will not occur, and diaphragm **20** will not be vibrated with a resulting lack of movement of reed **22** and no voltage will be induced in coil **24**.

From the foregoing it is apparent that I have provided novel means to utilize a pressure signal of a certain magnitude to generate an electromotive force. Since the frequency of resonator **120** is a function of the pressure passed parallel to its entrance port, and since only a pressure of a certain magnitude will be utilized by resonator **120**, it can be seen that when resonance occurs it will produce vibrations of diaphragm **20** within a narrow frequency range. As reed **22** moves with diaphragm **20** it can be seen that the reed will change the magnetic flux in air gaps **44** and **46** at a constant rate and thus produce and electromotive force in coil **24** that will be of a relatively constant magnitude.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in construction and arrangement within the scope of the invention as defined in the appended claims.

I claim as my invention:

1. Apparatus for generating an electromotive force from a pressure signal, comprising:

(a) a Helmholtz resonator utilizing a pressure signal motion comprising an enclosed volume having a of a predetermined magnitude to produce vibratory motion comprising an enclosed volume having a diaphragm at one end thereof and an entrance port at the opposite end thereof;

(b) means discharging a pressure signal perpendicular to and across said entrance port; and

(c) means coupled to said diaparagm for translating said vibratory motion into electrical energy.

2. A device according to claim 1 wherein said means to pass said pressure signal across said entrance port of said resonator includes a hollow L-shaped tube having an inlet port and a discharge port, the latter positioned adjacent said entrance port.

3. A device according to claim 1 wherein said means to produce electrical energy includes a connecting rod coupled to said diaphragm, a soft iron reed coupled to said connecting rod, and said soft iron reed surrounded by an electrical coil and a permanent magnet.

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