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IONIC WIND GENERATING DUCT

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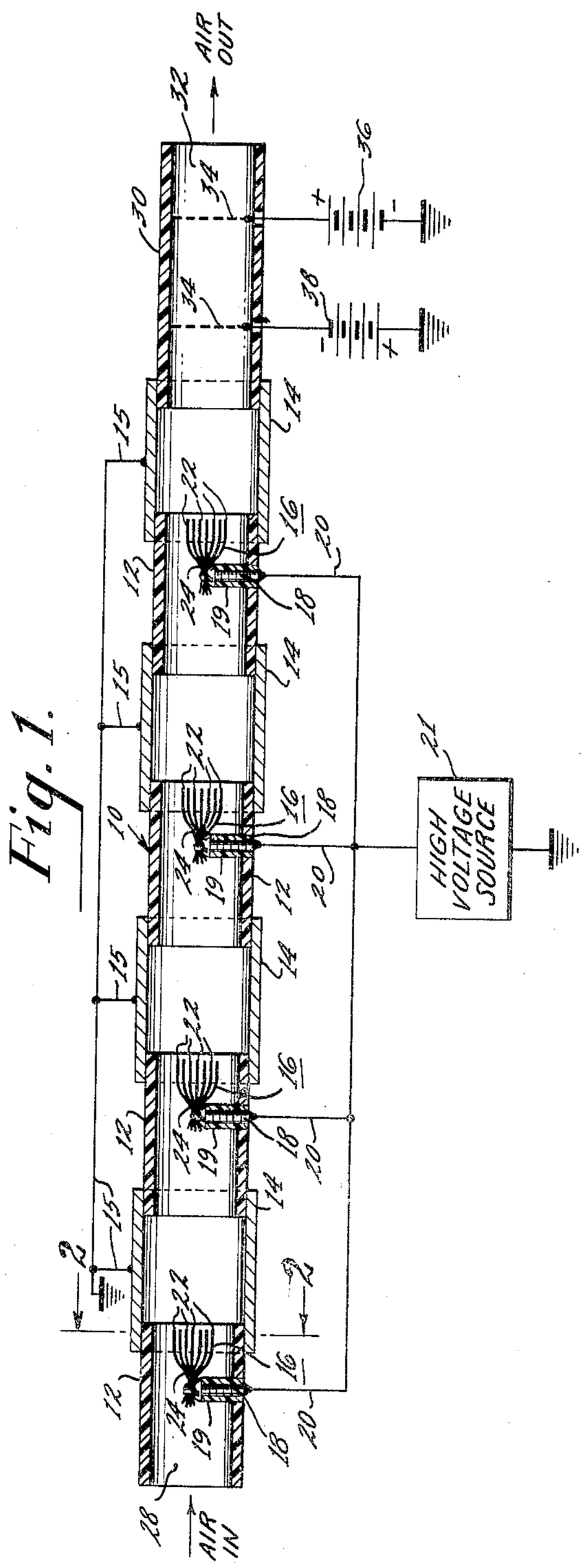

Fig. 1.

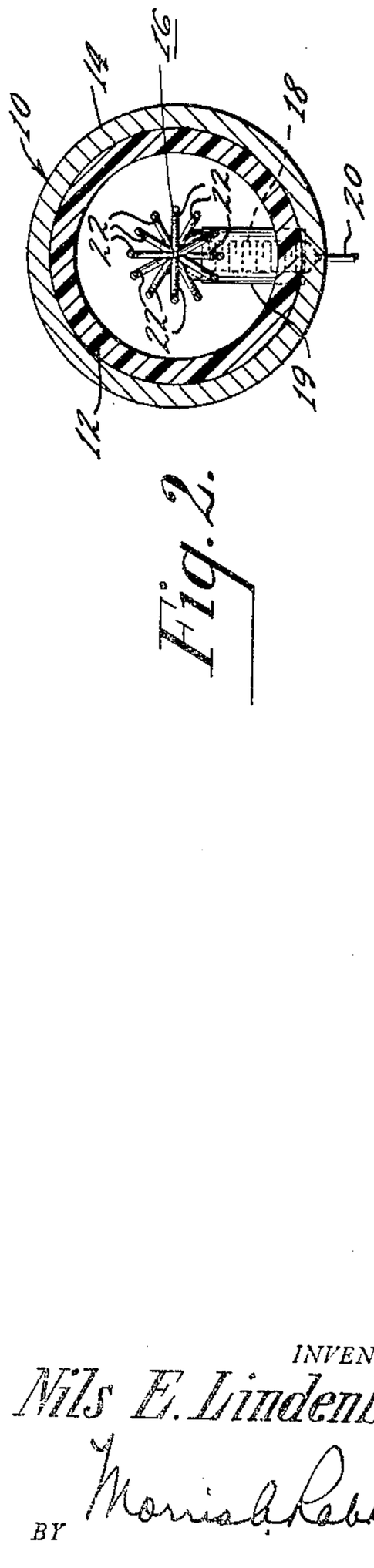

Fig. 2.

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IONIC WIND GENERATING DUCT

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3 Claims. (Cl. 230—69)

This invention relates to apparatus for converting one form of energy into another and more useable form of energy, and more particularly, although not necessarily exclusively, to novel means for producing pressure by an electrical discharge upon fluids, such as air or gas, in order to move these fluids.

A system and apparatus for producing motion in fluids, such as air or gas, involving the use of electrodes having special conductive properties energized at high voltages is known. Also, electro-mechanical devices in the nature of rotating and/or oscillating fan blades are well known. In order to produce sufficient velocity in the air or gas which is caused to be moved, conventional practice has dictated certain minimal requirements relative to the size and the speed of the movable blades, the maximum useable values of which, often times deprive the device of complete fulfillment of its objective. Namely, that of moving a large volume of air or gas swiftly and efficiently. Closely allied to the problems of speed and size of the device is the problem of noise. Noise is an inherent characteristic of any device in which frictionally engaged parts are caused to move in contact with one another or in which turbulence in a fluid stream is produced. The friction of the fluid, whether, for example, air or gas is moved causes production of noise. There is always a certain amount of frictional loss as well as noise encountered when using devices having parts that move and which make contact with the air.

It is an object, therefore, of the invention to provide a novel means for producing motion upon fluids, such as air or gas, without the use of any moving parts.

It is also an object of the invention to provide a device in the nature of or having the effect of a fan in which fluids, such as air or gas, may be caused to be moved at high velocities.

It is a further object of the invention to obtain a directed as well as a magnified propulsion effect upon air or upon a gas in general, from corona discharge points.

A device constructed in accordance with the teaching of the present invention may comprise a pipe or duct composed of alternate conductive and insulating sleeves. The sleeves may be cylindrical in cross section. A corona discharge device is positioned near the entrance to each conductive section of the duct. The discharge device, employed in practicing this invention, resembles a broom and the term "broom" will, therefore, be applied to it. All of the discharge brooms are electrically connected in parallel and all of the conductive sleeves are likewise connected in parallel. Either the discharge brooms or the conductive sleeves may be grounded. The propelling forces which are obtained in each section upon application of high voltage to the device are thus made to be serially additive. The emerging ions are neutralized by means of polarized sections or members placed within and across the exit orifice of the apparatus. The members just referred to may be in the nature of grids.

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation as well as additional objects and advantages thereof will best understand from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is a schematic diagram of a wind duct embodying the present invention and including the circuit connections therefor; and

Figure 2 is a cross section of the wind duct of Figure 1 along the line 2—2 of Figure 1.

Detailed reference will now be made to Figure 1, in which there is shown a schematic diagram of the cylindrical tube or pipe comprising an illustrative example of the wind generating duct of this invention. The duct **10**, in the illustrative example shown, comprises a series of alternate conductive and insulating cylinders or sleeves. The insulating cylinders **12** may be made of Bakelite or other suitable insulating material. The conducting cylinders **14**, are or may be fabricated from conductive material, such for example, as brass. As shown, the conductive sections are connected to a voltage reference point or are grounded through leads **15**. The various conducting and insulating portions are secured together, end to end, to form a long tube or pipe. The duct **10** shown in Figure 1, for example, comprises five conducting hollow metallic cylinders or sleeves **12** which are or may be constructed of brass. Between each conductive cylinder and concentric therewith are positioned four insulating elements in the form of cylindrical tubes or sleeves **14** which are or may be constructed of Bakelite.

Each insulating duct element has an ion producing discharge broom **16** fastened to a conductive support member **18** disposed within the air tube. An insulating lead-in member **19** may be used to provide rigidity for the broom support member **18**. A high voltage lead **20** is brought out through, or by means of, the support. The leads **20** are or may be connected together as shown. A suitable high voltage source **21** has one terminal connected to the leads **20** and its remaining terminal connected to ground. This source **21** provides direct current, although, alternating current could be used, for exciting the brooms **16**. The terminal connected to the brooms may be of either polarity.

Each one of the discharge brooms **16** is roughly umbrella shaped and each broom is composed of a multiplicity of fine wires **22** which are bundled at one end **24** and which are bent to radiate from a central point somewhat similar to the radiating ribs in an umbrella or fan. The outer points of the wires **22** lie in a circle shown in Figure 2, the center of which faces in a direction so as to move air associated therewith toward an exit orifice. The supports **18** for the discharge brooms **16** are secured to the inside wall of the insulating duct elements in a plane perpendicular to the longitudinal axis of the tube and positioned so that each of the brooms is directly in the path of the entering air.

The left side of the air duct **10**, as shown in Figure 1, is provided with an air intake orifice **28**. The opposite end of the air duct comprises an insulating duct element **30** which is slightly longer, in the illustrative embodiment shown, than the air intake element and includes the outlet orifice **32**. A plurality of ion neutralizing grids **34** comprising a predetermined number of vertically and/or horizontally disposed wires are fastened across the duct element **30**. Positive and negative voltage sources **36** and **38**, respectively, for the neutralizing grids, are connected to the grid wires. The position or order of arrangement of the neutralizing members **34** is immaterial.

The high voltage source **21**, which may be either alternating or direct current, supplies voltage on the order of ten thousand volts to the parallel connected ion pro-

ducing discharge brooms **16**. Either the brooms **16** or the sleeves **12** may be grounded.

The application of high voltage to the ion producing discharge brooms **16** establishes a corona around the wires of the brooms. The ions derive a velocity from the electrical field which has thus been generated in response to the application of the high voltage to the brooms. In so doing, the ions induce a motion in all the air with which they are mixed. This induced motion is in the general direction of the electric field. The apparatus thus acts as a four stage additive wind pressure generator.

There has thus been described a novel and simple air pressure generator by means of which a movement of a fluid medium, such as air, can be effected in a silent, steady, serially additive stream.

What is claimed is:

1. An ionic wind generating structure comprising a duct, said duct having alternate conducting and insulating sections, a pluarlity of corona discharge means, means for energizing said corona discharge means, and a plurality of conductive support members providing means for connecting said corona discharge means to said energizing means, one of said conductive support members being disposed within each of said insulating sections, one of said corona discharge means being secured to each of said support members, each of said corona discharge means extending from its support member within said insulating section across the junction of said insulating section with said adjacent conducting section, each of said corona discharge means being arranged to extend from said support member longitudinally towards a preselected end of said duct to additively induce fluid motion in said preselected direction.

2. An ionic wind generating structure comprising a duct, said duct having alternate conducting and insulating sections, a plurality of corona discharge brooms characterized by wires bundled together at one end thereof to form a junction point and radiating radially and longitudinally in a substantially uniform direction, means for energizing said corona discharge brooms, a plurality of conductive support members providing means for connecting said corona discharge brooms to said energizing means, one of said conductive support members being disposed within each of said insulating sections, one of said corona discharge brooms being secured at its junction point to each of said support members, each of said corona discharge brooms being arranged to extend longitudinally from its support member within said insulating section across the junction of said section with said adjacent conducting section, and each of said discharge brooms being arranged to have said wires extend longitudinally from said junction point towards a preselected end of said duct to additively induce fluid motion in said preselected direction.

3. An ionic wind generating structure comprising a duct having an entrance and an exit, said duct having alternate conducting and insulating sections, a plurality of corona discharge brooms characterized by wires bundled together at one end thereof to form a junction point and radiating radially and longitudinally in a substantially uniform direction, means for energizing said corona discharge brooms, a plurality of conductive support members providing means for connecting said corona discharge brooms to said energizing means, one of said conductive support members being disposed within each of said insulating sections, one of said corona discharge brooms being secured at its junction point to each of said support members, each of said corona discharge brooms being arranged to extend longitudinally from support member within said insulating section across the junction of said section with said adjacent conducting section, each of said discharge brooms being arranged to have its wires extend longitudinally from its junction points toward the exit of said duct to additively induce a wind towards said exit, said conductive sections being electrically connected in parallel, said brooms being electrically connected in parallel, and netralizing grids being disposed within the exit of said duct.

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