

# United States Patent

[11] 3,584,976

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[21] Appl. No. **776,515**  
[22] Filed **Nov. 18, 1968**  
[45] Patented **June 15, 1971**

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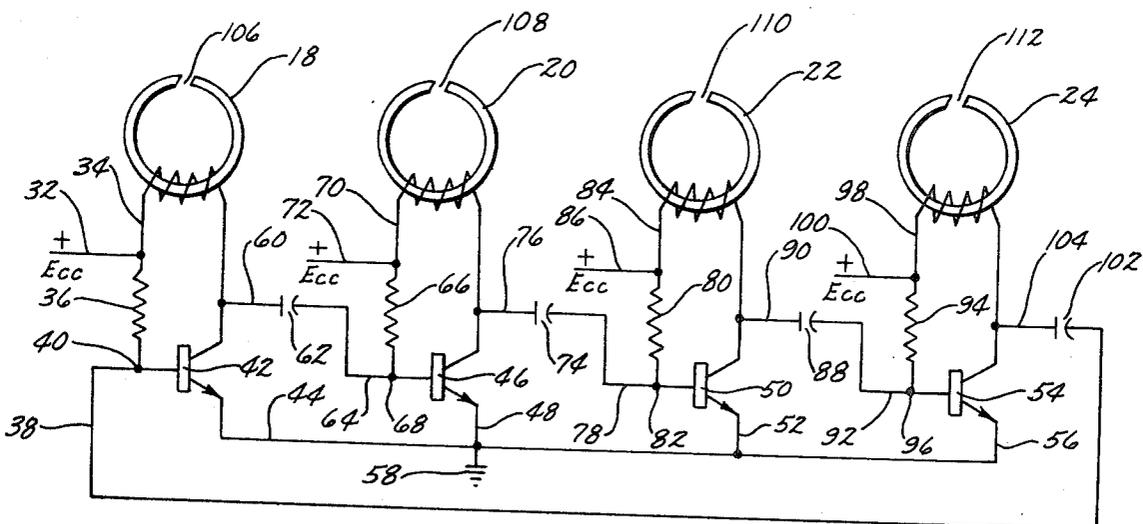
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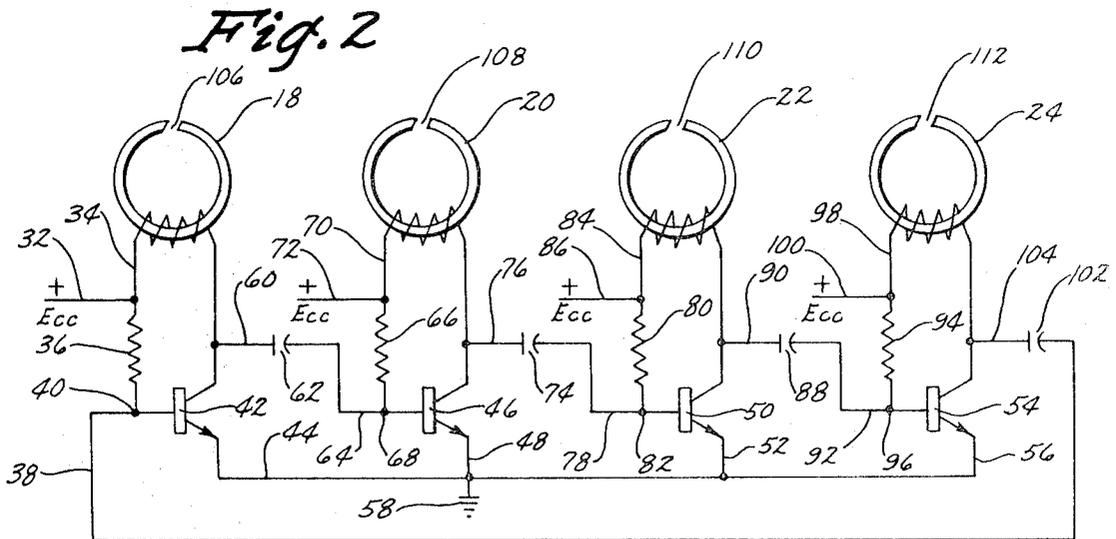
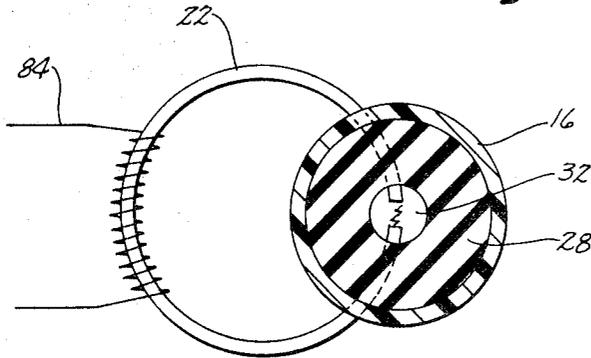
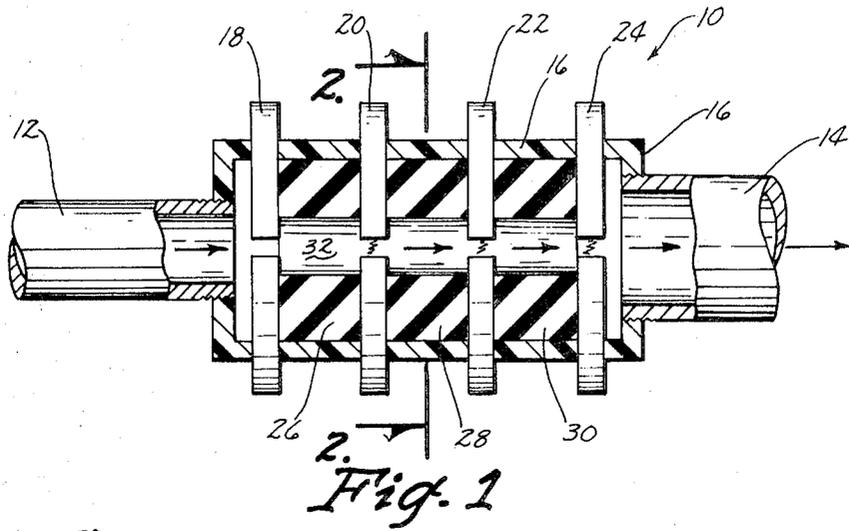
[54] **PARAMAGNETIC OXYGEN PUMP**  
6 Claims, 3 Drawing Figs.

[52] U.S. Cl..... 417/50  
[51] Int. Cl..... H02k 45/00  
[50] Field of Search..... 230/1;  
103/1E, 1M; 313/63

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**ABSTRACT:** A paramagnetic oxygen pump including a housing having intake and discharge ends with a bore formed in the housing extending between the intake and discharge ends thereof. A plurality of spaced apart electromagnets extend into the housing and each have a magnetic gap positioned in the bore in the housing. An electronic control means is provided and is connected to the electromagnets and is adapted to successively energize the electromagnets to cause the electromagnets to magnetically pull the air through the housing.





*Fig. 3*

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**PARAMAGNETIC OXYGEN PUMP**

It is the principal object of this invention to provide a paramagnetic oxygen pump.

A further object of this invention is to provide a paramagnetic oxygen pump which enriches air in oxygen as it is being pulled through the pump.

A further object of this invention is to provide a paramagnetic oxygen pump including an electronic control means coupled to a plurality of spaced apart electromagnets and adapted to energize the same to pull the air through the pump.

A still further object of this invention is to provide a paramagnetic oxygen pump which is extremely durable in use since it does not have any moving parts.

A further object of this invention is to provide a paramagnetic oxygen pump which is efficient in operation.

A still further object of this invention is to provide a paramagnetic oxygen pump which is economical to manufacture.

FIG. 1 is a partial sectional view of the paramagnetic oxygen pump of this invention.

FIG. 2 is a sectional view as seen along lines 2-2 of FIG. 1.

FIG. 3 is a schematic view of the circuitry of this invention.

The paramagnetic oxygen pump of this invention is generally designated by the reference numeral 10 and includes an air input tube 12 and an air output tube 14. The tubes 12 and 14 are suitably secured to opposite ends of an insulated housing 16 having four electromagnets 18, 20, 22 and 24 extending thereinto in the manner best illustrated in FIGS. 1 and 2. Housing 16 is provided with insulated spacers 26, 28 and 30 between the electromagnets and having a central bore 32 extending thereto. The bore 32 is in communication with the interiors of tubes 12 and 14 as illustrated in the drawings.

As seen in FIG. 3, electromagnet 18 is connected to a voltage source ECC by a lead 32. Wire 34 of electromagnet 18 is connected to a resistor 36 which is connected to a lead 38 at 40. A transistor 42 is connected to lead 38 and has its collector connected to wire 34. The emitter of transistor 42 is connected to a lead 44 which is suitably connected to the emitter of a transistor 46 by lead 48, to resistor 50 by lead 52, and to resistor 54 by lead 56. Lead 44 is grounded at 58 as illustrated in FIG. 3. Lead 60 connects wire 34 with a capacitor 62 which is connected to transistor 46 by lead 64. Lead 64 is connected to a resistor 66 at 68 and resistor 66 is connected to wire 70 of electromagnet 20. Wire 70 is connected to a voltage source by a lead 72. Wire 70 of transistor 20 is connected to the collector of the transistor 46 and is connected to one side of a capacitor 74 by a lead 76. The other side of capacitor 74 is connected to transistor 50 by a lead 78. Lead 78 is connected to resistor 80 at 82 and resistor 80 is connected to the wire 84 of electromagnet 22. Wire 84 is connected to a voltage source by lead 86. Wire 84 of transistor 22 is connected to the collector of transistor 50 and is connected to one side of a capacitor 88 by a lead 90. The other side of capacitor 88 is connected to transistor 54 by a lead 92. Resistor 94 is connected to lead 92 at 96 and is connected to wire 98 of electromagnet 24. Wire 98 is connected to a voltage source by lead 100. Wire 98 is connected to the collector of transistor 54 and is connected to one side of a capacitor 102 by a lead 104. The other side of capacitor 102 is connected to lead 38. For purposes of description, the magnetic gaps in the electromagnets 18, 20, 22 and 24 will be designated by the reference numerals 106, 108, 110 and 112, respectively. In operation, three of the four electromagnets will have electrical current energizing them simultaneously and the fourth electromagnet will be pulsed off in a wave that ripples to the right as viewed in FIGS. 1 and 3. This is achieved by the fact that transistors 42, 46 and 50 will be conducting simultaneously while the transistor 54 will be turned off. This sequence is followed by transistor 42 being turned off with transistor 46, 50 and 54 being simultaneously operated or in a conductive state. Thus, the electromagnets 18, 20 and 22 are simultaneously ener-

gized with electromagnet 24 being deenergized at this time and then the electromagnet 18 will be turned off with the electromagnets 20, 22 and 24 being simultaneously energized. The energization of the electromagnets in the mode just described pulls the oxygen molecules due to their slight paramagnetic qualities into one successive magnetic gap after another in the series of electromagnets. Thus the air is pulled successively into gaps 106, 108, and 110 with gap 112 being in an inoperative state and then the gaps 108, 110 and 112 will be energized with the gap 106 in an inoperative state. Some of the oxygen from the gap which has been just deenergized would diffuse to the right and some would diffuse to the left as viewed in FIG. 1. That oxygen which diffuses to the left would be lost but the oxygen that diffuses to the right as viewed in FIG. 1 will be successively squeezed to the right and out of the pump through the tube 14 as the electromagnets are successively operated. In effect, the circuitry as such provides a ring counter that counts to four to perform the electronic energization of the electromagnets in the order described above. The circuit illustrated in FIG. 3 functions in a resistance capacitance coupled multivibrator extended over four stages.

Thus it can be seen that a unique paramagnetic oxygen pump has been provided which pumps oxygen therethrough due to the magnetic qualities of the oxygen. The oxygen pump described herein pulls oxygen molecules thereto due to the slight magnetic qualities thereof through a series of successively operated electromagnets. It can be appreciated that the oxygen pump described herein involves no moving parts and will be extremely durable in use and will require a minimum of maintenance. Thus it can be seen that the pump accomplishes all of its stated objectives.

Some changes may be made in the construction and arrangement of my PARAMAGNETIC OXYGEN PUMP without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a device of the class described,
  - a housing having intake and discharge ends, said housing having a bore formed therein extending between its intake and discharge ends, said intake end being in communication with a source of air, a plurality of spaced apart electromagnets extending into said housing, each of said electromagnets housing a magnetic gap positioned in said bore,
  - an electronic control means connected to said electromagnets adapted to successively energize said electromagnets to cause said electromagnets to magnetically pull the air through said housing, and
  - said plurality of electromagnets including first, second, third and fourth electromagnets, said control means successively causing said first, second and third electromagnets being energized with said fourth electromagnet being deenergized, thence causing said first electromagnet to be deenergized while energizing said second, third and fourth electromagnets.
2. The device of claim 1 wherein said control means is comprised of a four-stage resistance capacitance coupled multivibrator.
3. The device of claim 1 wherein said housing is comprised of an electroinsulative material.
4. The device of claim 1 wherein said magnetic gaps are centrally positioned in said bore.
5. The device of claim 1 wherein a hollow air intake tube is connected to the intake end of said housing and a hollow discharge tube is connected to the discharge end of said housing, the diameter of said discharge tube being greater than the diameter of said intake tube.
6. The device of claim 1 wherein said first electromagnet is positioned adjacent said intake end with said fourth electromagnet being positioned adjacent said discharge end.