Sept. 8, 1970 J. D. REGO 3,527,055

MAGNETOPLASMADYNAMIC JET ENGINE

Filed April 15, 1968 2 Sheets-Sheet 1

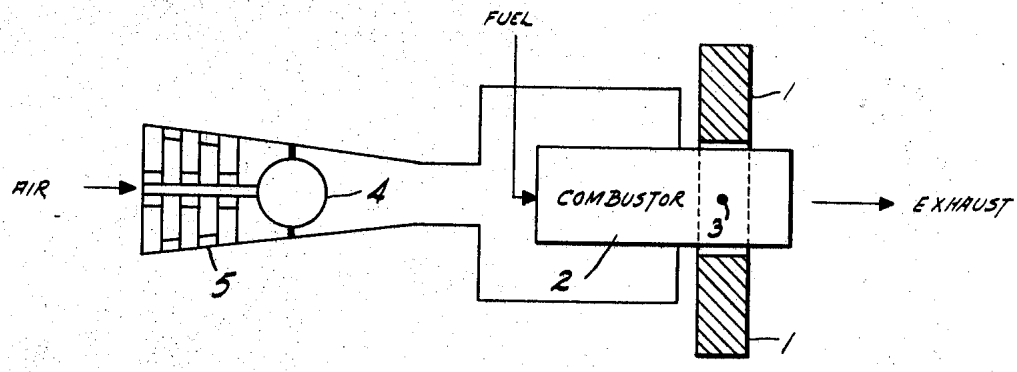

FIG. 1

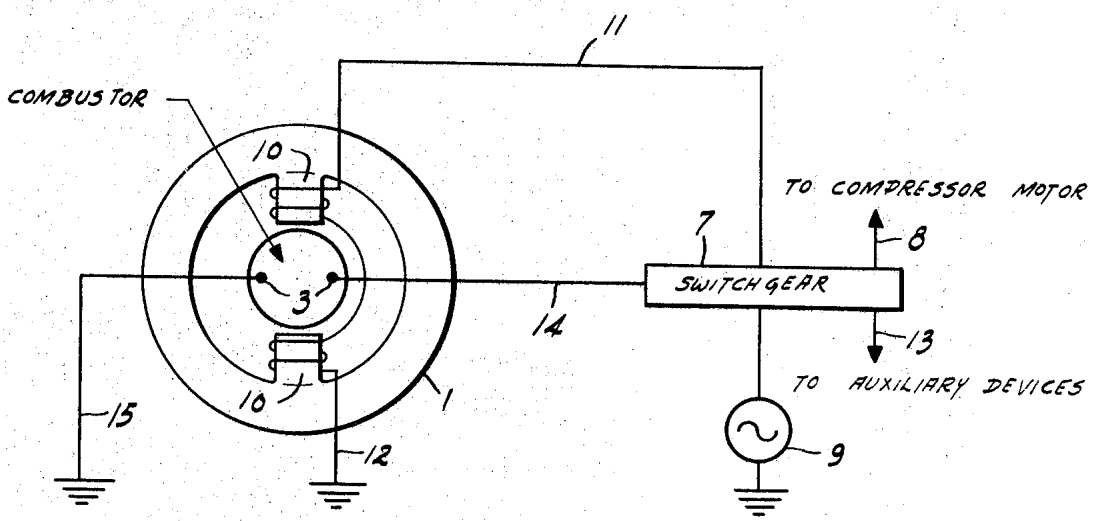

FIG. 2

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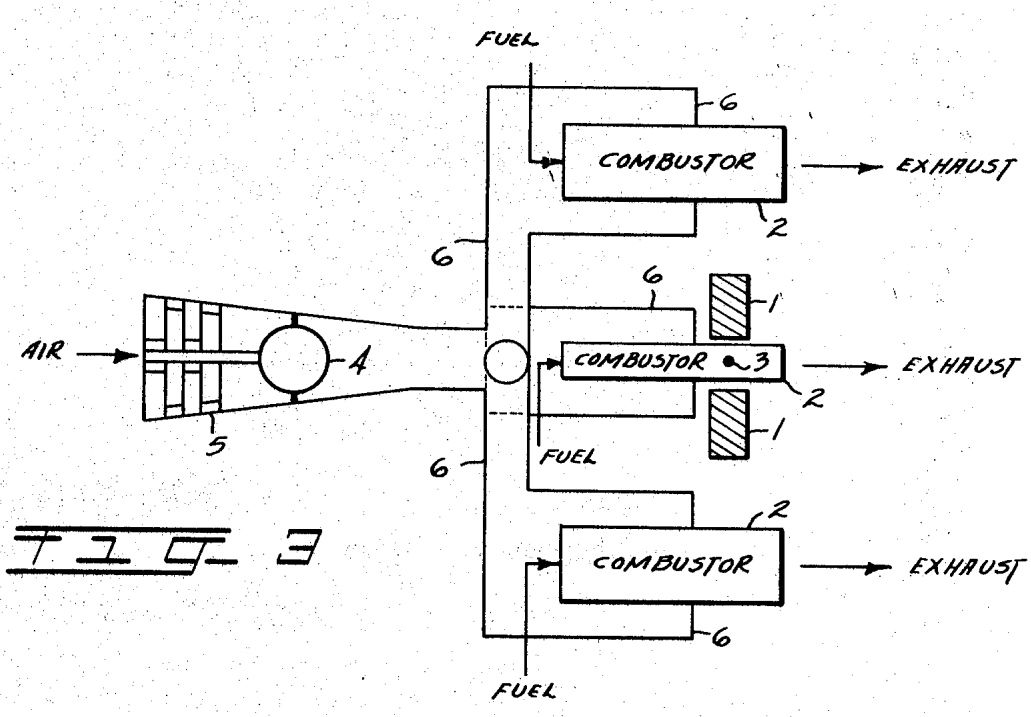

FIG 3

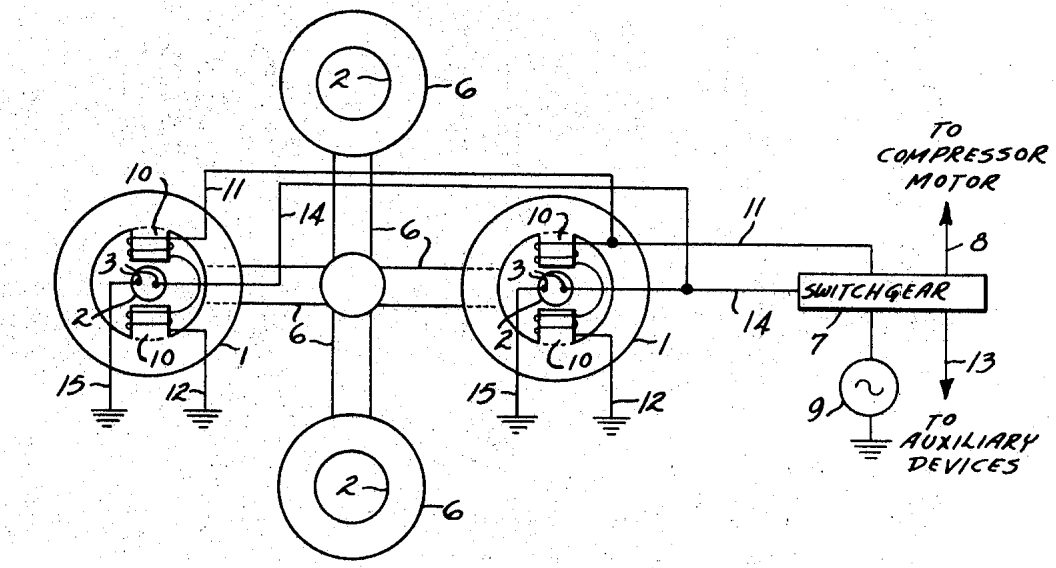

FIG 4

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MAGNETOPLASMADYNAMIC JET ENGINE

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U.S. Cl. 60—224 2 Claims

ABSTRACT OF THE DISCLOSURE

A jet engine comprising a compressor, a combustor and magnetoplasmadynamic means to generate electrical energy for driving the compressor and other auxiliary electrical equipment.

BACKGROUND OF THE INVENTION

The invention relates to an improvement in a jet engine, which improvement eliminates the need for the conventional gas turbine.

A conventional jet engine includes a gas turbine in its exhaust section to generate the power required to drive the compressor as well as electrical power required for auxiliary purposes. The presence of the turbine, however, limits the efficiency of the jet engine since the heat in the exhaust gases must be kept within a specified limit in order to prevent melting of the turbine blades. Furthermore, the quality of the fuel must meet strict requirements in order to limit the amount and type of solid particles appearing in the exhaust gas and which are harmful to the turbine blades.

The elimination of the turbine from the jet engine removes the present limitations on the heat and quality of the exhaust gases, thereby resulting in increased engine efficiency and permitting the use of cheaper fuels. It also makes possible the construction of a smaller, simpler, more compact and safe jet engine.

SUMMARY OF THE INVENTION

A jet engine made in accordance with this invention comprises a compressor driven by an electric motor, a combustor, and a magnetoplasmadynamic means for generation of electrical energy required to power the motor and other auxiliary devices.

An object of this invention is to increase the efficiency of a jet engine by removing the present requirement for limitations on the temperature of the exhaust gas.

An object of this invention is the provision of jet engine suitable for operation with cheaper fuels by removing the present limitations on the quality of the exhaust gases.

An object of this invention is the provision of a jet engine of simple, compact and economical construction, and one which has a longer, more trouble-free operating life than engines of conventional construction.

An object of this invention is the provision of a jet engine wherein the air compressor is driven by an electrical motor, and wherein energy for driving the motor after initial start-up of the engine is developed by a magnetoplasmadynamic device.

The above-stated and other objects and advantages of the invention will become apparent from the following description when taken with the accompanying drawings. It will be understood, however, that the drawings are for purposes of illustration and are not to be construed as defining the scope or limits of the invention, reference being had for the latter purpose to the claims appended hereto.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein like reference characters denote like parts in the several views:

FIG. 1 is a diagrammatic side view of a jet engine made in accordance with this invention;

FIG. 2 is a corresponding rear view and including a schematic representation of associated electrical circuitry;

FIG. 3 is a diagrammatic side view of a jet engine made in accordance with another embodiment of this invention; and

FIG. 4 is a corresponding rear view thereof and including a schematic representation of associated electrical circuitry.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the numeral **1** denotes an electromagnet encircling the combustor **2**. Positioned within the combustor and lying substantially in the median plane of the electromagnet are a pair of electrodes **3**. An electric motor **4** is mounted in the compressor **5** and has its drive shaft coupled to the compressor shaft. Switchgear, generally identified by the numeral **7** comprises suitable switches, circuit breakers and electrical metering devices required for the control and distribution of electrical power. One side of the compressor motor is grounded and the other side is connected to the switchgear by the lead **8**, whereby the motor can be energized by a voltage source **9** upon the closure of a suitable switch of the switchgear. Upon the closure of another switch of the switchgear, the electromagnetic coils **10** are energized through the leads **11**, **12** and ground. Other switches of the switchgear control auxiliary electrical equipment connected to the lead **13**. One electrode is connected to the switchgear by the lead **14** and the other electrode is grounded through the lead **15**.

The engine is started up by energizing the compressor motor from the external voltage source **9**. Once the fuel in the combustor becomes ignited, electrical energy is generated by the magnetoplasmadynamic device which operates on the principle which requires that the products of combustion be changed into a plasma by injection of seed material into the combustor, or by allowing the combustion to proceed at a high temperature of about 5000° C., thereby causing the gas to become ionized. The generated electrical energy is distributed through the switchgear, which facilitates the control and regulation of the energy to the electrical components. More specifically, when the engine is in operation, the switchgear is operated, either manually or automatically in such manner that the power for driving the compressor motor, and for energizing the electromagnet and auxiliary devices, is obtained from the magnetoplasmadynamic device. Thus, once the engine has been started it becomes self-sufficient.

A jet engine made in accordance with this invention can comprise a battery of combustors as shown in FIGS. 3 and 4. Some of the combustors are equipped with the described magnetoplasmadynamic device for the generation of both electrical energy and propulsive thrust. The other combustors are conventional and used only for propulsive thrust. All of the combustors are served by a common compressor through air ducts **6** since only one, or several, magnetoplasmadynamic devices generally are sufficient for the generation of all the electrical energy required to power the electrical components of the system. When two or more combustors are provided with magnetoplasmadynamic devices the corresponding electrodes and electromagnetic coils of such devices are connected in parallel.

Having now described the invention what I wish to protect by Letters Patent is set forth in the following claims:

1. A jet engine comprising,

(a) a compressor,

(b) a plurality of combustors arranged to receive compressed air from the compressor,
(c) means for supplying fuel to the combustors,
(d) an electric motor for driving the compressor,
(e) means for energizing the motor from an external voltage source during engine start-up,
(f) magnetoplasmadynamic devices associated with at least one but not all of the combustors, which devices are arranged to generate electrical energy upon ignition of the fuel in the associated combustor, and
(g) means for energizing the said motor by the electrical energy generated by the magnetoplasmadynamic devices during operation of the engine.

2. The invention as recited in claim **1**, wherein the said motor is mounted downstream of the compressor, and wherein the magnetoplasmadynamic devices comprise an electromagnet encircling the associated combustor, and electrodes mounted in the associated combustor and lying in the magnetic field developed by the associated electromagnet.

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U.S. Cl. X.R.

60—202, 269; 310—11