International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)
ISSN: 2456-236X
Vol. 01 Issue 02 | April-2017

AIR CAR (hybrid vehicle)

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ABSTRACT

The air car is a machine under development, and ultimately produced by Moteur Developpement International (MDI), founded the French inventor Guy Negre. It will be sold by this company too, as well as ZevCat, a US company, based in California.

The air machine is powered by an air motor, specially designed for the machine. The air motor used is manufactured by CQFD Air solution, a closely linked to the MDI company.

The motor is powered by compressed air, stored in a glass tank or carbon fiber at 4500 psi. The engine has similar to the normal injection engines, but uses elbow and special pistons, which remain at the top dead point of approximately 70% of the engine cycle; this allows greater power to be developed in the engine.

Although some consider the car to be polluted, it must take into account that the tanks are recharged using electric compressors (or petrol), resulting in some pollution, if the electricity used to drive the compressors comes from power stations pollutants (eg as a gas, or coal-fired power). The solar energy could be used to power the compressors in fuel distributor.

I. INTRODUCTION

A compressed air machine is a compressed air vehicle that uses an engine powered by compressed air. The machine can only be powered by air or combined (as in a hybrid vehicle) with gasoline, diesel, ethanol, or an electrical system with regenerative braking. An Air Car is a car that runs on compressed air alone, without the use of conventional fuels used in current cars a day. The machine is powered by an air motor. The air motor is a free emissions using compressed air piston engine. The motors are similar to steam engines as they use the pressurized expansion of the gas fed externally to perform work against a piston.

For the practical application of transport, several technical issues must first be addressed:

• When the pressurized air expands, cools, which it limits efficiency. This cooling reduces the amount of energy that can be recovered by expansion, so practical engines environmental applies heat to increase the available expansion.

• In contrast, the compression of the air from the pumps (to pressurize the tanks) heats the air. If this heat is not recovered represents a further loss of energy and thus reduces the efficiency.

• high-pressure air Luggage requires strong containers, which, if not made of exotic materials will be heavy, reducing the efficiency of the vehicle, while the exotic materials (such as composite materials made of carbon fiber) tend to be expensive.
• energy recovery in a vehicle during braking by compressing air generates heat, which must be preserved for efficiency.
• It should be noted that the air motor is not truly free emissions, because the power to compress air initially usually involves emissions at the point of generation.

This latest development with pressurized air as fuel in an engine was invented by Guy Negre, a French engineer. In 1991, the inventor Guy Nègre initiated Moteur Development International (MDI), Luxembourg and has invented an engine running on both dual-energy compressed air as the regular fuel. From this moment on, he managed to create a single compressed air engine, and improved its design to make it more powerful. In the 15 years that he worked on this engine, considerable progress has been made: the engine is now claimed to be competitive with modern ICE. Probably not even as powerful as an ICE (although depending on air motor model vs ICE model). Supporters claim that this is unimportant because the machine can simply be lightened, or the tanks to be put on a higher pressure (psi-level), pushing the engine above a comparable ICE engine

II. ENGINE DESIGN

It uses the compressed air to expand to drive the pistons in a piston modified engine. The operating efficiency is gained through the use of ambient heat at normal temperature to heat the air expanded otherwise cold from the storage tank. This non-adiabatic expansion has the potential to greatly increase the efficiency of the machine. The only cold air exhaust (-15 ° C), which can also be used for air conditioning in a car. The source of air is a carbon or glass fiber holding tank pressurized air at about 3,000 lbf / in² (20 MPa). The air is delivered to the engine via a rather conventional injection system. Unique design crank inside the engine increases the time during which the air charge is heated from ambient sources and a two-stage process allows improved speed of heat transfer.

The version of The Armando Regusci air motor has several advantages over the original by Guy Nègre. In the air motor of the initial Guy Nègre, a piston compresses the air from the atmosphere, keeping it in a small container that feeds the high-pressure air tanks with a small amount of air. Then that part of the air is sent to the second piston in which it operates. During compression for heating it, there is a loss of energy due to the fact that it can not receive energy from the atmosphere as the atmosphere is less warm it. Moreover, it has to expand as it has the crank. Guy Nègre of the air motor operates at constant torque, and the only way to change the torque to the wheels is to use a pulley transmission of constant variation, lose efficiency. In the version of Regusci, the transmission system is directed to the wheel, and has a variable torque from zero to maximum with all the efficiency. When the vehicle is stationary, the engine of Guy Nègre must be switched on and working, losing energy, while the version of Regusci did not.

In July 2004, Guy Nègre has abandoned its original design, and later showed a new design where he claimed to have invented in 2001, but his new design is identical to the air motor's Armando Regusci which was patented in 1989 (Uruguay) with the patent number 22976, and again in 1990 (Argentina). In these same patents, it is mentioned the use of electric motors to compress the air in the tanks.

III. USES OF AIR ENGINE

The engine is used to power a city car with space for five passengers and a predicted range of about 100 to 200 miles (160 to 320 km), depending on the traffic conditions. The main advantages are: no emissions at the roadside, the low-cost technology, the engine uses cooking oil for lubrication (only about 1 liter, changes only every 30,000 miles (50,000 km)) and integrated air conditioning. Range could be quickly tripled, since there are already carbon fiber tanks that have exceeded the safety standards that hold gas to 10,000 lbf / in² (70 MPa). The tanks may be recharged in about three minutes at a service station, or in a few hours at home to connect the machine to the electric network by means of a compressor on board. However, the air motor system and supply, considered as a system, are not pollution-free except for special cases, such as the production of electricity should have its own environmental costs. One of the special cases where it is an operator of a vehicle installed photovoltaic power generation or wind power unit.

IV . COMPRESSED AIR TECHNOLOGY CARS

MDI is preparing to introduce compressed air vehicles to the market. MDI has developed a high performance tablet technology. When compared to conventional gasoline engines, MDI's engine is far superior in terms of energy used andthermodynamics.

An overview of the air vehicle -

The technology vehicles MDI use is not new, in fact, had been around for years. compressed air technology allows engines that are both non-polluting and economical. After ten years of research and development, MDI is ready to present its vehicles cleaner on the market. Unlike electric vehicles or hydrogen-powered, MDI vehicles are not expensive and do not have a limited practical field. MDI cars are affordable and have a rate of return that stands up to current standards. To summarize, they are not expensive cars that do not pollute and are easy to get around the city.

Two technologies have been developed to meet different needs:

compressed air motors of individual energy -

The individual power engines will be available in both Minicats and CityCats. These engines have been designed for city use, where maximum speed is 50 km / h and which MDI believes that will soon be banned polluting.

compressed air more fuel energy dual motors -

The dual energy engine, on the other hand, has been designed as much for the city as the open road and will be available in all MDI vehicles. The engines work exclusively with compressed air while it is running below 50 km / h in urban areas. But when the car is used outside urban areas at speeds over 50 km / h, the engines will switch to fuel mode. The engine may use gasoline, diesel, biodiesel, gas, liquefied gas, ecological fuel, alcohol, etc.

Both engines will be available with 2, 4 and 6 cylinder, When the cylinders are empty, the driver may switch to fuel mode according to the computer board machine. The vehicles do not have normal velocity measurement. Instead, they will have a small computer screen that shows speed and engine revolutions. The system allows for infinite possibilities, such as telephone systems GSM, GPS satellite positioning systems, programs for the delivery people, emergency systems, Internet connections, voice recognition, presentation paper, the traffic information in three words the future is now.

V.THE AIR CAR'S TECHNICAL DETAILS

a) Compressed air tank- The compressed air tank is a glass tank or carbon fiber. These tanks hold 90 cubic meters of compressed air to 300 bar. This system is not dangerous in the event of an accident because there is no risk of operation. Because these are the same tanks used for transporting the liquid gas used by buses for public transport. The tanks have the same technology developed to contain natural gas. They are designed and officially approved to carry an explosive methane gas.In event of a major accident, in which are broken tanks, would not have exploded as they are not made of metal. Instead they would crack, as they are made of carbon fiber. An elongated slot would appear in the tank, without exploding, and the air would simply escape, producing a loud noise but harmless. Of course, since this technology is authorized to transport inflammable and explosive gas (natural gas), is

perfectly capable air.The tanks harmless and non-flammable in vehicles cats are composed of an inner thermoplastic container that ensures both hermetic. This is held in a carbon fiber shell and rolled through. This technique is the result of numerous studies in factors such as: mechanical specifications, density of the material, choice of fibers, etc. The conditions of use are effective maximum pressure (300 bar) and the operating temperature range: -40 ° C to 60 ° C . The tanks are extensively tested to meet the official approval, including: Airtight test pressure tests (1.5 x 300 = 405 b) breaking test (2.35 × 300 = 705 b) at room cycles and extreme temperatures test of resistance to fire Cut resistance Shock and drop test During the breaking test, the tank cracks, but do not break, without producing splinters or fragments. In the case of a cracked tank, it is more likely to occur inside the cylinder. The tanks used in vehicles cat should last for a period of fifteen years, to be tested every five years and are subject to wear depending on conditions of use. The tanks weigh 35-40 kg per 100 liters of air at 300 bar. In MiniCat's tanks weigh 70-80 kg. For added security, a protection plate is fixed under the car chassis and in addition limits access to the high-pressure air circuit. There is also an extraction system to deal with water produced by condensation.

b) The brake power recovery-The MDI vehicles will be equipped with a range of modern systems. For example, a mechanism stops the engine when the vehicle is stationary (at traffic lights, intersections, etc.). Another interesting feature is the pneumatic system which recovers about 13% of the power used.

c) The body- The MDI car body is built with fiber and foamed, as most of the machines currently on the market. This technology has two main advantages: the cost and weight. Nowadays the use of sheet metal for car bodies is only because of the cost - it is more economical to produce in a series of sheet metal bodies with respect to those in fiber. However, the fiber is safer (doesn't is cut such as steel), it is easier to repair (pasted), etc. Any rust MDI is examining using hemp fibers to replace glass fiber, and natural paints, produce 100% non-contaminating the body.

d) The air filter- The engine MDI works with both drawn from the atmosphere and compressed air preheating air in tanks. Air is compressed by the compressor on-board or at service stations equipped with high-pressure compression compressor.Before, the air must be filtered to remove any impurities that may damage the engine. Carbon filters are used to remove dirt, dust, moisture and other particles which, unfortunately, are in the air in our cities.This represents a true revolution in cars - is the first time that a car produced less pollution, that is, remove it and reduce existing pollution and emit no harmful gases and dirt. The exhaust pipe on MDI cars produces clean air, which is cold at the output (between -15º and 0 °) and is harmless to the human life. With this system the air that exits from the machine is the air that entered cleaner.

e) The Frame -On the basis of his experience in the aeronautical sector, MDI has put together highly resistant yet lightweight, frames, of aluminum rods glued together. Using auction allows you to build a society chassis shock resistant than regular chassis. In addition, the rods are glued in the same way as aircraft, which allows rapid assembly and join a safer compared to welding. This system helps to reduce production times.

f) Electrical system- Guy Negre, inventor of the MDI Air Car, acquired the patent for invention interesting for installation in an electric vehicle. Using a radio transmission system, each electrical component receives signals with a microcontroller. So only one cable is required for the entire car. So, instead of wiring each component (lights, dashboard lights, the lights inside the car, etc.), a cable connects all the electrical parts in the car. The most obvious benefits are the ease of installation and the repair and removal of about 22 kg of wire no longer needed. What's more, the whole system becomes a burglar alarm as soon as the key is removed from the machine.

VI. CONCLUSION

The car the air is the result of extensive research and development is an easy to drive, drive clean performance, high. MDI has got what the large car manufactures have promised in the past hundred years.

The final product is a lightweight vehicle that can reach speeds up to 220 km / h (although the legal limit is 120), a product that does not pollute like the twentieth century vehicles and it does not take a lifetime to pay. Essentially, MDI has developed a modern car, clean, and affordable that meets the needs of many people.

The main advantages of an air-powered vehicle are:

• Fast charging time

• Duration of long storage (batteries for electric vehicles have a limited number of cycles useful, and sometimes a limited calendar life, regardless of use).

• Potentially lower initial cost than battery electric vehicles when mass production.

hybrid aircraft is a very particular concept that runs on a fuel and electricity from a given place to the use of natural air exercise as fuel in the absence of conventional fuel when the car runs using electric power in combination with air. It is also very useful when considering the nature, aspect pollution as there would be 0% pollution during the running of the vehicle using air as no combustion to take place in order to run the vehicle for development. What is

the cost that would occur at the time of production and maintenance of the vehicle. Even a fuel-based hybrid air car and the air would be very useful as well as a reliable concept of the global automotive market.

VII. REFERENCE

[1] M.L. Mathur & R.P. Shamra ," Internal Combustion Engine" (Danpat Rai Publication , 2012.)
[2] V. Ganeshan ," Internal Combustion Engine" (Tata McGraw Hill, 3rd Ed. 2009.)
[3]https://www.google.co.in/search?q=air+car&espv=2&site=webhp&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjHnoKH7fvSAhVEXrwKHcuEAkQQ_AUIBigB&biw=1366&bih=662#imgrc=KW5Pu-ru5zRqDM:
[4]Dr. Kripal Singh , " Automobile Engineering Vol.1 " (Standard Publishers Distributors)
[5] http://auto.howstuffworks.com/fuel-efficiency/vehicles/air-car.htm.

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