

Induction Clutch with the Ability to Generate Electricity, Brake, Start Fuel Engine and Electric Engine

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Abstract: The induction clutch is a device that acts like a friction clutch but there is no abrasion and it is more accurate. Because electric, solar, and fuel car convertible to boats, vertical aircraft flying supersonic has sealed body, for this reason, a friction clutch cannot be used, because the friction clutch does not work well and due to friction, it creates a bad smell and needs that the produced gas is exited from the vehicle. Part of the new induction clutch has electronic control and another part is mechanical control. Because the electric, solar, and fuel car convertible to the boat, vertical aircraft flying supersonic must be light, an induction clutch will be used because this new induction clutch has several functions and it causes the removal of several parts in this vehicle. I made a version of this clutch in small dimensions with difficulty and I did the necessary tests and drew input and output diagrams. In this article, the new induction clutch is compared with a simple induction clutch and friction clutch, and magnetic clutch.

Keywords: Electricity Generation, Magnetic Induction, Cylinder Fuel Car, Vertical Aircraft, Flying Supersonic

Introduction

The clutch is a piece that controls the rotation of the input to the output from low to high or causes to disconnect or connect the engine force to the gearbox. The clutch is used in industry and devices such as photocopiers and cars.

For the clutch to operate in a car, there is a left side pedal under the driver's foot and by pressing or releasing the pedal by the driver, the clutch works.

In automatic gear cars, the automatic clutch works electric too.

Simple and Electric Friction Clutches

Simple and electric friction clutches control the force of input to output by creating friction between two or more plates. So, heat is created and disperses the powder into the environment that causes environmental pollution this friction clutch produces gas and because of abrasion it has a certain longevity, (Fig. 1) it cannot be used in electric, solar, and fuel car convertibles to boats, vertical aircraft flying supersonic that is registered in the journal of aircraft and spacecraft technology (Abdullah and Schlattmann, 2016).

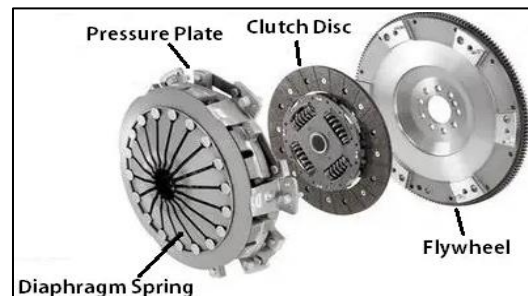


Fig. 1: Friction clutches in Google

Simple Induction Clutch

According to my prediction, a simple induction clutch (Eddy Current Clutch) only acts as a clutch and it is very accurate but it only transfers about 5-60% of force from input to output and does not transfer about 60-100% of the force from input to output. For this reason, it is of quantitative use in the industry and is not applicable in the car (Fig. 2). There is no scientific information about this simple clutch in journals but there is little information on Google. And the information about this clutch is incomplete, this clutch is a painting, and it not industrial design and I didn't see it made (Eddy Current Clutch, 2016).

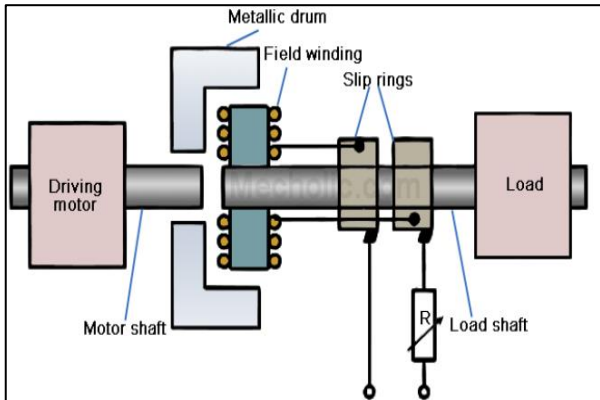


Fig. 2: Eddy current clutch (Simple induction clutch) in Google

Electromagnetic Clutch

Electromagnetic clutch is a clutch that connects several plates through a coil and a magnetic force and the force is transferred between the two shafts from the input to the output and works like a friction clutch, because of friction, this clutch also generates heat and has abrasion so it has a short life and it has less accuracy than the induction clutch. This clutch is used in industry and mechatronic devices such as photocopiers (Fig. 3) (Dubey, 2019).



Fig. 3: Electromagnetic clutch in photocopiers in Google

New Designed Induction Clutch Made by Myself

The tests I have done on the new induction clutch specify that produces electricity from about 33.9-64% connection and from 33.9-64% it has the capability of electrical control by changing the resistance and from about 60-100% it is mechanically-inductively controlled and it is mechanically controlled from 87.7-100% and it

has the capability of analog continuous and digital clutching. This new induction clutch cannot be connected to a cylinder fuel engine because, in the start state, there is a difference in speed and torque with the cylinder fuel engine. I will solve this problem with a newer design in the future.

The new induction clutch has the ability to start, electric motor, clutch and brake another feature of this new induction clutch is air compression for electric, solar, and fuel car convertible to boats, vertical aircraft flying supersonic, which is registered in the journal of aircraft and spacecraft technology. To control this new induction clutch, the vehicle needs an extra pedal.

A newly designed induction clutch is large in size in Solid Works software but is made by myself in small dimensions and it has the ability to connect force from input to output from about 33.9-100%, but 0-30% can also be added and because it has many features, it will be used in the electric, solar and fuel car convertible to the boat, vertical aircraft flying supersonic, that is registered in the journal of aircraft and spacecraft technology (Fig.4) (Mousavi1, 2020).



Fig. 4: Electric, solar, and fuel car convertible to boat, vertical aircraft flying supersonic

Materials and Methods

The big new main induction clutch has been designed in Solid Works software. Small induction clutch is more compact than the solid works large clutch and they are not different from each other in the electric motor and starter mode, it creates a torque of about 130 nm at 3000 rpm but there are 2 induction clutches in the flying car therefore, so about 260 nm of torque is suitable for the electric, solar and fuel car convertible to the boat, vertical aircraft flying supersonic in car mode. car cylinder engines need a minimum speed of about 1000 rpm but the jet engine needs about 3000 rpm for a start so this new induction clutch can convey the jet engine to 3000 rpm in the start

state is the minimum speed required for a jet engine and it is suitable for the electric, solar and fuel car convertible to boat, vertical aircraft flying supersonic but jet engines consume more fuel than cylinder engines in the minimum rotation (Plan Nerd, 2021) the mass of this new induction clutch is approximately 20 kg (Fig. 5).

In my laboratory and my workroom, I made a new induction clutch sample in small dimensions of about 5×6 cm, this new induction clutch is made of an inductor, connectors, bearings, slip rings, brushes, diode bridge circuits and switches or clutch rotation control circuits. Because I didn't have a small-sized fuel engine or small-sized jet engine I used the electric motor to test the clutch.

I mounted this little clutch on some pieces of wood and I did the clutch and electric motor, starter, and brake tests and prepared a number of tables and diagrams. (Fig. 6)

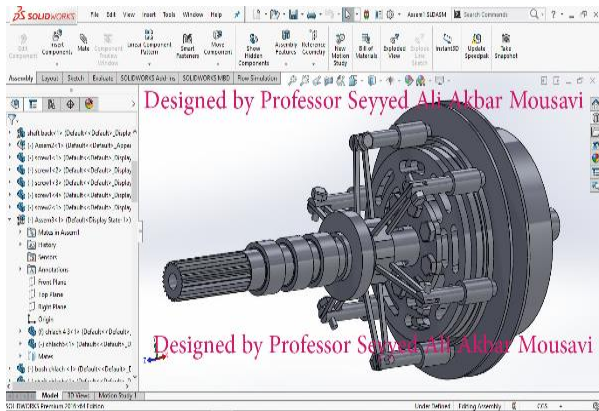


Fig. 5: New main induction clutch is designed in Solid Works software



Fig. 6: Small induction clutch for testing

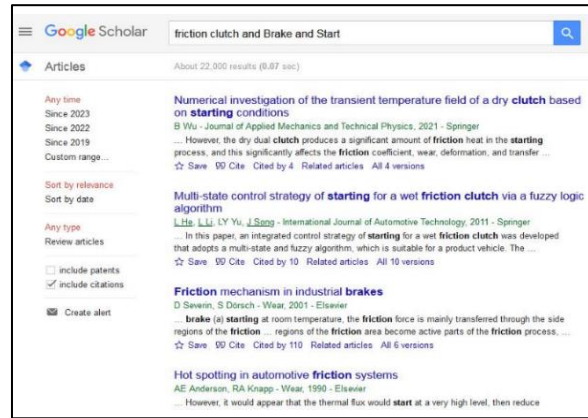


Fig. 7: The induction clutch was not in the google scholar research

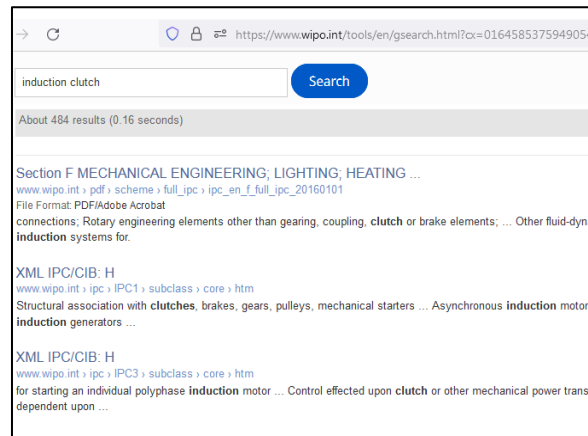


Fig. 8: The induction clutch was not in the patent research

The new induction clutch that has many abilities has not been registered in Google and google scholar (Fig. 7) and as an international invention. I will register this clutch to my name in international invention patent (Fig. 8) (The international invention system website).

Results

Magnetic induction is a physics phenomenon related to electricity and magneto that is in a coil in a variable magnetic field and generates voltage. This physical phenomenon has no abrasion and can create a force. This physical phenomenon has been used in the new induction clutch and transmits energy from the input shaft to the output shaft (https://en.wikipedia.org/wiki/Electromagnetic_induction):

$$\epsilon = -N \frac{d\phi}{dt}$$

According to this equation, a voltage is produced in the coil with changes in the magnetic field proportion to the coil.

If we make far and near, a magnet to the coil that is a short circuit, in this case, the coil has the desire to move in the direction of the magnet. With the help of this physical phenomenon, a simple induction clutch was designed and built in the range of 5-60% but it is of little use and it is not applicable for cars so I designed and made a new induction clutch with the ability to transfer force from 33.9-100% that has many abilities.

Small clutch tests are based on input rotation and output rotation that has the mechanism of the big and main plan.

A multimeter has been used for testing and we put the button on Hertz and the sensor has been used to detect Hertz. To detect the rotation, we must approximate the sensor to the shaft and multiply the Gained hertz number by 60, to get the rotation in according to rpm. I saw this method of measurement on the Internet before but I do not see the reference now:

$$HZ * 60 = rpm$$

Clutch rotation test for driving force generation with propeller: In this test, by connecting a propeller to the clutch in the driving force state, the output rotation became 50.2 Hz. (Fig.9):

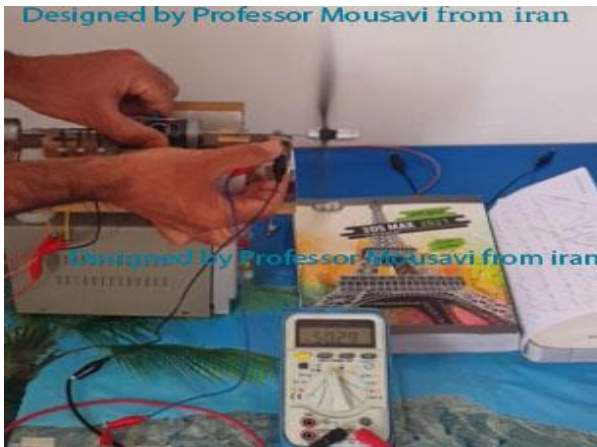


Fig. 9: Clutch rotation test for driving force generation with propeller is 50.2 HZ

$$50.2 * 60 = 3012rpm$$

Clutch rotation test for driving force generation without propeller: In this test, without connecting a propeller to the clutch in the engine state, the output rotation became 117.1 Hz. (Fig. 10).



Fig. 10: Clutch rotation test for driving force generation without propeller is 117.1 HZ

$$117.1 * 60 = 7026rpm$$

Clutch rotation testing to driving force generation for starting the fuel engine: In this test, keeping the clutch output constant, the input rotates and it can be used to start a jet engine, in this test, the shaft rotation became 32.2 Hz but it can also be more up to 80 Hz. (Fig.11):

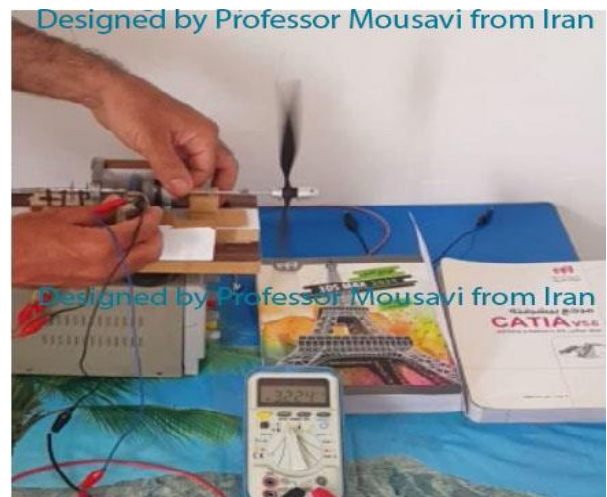


Fig. 11: Clutch rotation testing to driving force generation for starting the fuel engine is 32.2 HZ but it can also be more up to 80 HZ

$$32.2 * 60 = 1932rpm$$

In this experiment, many samples were taken and the input rotation to rotation output is given in the following figures (Figs.12-17) and Table 1:



Fig. 12: The first test of the clutch input rotation is 48.9 HZ
Clutch Rotation Test

$$48.9 * 60 = 2934rpm$$



Fig. 13: The second test of clutch output rotation is 16.6 HZ
 $16.6 * 60 = 996rpm$

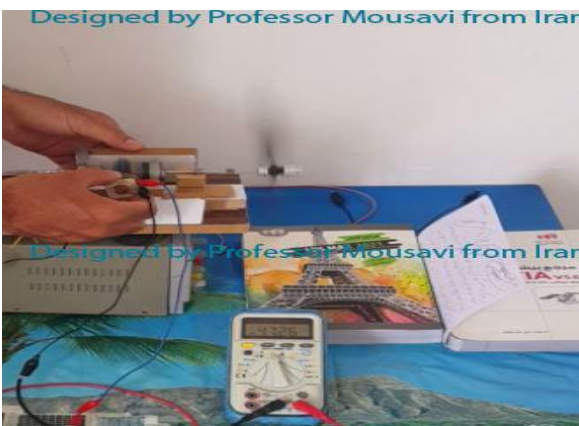


Fig. 14: The third test of clutch input rotation is 47.2 HZ
 $47.2 * 60 = 2832rpm$

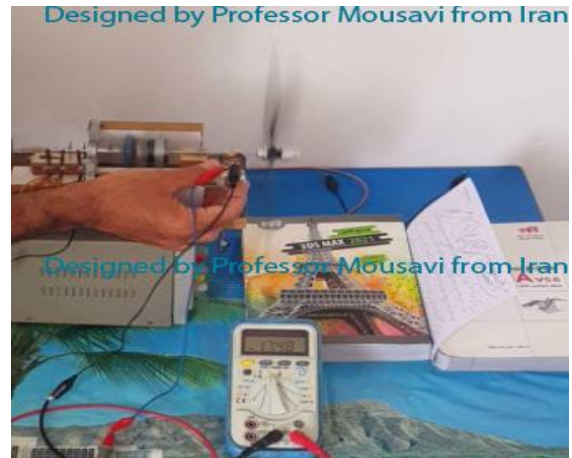


Fig. 15: The fourth test of clutch output rotation is 17.4 HZ
 $17.4 * 60 = 1044rpm$



Fig. 16: The fifth test of clutch input rotation is 45.7 HZ
 $45.7 * 60 = 2742rpm$



Fig. 17. The sixth test of clutch output rotation is 18.3 HZ
 $18.3 * 60 = 1098rpm$

The number of clutch test images is 18 tests and I only put these six photos of the clutching in this article. In (Table 1) 18 tests of the clutch are shown:

$$HZ * 60 = rpm$$

Table 1: Test 18 of clutching

Input rotation	Output rotation
48.9hz or 2934 rpm	16.6hz or 996 rpm
47.2hz or 2832 rpm	17.4hz or 1044 rpm
45.7hz or 2742 rpm	18.3hz or 1096 rpm
44.7hz or 2682 rpm	21.2hz or 1272 rpm
43.7hz or 2622 rpm	25.3hz or 1518 rpm
42.8hz or 2568 rpm	27.4hz or 1644 rpm
41.8hz or 2508 rpm	28.8hz or 1728 rpm
37.5hz or 2250 rpm	32.9hz or 1974 rpm
35.3hz or 2118 rpm	35.3hz or 2118 rpm

The lowest transmission of the input rotation to the output rotation is 33.9%:

$$\frac{996 * 100}{2934} = 33.9\%$$

The maximum transmission of the input rotation to the output rotation, the half-clutch mode is 87.7%:

$$\frac{1974 * 100}{2250} = 87.7\%$$

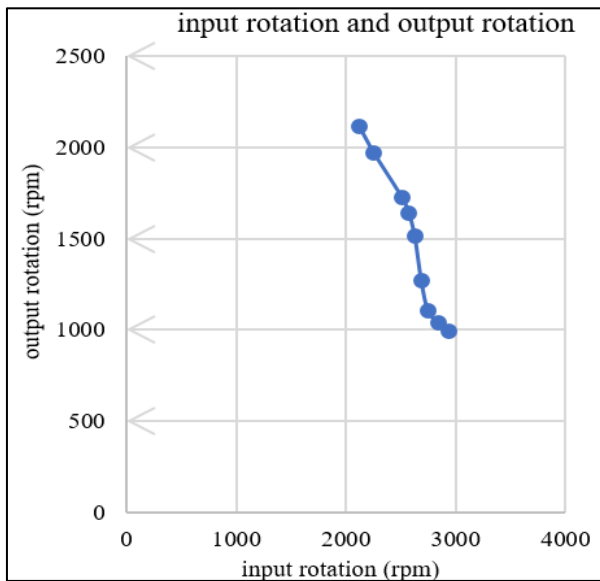


Fig. 18: The diagram of the input rotation compared to the output rotation

The diagram of the input rotation compared to the output rotation is according to table 1. (Fig.18).

This new clutch heats up to about 20°C Celsius in half-clutch mode so it can work continuously and it has

no abrasion. This phenomenon in the flying boat car with the help of the jet engine in the bend of the road causes better balance.

The disturbance of disorder in the output rotation of this clutch is about 2%. This rotation disorder is mostly due to friction in the bearing.

There is also a figure, table, and diagram of the clutch in the electric motor state and the power generation state in relation to the current consumption and voltage there are also braking tests but there are many tests and photos and the data volume of the article increases. The braking table is similar to the clutch table and there is no need for presentation.

Discussion

A simple induction clutch can transfer rotation from input to output from about 5-60% but no article was found in the journals about this clutch. but there is little information on Google. And the information about this clutch is incomplete, this clutch is a painting, and it not industrial design and I didn't see it made.

About the new induction clutch that is my design according to the tests of Figs. 12-17 and Table 1, this clutch has the ability to transfer rotation from 33.9-100% and I even can also apply rotation transfer from 0-33% but electricity production decreases but in the laboratory sample that I made, I did not put this mechanism.

This clutch can fly a small control plane with a mass of 400 g in the mode of generating the driving force with the propeller or it can move a control car at a speed of about 15 km/h.

The bearings of this new induction clutch must be lubricated or replaced periodically.

Acknowledgment

Thank you to the publisher for their support in the publication of this research article. We are grateful for the resources and platform provided by the publisher, which have enabled us to share our findings with a wider audience. We appreciate the efforts of the editorial team in reviewing and editing our work, and we are thankful for the opportunity to contribute to the field of research through this publication.

Funding Information

I am an inventor and I had a laboratory and a workroom and I have. I am proficient in most sciences and techniques and I had no financial support I can make tools from soil and recycled materials.

The costs of tests and construction were about 80 dollars and I made the parts in 3 months and I bought

some parts from the market and I did the tests. This little clutch was hard to make but making the original big clutch costs about 6000 dollars but it is easy to make.

When I registered all the articles about the flying boat car in the journals I will try to attract investors and build this vehicle.

Conflict of Interest

Automobile companies, aircraft companies and manufacturing companies are affected.

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