Adv Swapnil Jayantrao Gawande
(IN/PA-1587)
Office: Plot no 130,
C/o Dhatrak, Hanuman nagar,
Medical Square, Nagpur.
Mob: 9890333567
Resi: R9 Harshnil, Eknath puram
near Shankar nagar, Amravati
Ph: 0721-2566861
E-mail:- sjgawande@gmail.com

To
The controller of patents,
The patent office,
At Mumbai

APPLICATION FOR PATENT ALONG WITH COMPLETE SPECIFICATION

APPLICANT(S)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

Documents attached with the application:-

	Number of Pages
Form 1	3
Form 2	15
Form 3	1
Form 26	1
TOTAL	20 pages

Fee paid along with the application:-

1. Form 1 Rupees 1000(one thousand only)

TOTAL AMOUNT RUPEES 1000(ONE THOUSAND ONLY)
Mode of payment in Cash/Cheque/bank draft bearing no

FORM 1 (FOR OFFICE USE ONLY)

THE PATENT ACT 1970
(39 OF 1970)
And
The patent rules, 2003

Application number:
Filing date:
amount of fee paid:
CBR NO:

APPLICATION FOR GRANT OF PATENT
[See sec 7, 54,135 and rule20 (1)]

1 APPLICANT(S)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

2 Inventor(s)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

2. TITLE OF INVENTION

Duel Rotor Induction Synchronous Electric Machine

4. ADDRESS FOR CORRESPONDANCE OF AUTHORISED PATENT AGENT IN INDIA:-

R 9 Harshnil, Eknath puram
Near yogakshem coloney,
Amravati, Maharashtra

Ph: 0721-2566861
Mob: 9890333567
E-mail:-sjgawande@gmail.com

5. DECLARATION:

(i) Declaration by the inventors

We the above named inventors are the true and first inventors for this invention
Dated this 15th day August 2011

Signature of the inventors

Name: (1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay

(ii) Declaration by the applicants

We the applicants hereby declare that:-
We are in possession of above mentioned invention.
The complete specification relating to the invention is filed with the application
There is no lawful ground of objection to the grant of patent to us.

Signature of the applicants

Name: (1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay

6. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

(a)Complete specification in duplicate

(b)Drawings in duplicate

(c) Statement and undertaking on form 3 in duplicate

(d) Abstract in duplicate

(e) Form number 26 Power of authorization to patent agent.

(f) Form number 9.

(g) Form number 18.

Fee Rs in Cash/Cheque/bank draft bearing no

Date on Bank.

We hereby declare that to the best our knowledge, information and belief the facts and the matter stated herein are correct and we request that the patent may be granted to us for the said invention.

Dated this 15th day August 2011

Signature:

Name :(1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay

FORM 2

THE PATENT ACT 1970
(39 OF 1970)
AND
The patent rules, 2003

COMPLETE SPECIFICATION
(See section 10: rule 13)

1. TITLE OF INVENTION
Duel Rotor Induction Synchronous Electric Machine

2 APPLICANTS(S)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

3. PREAMBLE TO THE DESCRIPTION

COMPLETE

Following specification particularly describes the invention and the manner in which it is to be performed.

4. DESCRIPTION.

Technical field of invention:

The present invention relates to induction machine and more particularly to combination of squirrel cage induction and synchronous machines having good power factor under motor and generator operation over wide-ranging working conditions.

Prior art:

The common poly phase squirrel-cage induction motor is one of the best and most popular electric motor to convert alternating current (A.C.) electrical energy into mechanical energy having applications in variety of domestic, industrial purposes. It is robust, efficient, simple in construction, easy to maintain and economical in cost as compared to other electric motors however; it works at slip frequency means near synchronous speed depending on the number of poles and A.C. supply frequency however, at near synchronous speed its output torque reduces to zero. While it can also be used as an induction generator provided it is connected to A.C. supply system and the prime mover speed is more than the synchronous speed however, it draws its reactive power requirement from the system resulting in a poor power factor operation which is detrimental to overall system performance. Despite such disadvantages induction machine is still being recommended for power generation especially in wind mill power generation due to its robust construction and most importantly it poses no problem to system static and dynamic stability moreover; it improves system reliability as compared to synchronous generators under adverse conditions. In case of induction generators various electronic systems have been adopted to make it run at other speeds to have good efficiency and good power factor. In many applications including wind-mill applications where the prime mover speed does not remain constant and also unpredictable a double fed wound rotor induction motors are in use in conjunction with electronic variable frequency inverter supply to wound rotor. In other system the induction motor stator is supplied with electronic variable frequency inverter drive. In all such systems the main objective is to circumvent limitations of induction machine to run within limited speed range near synchronous speed and at a poor power factor. In the induction generator operation despite all such electronic systems there still remains few serious issues like

efficiency, reliability, maintenance and complexity of electronic control system and associated cost.

Problems to be solved:

Therefore there is a need of a simpler solution to such problems which would allow squirrel-cage induction machine operation at leading power factor, better efficiency, cost effective, low maintenance, capable of running at wide-range of speeds and having a stable operation under steady state as well as in dynamic state under sudden and varying load conditions and further to provide an alternative to doubly fed wound rotor induction machine with complex control system and high-tech electronic inverter/converter drives in certain applications and further to replace synchronous generator.

These and other advantages will be more readily understood by referring to the following detailed description for a novel duel rotor synchronous induction machine having plurality of concentric co-axial rotors disclosed hereinafter with reference to the accompanying drawings and which are generally applicable to other induction machine applications to fulfill particular application illustrated hereinafter.

Object:

1. Primary object of this invention is to combine the useful characteristics of squirrel-cage machine and excellent power factor characteristic of synchronous machine under wide-range of speeds.
2. The other object of the present invention to provide duel concentric co-axial rotors wherein one is used as a squirrel-cage rotor hitherto referred to as induction rotor engaged in power conversion and other concentric co-axial rotor functioning as a synchronous machine hitherto referred to as synchronous rotor, having excitation system rotating at synchronous speed being mechanically isolated and provide the reactive power to the electric system.
3. Another object of the present invention is to provide a machine which is easy to manufacture.
4. Still other object of the present invention is to provide a reliable machine which overcomes the system reliability issues like static and dynamic stability under adverse prime mover and load conditions.

5. Another object of the present invention is to dispense with power electronics inverter and converters from the induction machine system in certain applications.
6. Further object of the present invention is to provide a cost effective and reliable solution.

Further objects and features can be readily understood by any person skilled in the art by referring to the detail description and appended claims of the invention.

STATEMENT:

Following specifications provides the general description of embodiment of the present invention comprising a duel rotor induction synchronous electric machine having certain length and comprising a stator means stationery part in the form of laminated core made from soft magnetic material of certain length and having plurality of slots for electrical windings preferably suitable for poly phase electric supply voltage and frequency and a cylindrical rotor means induction rotor having lesser diameter but equal length in the form of laminated hallow cylindrical core made preferably from soft magnetic material and mounted concentrically, axially, rotatably inside the cylindrical space of the said stator leaving some radial and annular air gap to facilitate relative motion and the said induction rotor further fixed to end covers on both sides which are further keyed to the concentric shaft to form a single rigid mechanical member and the said induction rotor further comprises plurality of holes on the periphery wherein plurality of electric conductors means rotor bars fitted and the plurality of rotor bars short circuited on both sides by rings thus forming a squirrel cage however; the said induction rotor may in the form of wound rotor and further a synchronous rotor having still lesser diameter but equal length in the form of laminated hallow cylindrical core made preferably from soft magnetic material and fitted with antifriction bearing on both ends and located on the concentric shaft thus rendering it to rotate freely on the said shaft and mounted concentrically, axially and rotatably within the cylindrical space of said induction rotor leaving radial and annular air gap to facilitate relative motion and the said synchronous rotor further comprises plurality of holes on the periphery wherein plurality of electric conductors means damper bars fitted and the plurality of damper bars short circuited on both sides by rings thus forming a freely rotatable synchronous rotor and the synchronous rotor further comprises an excitation system for providing magneto motive force (MMF) for the establishment of working flux in the magnetic circuit of the said embodiment thus a duel rotor assembly comprising

induction rotor rotatably mounted within said stator and synchronous rotor mounted rotatably within said induction rotor and on the said shaft and the said stator rotors assembly thus formed mounted concentrically, axially inside a stator housing having end shields on both sides and each end shield is having an arrangement for fixing an antifriction bearing to support the concentric shaft on both side and the said shaft having extension with a key way for external mechanical coupling thus forming the said duel rotor induction synchronous electric machine embodiment.

On application of electric poly phase power supply to the stator winding results in development of a rotating magnetic field which rotates at synchronous speed and draws magnetizing current from the connected supply. Magnetic lines of force developed by the rotating magnetic field cuts the cage bars means conductors of said induction rotor and generate voltages, causing current to flow in the respective cage bars means conductors. The interaction between the said currents and rotating magnetic field develops torque, tending to turn the rotor bars means conductors of the induction rotor in the direction of rotating magnetic field thus turning the keyed shaft. As the speed of the induction rotor increases the relative speed between the said rotor and rotating magnetic field decreases causing a decrease in induced voltage therein and thus if the rotor were to run at the speed of rotating magnetic field the induced voltage would be zero hence current would be zero and the torque would be zero hence the said induction motor on its own cannot rotate at synchronous speed. When the said rotor is rotated at higher speed in the same direction than the synchronous speed, the rotor bars cuts the rotating magnetic field and develops voltage in opposite direction than that of a motor and mechanical power input to induction rotor gets converted to electric power in the stator winding which in turns supplies it to the connected power supply thus the said machine works as an induction generator. The induction rotor in the form of wound rotor may be connected to inverter A.C. supply means doubly fed rotor system. The synchronous rotor mounted within the cylindrical space of induction rotor and mounted on shaft with bearings rendering it to rotate freely on the shaft. The said synchronous rotor comprises magnetic poles with alternate polarity uniformly positioned so as to direct the flux radially in the magnetic circuit of the embodiment and further comprises plurality of damper bars fitted inside plurality of holes on its outer periphery and short circuited by rings on both sides thus forming a damper bar cage similar to squirrel cage as in induction rotor and it further acts as a magnetic shield to prevent demagnetization of magnets due to rotating magnetic field. The rotating magnetic field developed by the stator also interacts with the damper bars similar to squirrel cage and develops torque in the same direction of rotating magnetic field thus the

said synchronous starts rotating till it reaches a speed close to synchronous speed whereupon the excitation field magnets get locked with the rotating magnetic field like any other synchronous machine and the synchronous rotor starts rotating at synchronous speed and provides magneto motive force (MMF) for the establishment of working flux in the magnetic circuit of the said embodiment instead of MMF means reactive power hitherto provided by the incoming power supply system and likewise depending upon the pole strength, supplies additional reactive power to the connected power supply system means working in leading power factor mode like conventional synchronous generator. The said damper bars further prevents excessive magnetic field reaching the magnets to avert demagnetizing the poles during the initial starting phase of the synchronous rotor. Further during operation of the conventional induction generator the magnetizing power is drawn from the supply resulting in lagging power factor operation which is detrimental in many ways to the overall system operation. The present embodiment comprising duel rotor induction synchronous electric machine working as a generator supplies real and reactive power to the system unlike conventional induction generator and improves system performance substantially in steady state stability and dynamic stability areas and further operates in wide-speed range unlike fixed speed operation of conventional synchronous generator.

The above and other objects, apparent from the drawings, and following description, may be attained, the above described difficulties overcome, and the advantages and results obtained, by the embodiments, construction, arrangement and combinations, sub combinations and parts which comprise the present invention of duel rotor synchronous induction machine, a preferred embodiment of which, illustrated of the best mode in which the applicants have contemplated applying the principle, being set forth in details in the following description and illustrated in the accompanying drawings and which are generally applicable to other electric machines to fulfill particular application illustrated hereinafter.

BRIEF DESCRIPTION OF DRAWING:

The invention is described by way of example with reference to the accompanying drawings

Sheet 1/1:

Figure-1 is a sectional view of through the duel rotor induction synchronous electric machine embodying the invention;

Figure-2 is a sectional end view of the same parts being broken away on section lines A-C and B-C for the purpose of illustration

Referring now more particularly to the embodiment of the invention illustrated in which similar reference character refers to similar parts throughout, it will be understood that while the upper half section is shown close to the stator slot through the centre of shaft, the lower right hand quarter segment shows the section through the squirrel cage and remaining quarter section shows the section outside the squirrel cage rotor, as the machine being symmetrical and further the illustrations does not show cooling, lubricating system, mechanical hardware, machine mounting arrangements, electrical installation, switch-gear and other all being conventional.

In order that the manner in which the above-cited and other advantages and objects of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and therefore not to be considered limiting on its scope, the invention will be described with additional specificity and details through the use of the accompanying drawings.

Detailed description:

Sheet 1/1 comprises Figure-1 showing the section of the embodiment of present invention. The machine is enclosed in stationery concentric housing 101 having end shields 102 attached to opposite ends thereof. A bearing housing 103 is formed at the end of each end shield 102 within which are mounted anti-friction bearings for rotatably supporting a concentric shaft 125. The said shaft 125 is having a key way 126 for coupling mechanical load or prime mover (not shown) externally. Stator core 104 having certain length and made of soft magnetic material laminations and having plurality of concentric stator slots 105 mounted in the said housing 101. The stator is wound suitably for the incoming supply comprising electric conductors 106 placed inside slot 105 and having winding overhang 107 on both sides of the stator core 104. Squirrel cage means induction rotor 110 in the form of a cylindrical ring having same length that of stator core 104 and made preferably from soft magnetic material is rotatably, concentrically and axially mounted within the stator 104. The said rotor 110 having suitable concentrically located plurality of holes near its outer diameter to accommodate plurality of rotor bars 111 and having end rings 112 on both sides to short circuiting the ends of said plurality of rotor bars 111 to form a squirrel cage. A uniform radial and annular air gap 102 is formed between the stator 104 and induction rotor 112 to facilitate rotation of said rotor 112 within stator 104. The rotor 102 is fitted on end covers 113 on both sides which are further keyed

by keys 114 to the shaft 125 so to form a rigid mechanical member thus forming an induction rotor embodiment. Synchronous rotor 119 being in the form of a cylinder having same length that of stator core 104 and made preferably from soft magnetic material is rotatably, concentrically and axially mounted within the induction rotor 110 and over shaft 125. There is a uniform radial and annular clearance 115 between the induction rotor 110 and synchronous rotor 119 and shaft 125. The said rotor 119 is mounted on antifriction bearings 120 fitted on both sides and supported by shaft 125 so that the said rotor rotates freely and concentrically on shaft 125. The said rotor 119 having suitable concentrically located plurality of holes near its outer diameter to accommodate plurality of damper bars 116 and having end rings 117 on both sides to short circuiting the ends of plurality of damper bars 116 to form a damper bar cage. In the present embodiment interior permanent magnets 118 (IPM) are located in the core 119 of the synchronous rotor (for illustration purpose only a typical arrangement of two pair magnets for four pole machine is depicted however different number of pole pairs and other types of permanent magnets topology including electromagnets is possible) wherein the magnet having north (N) and south (S) polarity are placed alternately and uniformly on a suitable circle diameter. The magnet poles depicted by N1, S2, N3 and S4 are oriented radially toward the said stator 104 whereupon flux lines originate from north poles N1, N2 and ends in south poles S2 and S4 so as to complete the magnetic circuits along flux lines F12, F14,F32, and F34 thus encompassing the embodiment of the said invention.

The operation of the embodiment of the present invention will now be explained with reference to the illustration as shown in Figure-1 and Figure-2. On electrically connecting the stator poly phase winding 106 to poly phase A.C. source (not shown) the winding develops a rotating magnetic field due to magneto motive force (MMF) in the direction of Ni and sets up magnetic line of flux in the direction of F12, F14, F32, F34 shown by arrows. Magnetic line of flux from the stator 104 enter through radial air gap 108 in the core of induction rotor 110 and cuts the rotor bars 111 developing means generating means inducing electromotive force (EMF) means voltage in the said bars appropriate to the direction of rotating field Ns perpendicular to the direction of magnetic line of flux. The said bars 111 being short circuited by end rings 112 sets up currents in the said bars 111 in such a direction that the forces exerted by their interaction make the bars 111 means the induction rotor 110 move means rotate in the direction Ni means in the direction of rotating magnetic field. The said induction rotor being fixed to the end covers 113 which in turn keyed to the shaft 125 thus forming a rigid induction rotor embodiment, the force or torque developed in the bars 111 rotates the shaft 125. At the beginning of

the rotation of the said rotor the frequency of said voltage being that of A.C. source which is being maximum the magnetic lines of force do not penetrate much below the said bars 111 due to much higher opposing magneto motive force exerted by said short circuited bars which in turn reduces the flux reaching to the synchronous rotor 119. As the said bars 111 starts rotating towards speed Ni in the direction Ns the frequency known as slip frequency of voltage in the bars goes on decreasing as the relative velocities (means Ns-Ni) of rotating magnetic field and the rotor bars reduces which in turn reduces the induced voltage and so the opposing magneto motive force and thus more lines of flux start penetrating towards the synchronous rotor 119. Once the induction rotor speed reaches close to synchronous speed Ns torque reduces to lower value decided by the load and machine losses however the said rotor on its own never reaches speed Ns theoretically as the voltages induced in the said bars 111 become zero as difference between Ns and Ni becomes zero. The synchronous rotor comprises damper bars 116 being short circuited by rings 117 interacts with the rotating magnetic field, though at reduced strength during starting, in the direction Ns and as explained earlier rotates in the direction Ns. The reaction of the said damper bars 116 opposite to rotating magneto motive force means reaction reduces the flux reaching to the magnets 118 thus preventing demagnetizing effect thus the said damper bars serve duel purpose of developing torque in the direction of Ns and also shielding the magnets from demagnetizing. When said synchronous rotor reaches a speed Ni close to Ns the magnetic lines of flux from the magnet 118 get locked with the rotating magnetic field, a phenomenon known as synchronization, and the synchronous rotor starts rotating at synchronous speed Ns. Such operation is being facilitated by the unique feature of the embodiment wherein the moment of inertia of synchronous rotor is comparatively low, being free to rotate without mechanical load means playing no part in real power conversion. As explained earlier the electrically connection of stator poly phase winding 106 to poly phase A.C. source stator 104 draws magnetizing current means reactive power from the source to set up magnetic lines of flux in the associated magnetic circuit F12 through F14 which culminates in poor power factor operation inherent to induction motor operation and being one of the serious disadvantages which becomes a serious drawback when such machines operate as induction generators. In the said embodiment of the present invention the said synchronous rotor comprises magnets and being locked in to synchronism the said magnets provide the desired MMF to set up required lines of flux in the said magnetic circuits thereby substituting the said magnetizing current means reactive power and further able to supply reactive power to the connected system. When the said embodiment means the synchronous rotor therein, is connected to a prime mover

the speed Ni increases beyond Ns and the direction of voltage in the bars 111 reverses means the direction of the currents therein and the said embodiment works like a generator and the range of such operating speed for efficient operation is comparatively wider than synchronous generator hence induction generators are preferred to synchronous generator wherever input power to prime mover varies slowly or suddenly and beyond certain limits such as in wind mill generator. By suitable selection the magnet the said embodiment supplies reactive power (means leading power factor) to the connected source like conventional synchronous generator. The excitation system means magnets comprised on synchronous rotor can have different permanent magnets topologies including electromagnets or the combination with associated field windings on cylindrical rotor or salient poles with associated slip rings-brushes including brushless excitation depending upon the application and cost effective design and reliability aspects.

In the ongoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirement of prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set fourth in the appended claims.

CLAIMS

We claim:-

1. A duel rotor induction synchronous electric machine embodiment of the present invention comprising the preferred embodiment of the device comprising a stationery housing having mounting arrangement for fixing to some rigid foundation, fitted with end shields attached to opposite ends wherein at the centre a bearing housing formed within which anti-friction bearings and shaft mounted and a stator means stationery part in the form of hallow laminated core having outer diameter and inner diameter made from soft magnetic material having certain core length and radial thickness and further having plurality of slots formed at the inner diameter periphery for electrical windings suitable for electric supply voltage and frequency and supply connections being brought out and a cylindrical rotor means induction rotor in hallow cylindrical form having outer diameter and inner diameter where the said outer diameter being lesser than inner diameter of said stator and having length equal to the length of said stator core and made preferably from soft magnetic material and mounted concentrically, axially, rotatably inside the cylindrical space of the said stator leaving some radial and annular air gap as mechanical clearance for free rotation within the said stator and the said induction rotor further comprises plurality of holes on the outer diameter periphery wherein plurality of electric conductors means rotor bars fitted and further short circuited on both sides by short circuiting rings thus forming a squirrel cage or wound induction rotor with associated slip ring brushes elements connected to separate inverter supply means doubly fed induction rotor and the said induction rotor means also a wound induction rotor further fixed to end covers on opposite sides which are further keyed to the concentric shaft to form rigid mechanical assembly and a second cylindrical rotor means synchronous rotor in hallow cylindrical form having outer diameter and inner diameter where the said outer diameter being lesser than inner diameter of said induction rotor and having length equal to the length of said stator core and made preferably from soft magnetic material and mounted concentrically, axially, rotatably inside the cylindrical space of the said induction rotor leaving some radial and annular air gap as mechanical clearance for free rotation within the said induction rotor and the said shaft and the said synchronous rotor further comprises plurality of holes on the outer diameter periphery wherein plurality of electric conductors means damper bars fitted and further short circuited on opposite sides by short circuiting rings thus forming a damper bar cage within and the said synchronous rotor having bearing housing on opposite sides for mounting antifriction bearings and the said bearings further mounted on shaft thus the said rotor free to rotate on the said shaft and the

synchronous rotor further comprises excitation system for providing magneto motive force (MMF) for the establishment of working flux in the magnetic circuit and the said shaft having extension with a key way for external mechanical coupling thus forming the said duel rotor induction synchronous electric machine embodiment working as electric motor, electric generator, rotary condenser with desirable power factor.

2. The preferred embodiment of the device as claimed in claim 1 comprising:
a. a stationery housing having mounting arrangement for fixing to some rigid foundation, fitted with end shields attached to opposite ends wherein at the centre a bearing housing formed within which anti-friction bearings and shaft mounted;

b. a stator means stationery part in the form of hallow laminated core having outer diameter and inner diameter made from soft magnetic material having certain core length and radial thickness and further having plurality of slots formed at the inner diameter periphery for electrical windings suitable for electric supply voltage and frequency and electric supply connections being brought out;

c. a cylindrical rotor means induction rotor in hallow cylindrical form having outer diameter and inner diameter where the said outer diameter being lesser than inner diameter of said stator and having length equal to the length of said stator core and made preferably from soft magnetic material and mounted concentrically, axially, rotatably inside the cylindrical space of the said stator leaving some radial and annular air gap as mechanical clearance for free rotation within the said stator and the said induction rotor further comprises plurality of holes on the outer diameter periphery wherein plurality of electric conductors means rotor bars fitted and further short circuited on both sides by short circuiting rings thus forming a squirrel cage within and the said squirrel cage induction rotor or wound induction rotor with associated slip ring, brushes elements connected to separate inverter supply means doubly fed induction rotor which further fixed to end covers on opposite sides which are further keyed to the concentric shaft to form rigid mechanical assembly;

d. a second cylindrical rotor means synchronous rotor in hallow cylindrical form having outer diameter and inner diameter where the said outer diameter being lesser than inner diameter of said induction rotor and inner diameter being slight more than the said shaft and having length equal to the length of said stator core and made preferably from soft magnetic material and mounted concentrically, axially, rotatably

inside the cylindrical space of the said induction rotor leaving some radial and annular air gap as mechanical clearance for free rotation within the said induction rotor and the said synchronous rotor further comprises plurality of holes on the outer diameter periphery wherein plurality of electric conductors means damper bars fitted and further short circuited on opposite sides by short circuiting rings thus forming a damper bar cage within and the said synchronous rotor having bearing housing on opposite sides for mounting antifriction bearings and the said bearings further mounted on shaft thus the said rotor free to rotate on the said shaft and the synchronous rotor further comprises excitation system for providing magneto motive force (MMF) for the establishment of working flux in the magnetic circuit.

3. The preferred embodiment of the device as claimed in claim 1,2 comprising said stationery housing within which said stator is rigidly mounted within which said induction rotor is coaxially aligned and rotatably mounted and rigidly fixed to the concentric shaft and within the said induction rotor and the said shaft said synchronous rotor is coaxially aligned and rotably mounted and the said shaft having extension with key slot is mounted on antifriction bearings and the said bearings are further mounted within the said bearing housings of said end shields and the said end shields are attached to the opposite ends of the said stationery housing thus comprising said duel rotor induction synchronous electric machine device.

4. The induction rotor as claimed in claim 3 means comprising squirrel cage rotor, wound induction rotor;

5. The said supply as claimed in claim 1,2,3,4 means having single or poly phase electric supply with certain alternating frequency, inverter supply for stator, inverter supply for wound induction rotor.

6. The said excitation system claimed in 1,2,3,4 means comprising topologies of permanent magnets, direct current field poles means electromagnets associated with slip rings and brushes, combination of permanent magnets and electromagnets, brushless excitation system; wherein the magnetic poles formed placed alternately on suitable circle diameter comprising the said synchronous rotor.

7. The said induction synchronous electric machine claimed in 1,2,3,4,5, and 6 means motor, generator, rotary condenser;

ABSTRACT

The present invention comprising a duel rotor induction synchronous electric machine comprising stationery housing within which the electrically wound stator is rigidly mounted within which squirrel cage or wound induction rotor is coaxially aligned and rotatably mounted and rigidly fixed to the concentric shaft and within the induction rotor and the shaft a synchronous rotor having excitation system is coaxially aligned and rotably mounted to run freely and the shaft having extension with key slot is mounted on antifriction bearings and the bearings are further mounted within the bearing housings of the end shields and the end shields are attached to the opposite ends of the stationery housing thus comprising said duel rotor induction synchronous electric machine device working in a wide-range speeds as electric motor, electric generator, rotary condenser with desirable power factor.

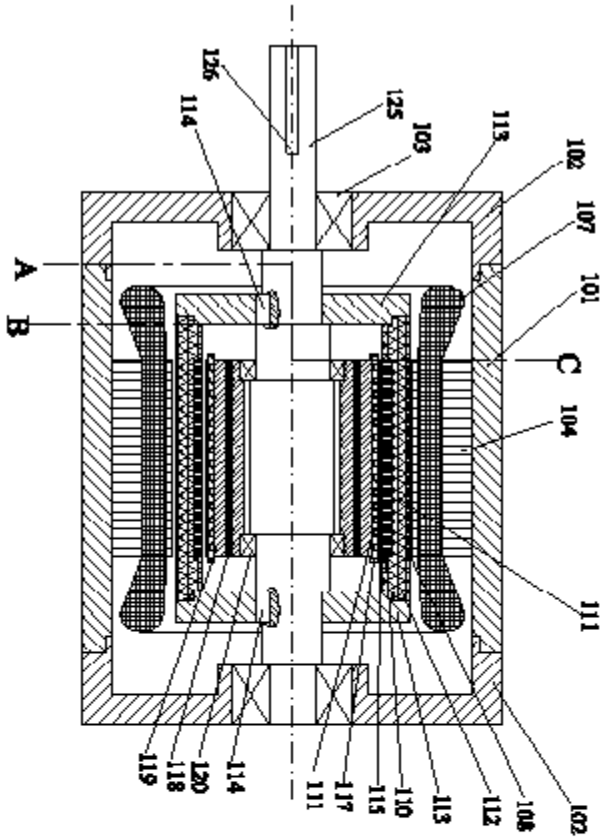

Figure-1

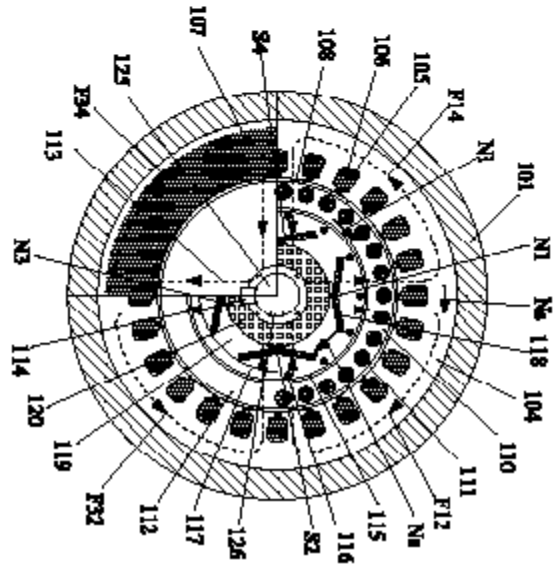

Figure-2

FORM 3

THE PATENT ACT 1970
(39 OF 1970)
AND
The patent rules, 2003
STATEMENT AND UNDERTAKING UNDER SECTION 8
(See section 8; rule 12)

We

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602

Hereby declare:-
(i) That we have not made any this application for the same /substantially the same invention outside India.

Dated this 15th day August 2011

Signature

Ingole Vijay Tulshiram

To
The controller of patents,
The patent office,
At Mumbai

Form 5

THE PATENT ACT 1970

(39 OF 1970)

AND

The patent rules, 2003

DECLARATIO AS TO INVENTORSHIP

(See section 10(6); rule 13(6))

We

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602

HEREBY DECLARE THAT WE ARE THE TRUE AND FIRST INVENTORS OF THE INVENTION DISCLOSED IN THE COMPLETE SPECIFICATION FILED ALONG WITH OUR APPLICATION

Signature of the inventors

Name: (1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay