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SUPERINDUSTRIA Y COMERCIO

Señora Jefe de la
DIVISION DE NUEVAS CREACIONES
Superintendencia de Industria y Comercio
E. S. D.

Radicación: 01077342 00000002 Folios: 83
Fecha (USD): 2002-01-11 17:37:17
Trámite: 002 PATENTES y 1 REGISTRO/ 444 REPUESTA
Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

Referencia : Expediente No. 01.077.342
Solicitante : GENERAL ELECTRIC CANADA INC.
Asunto : Solicitud de patente para: "SISTEMA
DE AISLAMIENTO DE CAMPO ELECTRICO
GRADUADO PARA MAQUINA
DINAMOELECTRICA"
Fecha de la solicitud : 11 de septiembre de 2001

TRAMITE: 002 - EVENTO: 001 - ACTUACION: 444

1. Yo, Emilio FERRERO, obrando como apoderado del solicitante en el asunto antes identificado, me refiero al oficio número 2993, notificado por fijación en lista de fecha del 29 de noviembre de 2001.

2. Mediante el oficio número 2993 se puso en conocimiento del solicitante el informe que contiene las observaciones hechas por su Despacho sobre la presente solicitud de patente. Atiendo a las observaciones de la manera siguiente:

2.1. Dibujos. De acuerdo con lo requerido presento junto con este escrito nuevos dibujos de las figuras 1 a 6 en las cuales se han puesto las leyendas en castellano.

2.2. Arte Final. Adjunto a este memorial presento la figura característica por duplicado en tamaño 12 x 12 cm tal como lo solicita su Despacho.

2.3. Documento de cesión del derecho a la patente. Presento junto con este escrito el documento de cesión de los inventores al solicitante debidamente notariado y legalizado.

2.4. Poder. Presento con este memorial el poder otorgado por la sociedad GENERAL ELECTRIC CANADA INC. debidamente legalizado, junto con su respectiva traducción, que me faculta para actuar en esta solicitud de patente de invención.

Ruego a Usted reconocerme personería como apoderado de la solicitante.

2.5. Documento de prioridad. Presento con este escrito los documentos de prioridad de las solicitudes de patente canadienses números 2.319.281 del 14 de septiembre de 2000 y 2.344.564 del 3 de mayo de 2001 junto con sus respectivas traducciones del capítulo reivindicatorio, en las cuales se basa la reivindicación de la prioridad.

2.6. Recibos. Presento junto con este escrito los recibos de caja No. 01-81,215, por valor de \$ 73.440 y No. 02-343, por valor de \$4,560, por concepto de pago de la tasa de modificación de solicitud.

3. Puesto que se han atendido a cabalidad las observaciones hechas por su Despacho sobre la presente solicitud de patente, atentamente solicito que se continúe su tramitación.

Bogotá, 11 ENE. 2002
Señora Jefe,


EMILIO FERRERO
T.P.A. No. 31.929

 COLO 12926-801-001-1
JBP/Id-5



Espacio reservado para el adhesivo de radicación

**FORMULARIO UNICO DE CORRECCIONES Y MODIFICACIONES
2000-10**

1 SOLICITUD DE:		
☐ Corrección de Error Material ☒ Modificación a una solicitud		
2 SOLICITANTE	Nombre: GENERAL ELECTRIC CANADA INC. sociedad constituida y existente bajo las leyes de Canadá Dirección: 2300 Meadowvale Blvd., Mississauga, Ontario L5N 5P9, Canadá Teléfono: 546 09 70 E-mail: clientes@camyp.com Fax: 249 40 70 Domicilio: Mississauga, Ontario, Canadá	IDENTIFICACION C.C. ☐ NIT ☐ C.E. ☐ Otro ☐ Número: _____
3 REPRESENTANTE O APODERADO	Nombre: Emilio Ferrero Dirección: Carrera 4ª No. 72-35 Teléfono: 347 38 11 E-mail: caveller@cavelier.com Fax: 217 92 11 Domicilio: Bogotá, Colombia	IDENTIFICACION C.C. ☒ NIT ☐ C.E. ☐ Otro ☐ Número: <u>438.019</u> TP <u>31.929</u>
4 Número de expediente: 01.077.342 Clase: H32K 003/032 Título del Invento: SISTEMA DE AISLAMIENTO DE CAMPO ELECTRICO GRADUADO PARA MAQUINA DINAMOELECTRICA		
5 Descripción de la corrección o modificación solicitada Se presentan los dibujos con sus respectivas leyendas en castellano.		
6 Comprobante de pago No. <u>01-81.215</u> por valor de <u>\$73.440</u> Fecha <u>28 de diciembre de 2001</u> Comprobante de pago No. <u>02-343</u> por valor de <u>\$4.560</u> Fecha <u>8 de enero de 2002</u>		
7 Anexos: ☒ Comprobantes de pago de la tasa por valor de \$ 78.000 ☐ Poderes, si fuere el caso ☐ Certificado de existencia y representación legal, cuando el solicitante sea persona jurídica ☐ Certificado que acredita el cambio de nombre		
8 NOMBRE: <u>EMILIO FERRERO</u> FIRMA: C.C. 438.019 de Usaquén T.P. 31.929		
Instrucciones para el diligenciamiento del presente formulario, ver reverso de esta página		

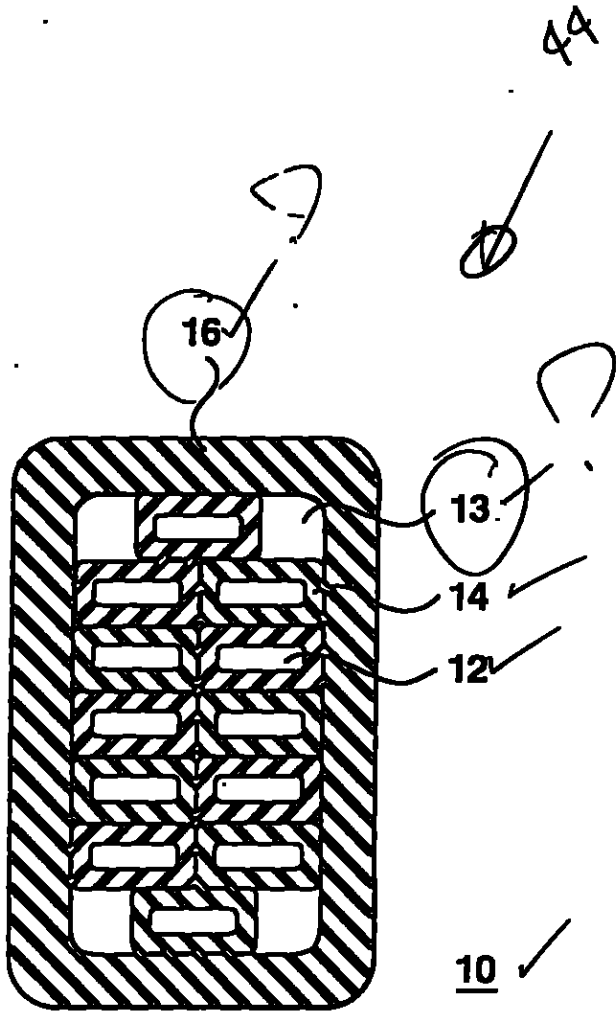


FIG. 1 (ESTADO DE LA TECNICA)

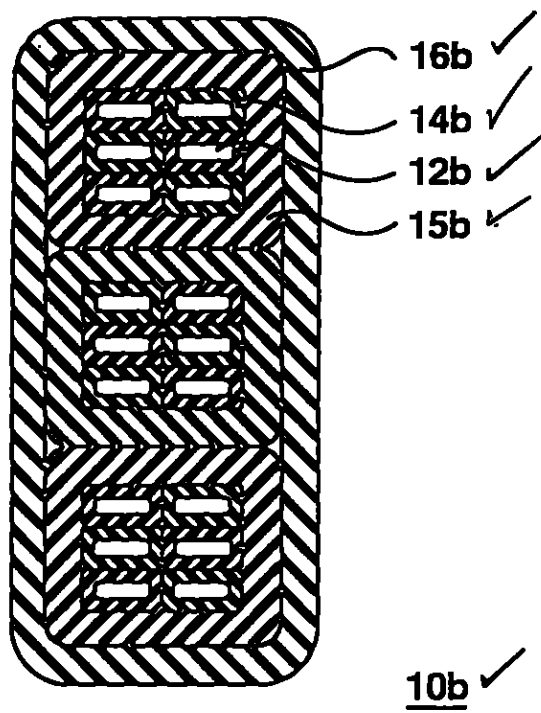


FIG. 2 (ESTADO DE LA TECNICA)

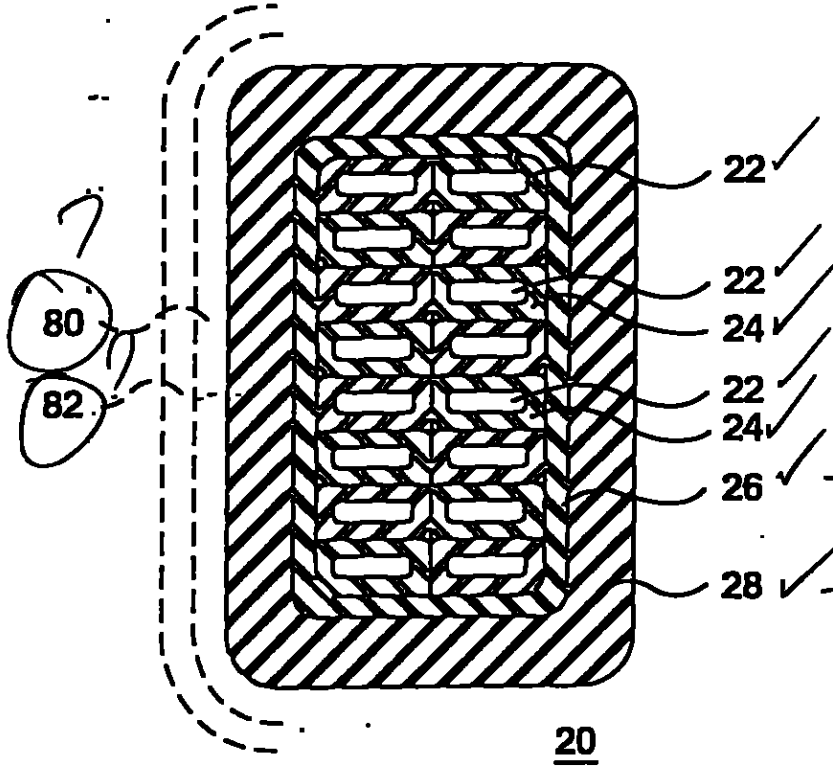


FIG. 3A ✓

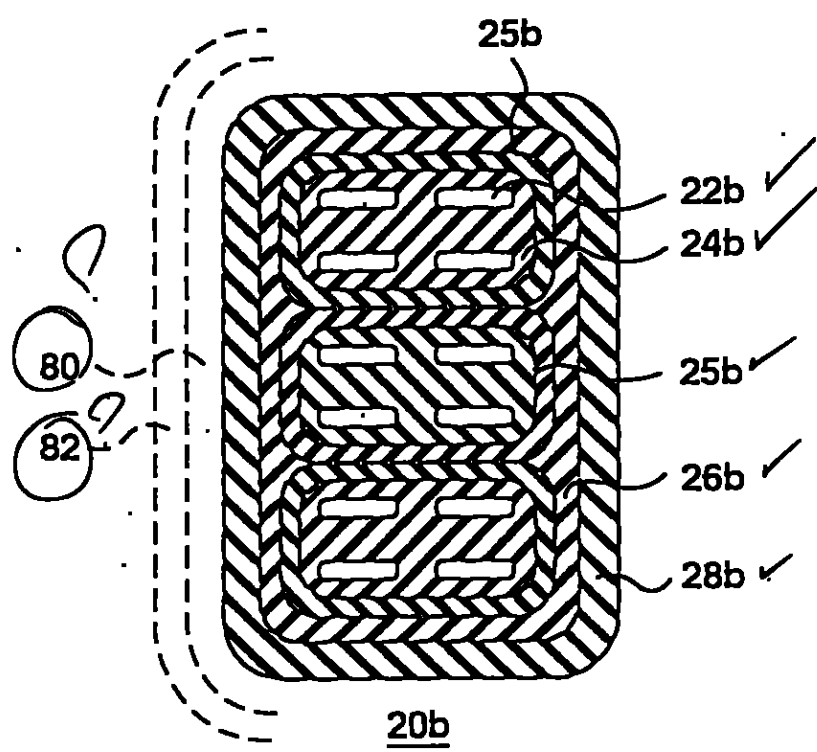


FIG. 3B

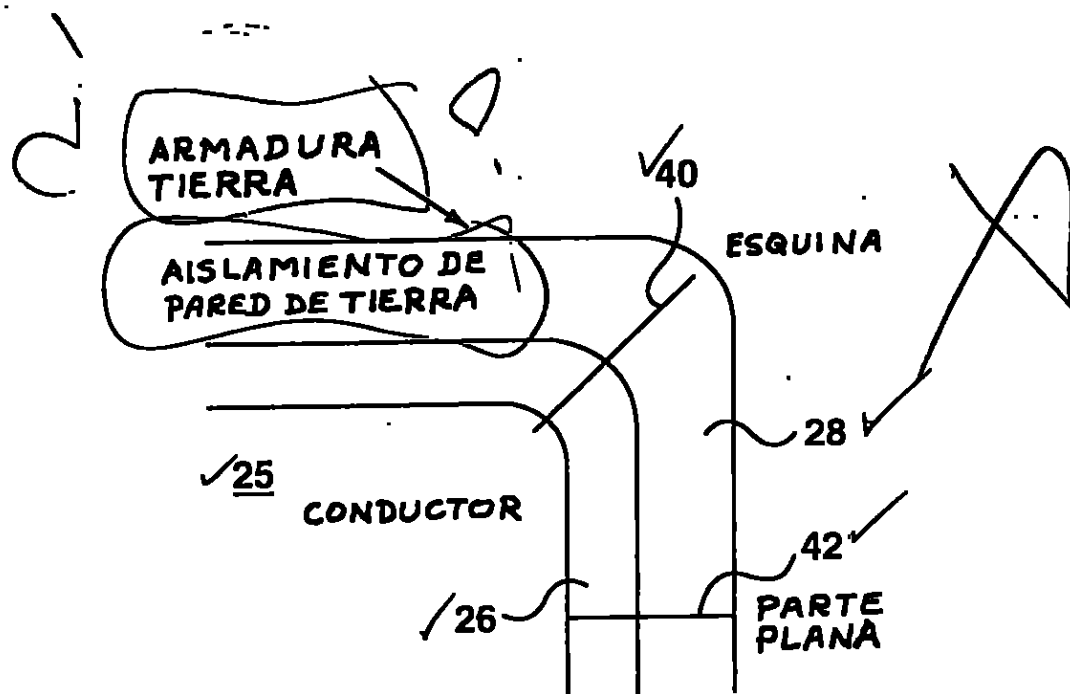
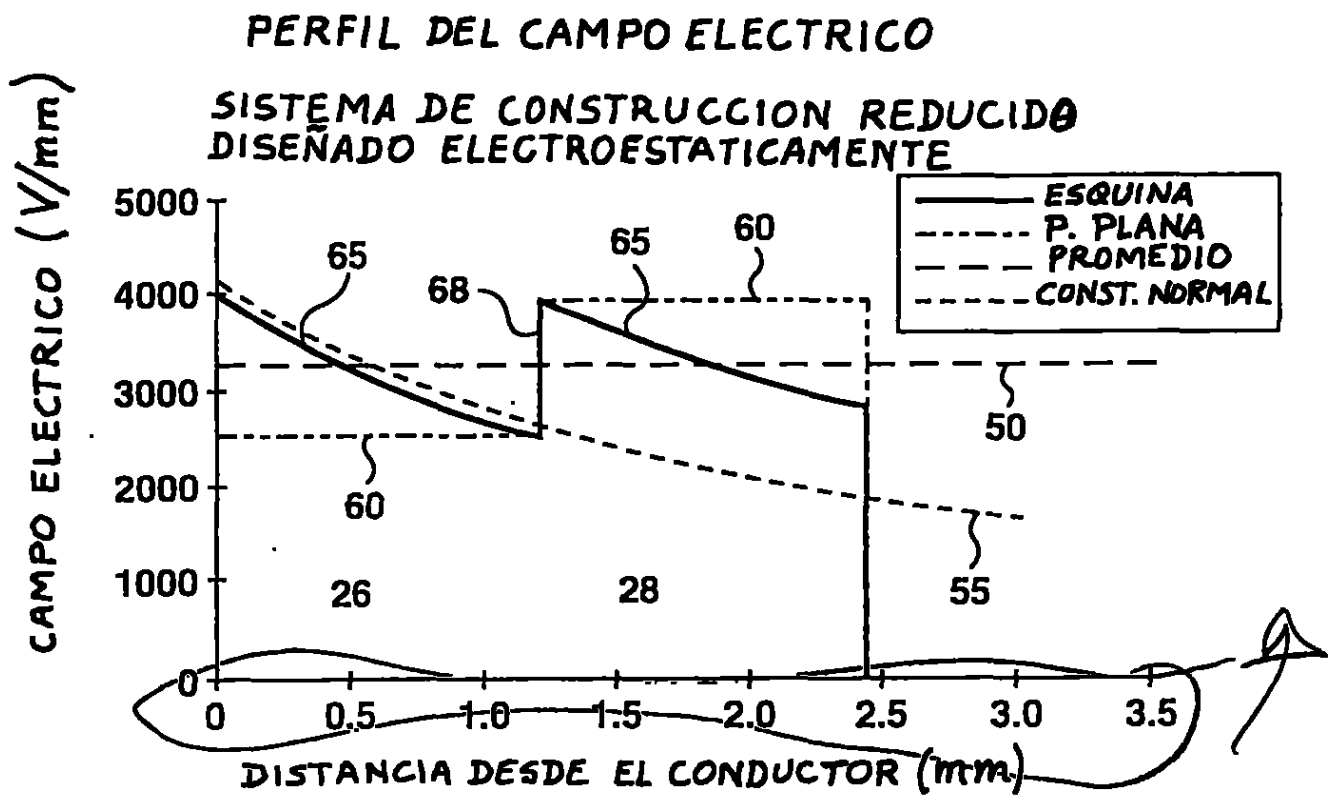
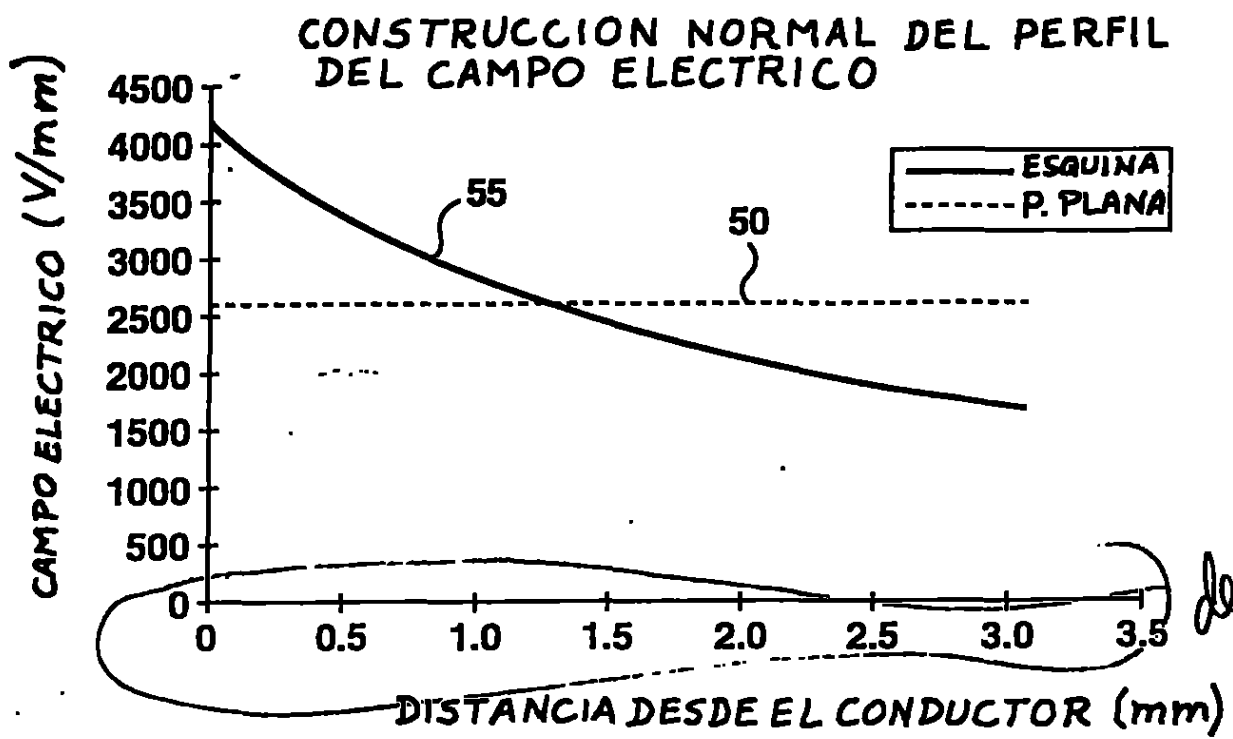


FIG. 4





F RMATO DE DIGITALIZACION
RELACION DE ANEXOS



Royni
Technologies S.A.
Calle 100 No. 100-100

48

Expediente No		01077342	No de Folio
Item		No de Unidades	
1	CD		
2	DVD		
3	REVISTA		
4	LIBRO		
5	PERIODICO		
6	DISQUETES		
7	SOBRE DE MANILA ✓		
8	SOBRE BLANCO TAMAÑO CARTA		
9	SOBRE BLANCO TAMAÑO OFICIO		
10	OTROS:		

Observaciones:
Arte final



Ontario

THE MANAGEMENT BOARD OF CABINET

I HEREBY CERTIFY AS FOLLOWS:

BARBARA FAYE McFADDEN

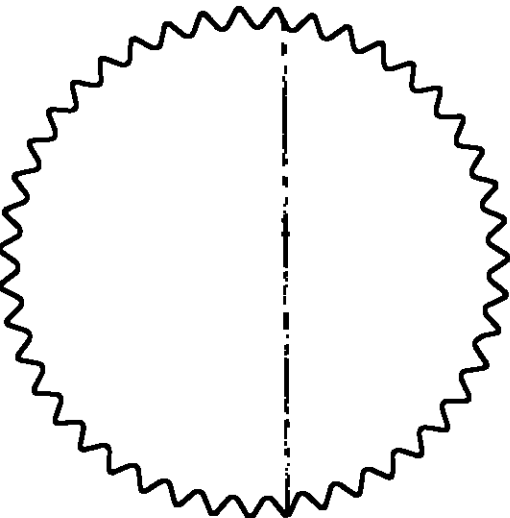
of the City of Mississauga, in the Regional Municipality of Peel, in the Province of Ontario, whose name is subscribed to the attached Instrument, was, at the time of subscribing thereto, a NOTARY PUBLIC appointed for a period of three years from the 30th day of August, 2000. It is effective only in the Regional Municipality of Peel, and only while you are working for General Electric Canada Inc. and is limited to the attestation of instruments and the taking of affidavits in connection with the business of that company, its subsidiaries, associates and affiliates.

I FURTHER CERTIFY THAT I have compared the signature of the said NOTARY PUBLIC subscribed to the attached Instrument with the specimen signature of the said NOTARY PUBLIC filed in this office and verily believe the said signature to be genuine; and THAT I have compared the impression of the Seal of the said NOTARY PUBLIC appearing on the attached Instrument with the specimen of the Seal filed in this office and verily believe the impression of the Seal to be genuine.

IN TESTIMONY WHEREOF I have hereunto set my Hand and affixed the Seal of the Management Board of Cabinet of the Province of Ontario at the City of Toronto in the said Province this thirteenth day of December, A.D. 2001.

A handwritten signature in cursive script.

for SECRETARY OF THE MANAGEMENT BOARD OF CABINET



50

NOTARIAL CERTIFICATE

CITY OF MISSISSAUGA :

COUNTY OF PEEL :

PROVINCE OF ONTARIO :

I, Barbara F. McFadden, the undersigned Notary Public, hereby certify that the papers hereto annexed are true and accurate copies of the assignments in:

Docket:	GECAN3189C
Canadian Serial Nos:	2,319,281 and 2,344,564
Filing Dates	September 14, 2000 and May 3, 2001
Title:	GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE
Signed by:	A. Karim Younsi David A. Snopek Robert Draper Konrad Weeber

in favour of General Electric Canada.

Signed this 22 day of November, 2001.


Notary Public

BARBARA FAYE McFADDEN, Notary Public,
Regional Municipality of Peel, limited to the
attestation of Instruments and the taking of
affidavits, for General Electric Canada Inc.,
its subsidiaries, associates and affiliates.
Expires: August 30, 2003.

MINISTERIO DE RELACIONES
EXTERIORES

Mont 6 m 20' 62

IMPUESTO DE TIMBRE: U.S. \$ 7
DERECHO CONSULAR FIRMADO POR EL
TOTAL A CARGO AUTUMENTO DE SEMPERA
LAS FUNCIONES INDICADAS

NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2002 JAN -3 A 11: 22

DE DE LEGALIZACIONES
SECTATE DE BOGOTA D.C.

CONSULADO GENERAL DE COLOMBIA

Toronto, CANADA

No. 422
Fecha DEC 14 2001

El Consulado General de Colombia
CERTIFICA: que el Señor

Barbara Paez Quevedo
que autoriza el presente documento.
Ejercía legalmente en la fecha a
expresada, las funciones de:

y que la firma y sello que en el
documento aparecen como suyos
son los que usa y acostumbra en sus
actos oficiales.

El Consulado no asume responsabi-
dad alguna por el contenido del
documento.

Servicio Exterior

MARTALIGIA GONZALEZ
CONSUL GENERAL

ASSIGNMENT

In consideration of One Dollar and other good and valuable consideration, of which we acknowledge receipt,

we, **A. Karim Younsi**, Canadian Citizen, residing at 725 Wallis Drive, Peterborough, Ontario K9J 8E4 Canada and **David A. Snopek**, Canadian citizen, residing at 1158 Baker Street, Peterborough, Ontario K9H 7P9 Canada;

respectively sell and assign to **GENERAL ELECTRIC CANADA INC.**, having a place of business at 2300 Meadowvale Blvd., Mississauga, Ontario L5N 5P9, its successors and assigns, all right, title and interest in the improvements in

GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

invented by us, as described in the application for **CANADIAN LETTERS** patent and any and all applications for patent and patents therefor in any and all countries, including all divisions, reissues, continuations and extensions thereof, and all rights of priority resulting from the filing of said **CANADIAN** patent application and authorize and request any official whose duty it is to issue patents, to issue any patent on said improvements or resulting therefrom to said **GENERAL ELECTRIC CANADA INC.**, or its successors or assigns and agree that on request and without further consideration, but at the expense of said Company, we will communicate to said Company or its representatives or nominees any facts known to us respecting said improvements and testify in any legal proceeding, sign all lawful papers, execute all divisional, continuing and reissue applications, make all rightful oaths and generally do everything possible to aid said Company, its successors, assigns, and nominees to obtain and enforce proper patent protection for said invention in all countries.

1.

SIGNED AT Peterborough this 12 day of September, 2000.

Piero V. Ronca
Signature of Witness

A. Karim Younsi

DECLARATION:

I, PIERO V. RONCA whose full post office address is:
(Name of Witness)

2865 TELEVISION RD - PETERBOROUGH, ONT K9L 1E9
Address of Witness

declare:

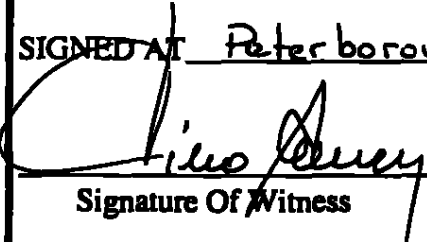
That I was personally present and did see A. KARIM YOUNSI
who is personally known to me to be the person named in the above assignment, duly sign and execute the same.

Declared at PETERBOROUGH this 12 day of SEPTEMBER, 2000.

Piero V. Ronca
Signature of Witness

2.

SIGNED AT Peterborough this 12th day of September, 2000.


Signature Of Witness


David A. Snopek

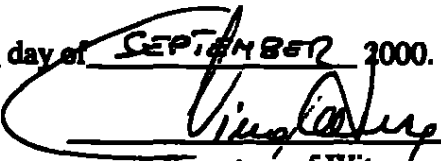
DECLARATION:

I, PIERO V. RONCA whose full post office address is:
(Name of Witness)

2865 TELEVISION RD - PETERBOROUGH, ON - K9L 1E9
Address of Witness

declare:
That I was personally present and did see DAVID A. SNOPEK ✓
who is personally known to me to be the person named in the above assignment, duly sign and
execute the same.

Declared at PETERBOROUGH this 12 day of SEPTEMBER 2000.


Signature of Witness

ASSIGNMENT

In consideration of One Dollar and other good and valuable consideration, of which I acknowledge receipt,

I, **Robert Draper**, Canadian citizen, residing at 1510 Ravenwood Drive, Peterborough, Ontario
K9K 2J3 Canada;

sell and assign to **GENERAL ELECTRIC CANADA INC.**, having a place of business at 2300 Meadowvale Blvd., Mississauga, Ontario L5N 5P9, its successors and assigns, all right, title and interest in the improvements in

GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

invented by me, as described in the application for CANADIAN LETTERS patent, Serial No. 2,319,281 filed September 14, 2000, and any and all applications for patent and patents therefor in any and all countries, including all divisions, reissues, continuations and extensions thereof, and all rights of priority resulting from the filing of said CANADIAN patent application and authorize and request any official whose duty it is to issue patents, to issue any patent on said improvements or resulting therefrom to said General Electric Canada Inc., or its successors or assigns and agree that on request and without further consideration, but at the expense of said Company, I will communicate to said Company or its representatives or nominees any facts known to us respecting said improvements and testify in any legal proceeding, sign all lawful papers, execute all divisional, continuing and reissue applications, make all rightful oaths and generally do everything possible to aid said Company, its successors, assigns, and nominees to obtain and enforce proper patent protection for said invention in all countries.

SIGNED AT <u>Peterborough</u> this <u>17th</u> day of <u>November</u> , 2000.	
<u>Craig Wilson</u> Signature Of Witness	<u>Robert Draper</u> Robert Draper

DECLARATION:	
I, <u>CRAIG WILSON</u> whose full post office address is:	
(Name of Witness)	
<u>14 Westhazel Rd, Toronto, Ontario, Canada, M8W 4R9</u>	
Address of Witness	
declare:	
That I was personally present and did see <u>Robert Draper</u>	
who is personally known to me to be the person named in the above assignment, duly sign and execute the same.	
Declared at <u>Peterborough, Ont</u> this <u>17th</u> day of <u>November</u> 2000.	
<u>Craig Wilson</u> Signature of Witness	

ASSIGNMENT

In consideration of One Dollar and other good and valuable consideration, of which I acknowledge receipt,

I, **Konrad Weeber**, Austrian Citizen, residing at 785 Riverview Rd., Rexford, NY 12148, U.S.A.
sell and assign to **GENERAL ELECTRIC CANADA INC.**, having a place of business at 2300 Meadowvale Blvd.,
Mississauga, Ontario L5N 5P9, its successors and assigns, all right, title and interest in the improvements in

GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

invented by me, as described in the application for CANADIAN LETTERS patent, Serial No. 2,319,281 filed September 14, 2000, and any and all applications for patent and patents therefor in any and all countries, including all divisions, reissues, continuations and extensions thereof, and all rights of priority resulting from the filing of said CANADIAN patent application and authorize and request any official whose duty it is to issue patents, to issue any patent on said improvements or resulting therefrom to said General Electric Canada Inc., or its successors or assigns and agree that on request and without further consideration, but at the expense of said Company, I will communicate to said Company or its representatives or nominees any facts known to us respecting said improvements and testify in any legal proceeding, sign all lawful papers, execute all divisional, continuing and reissue applications, make all rightful oaths and generally do everything possible to aid said Company, its successors, assigns, and nominees to obtain and enforce proper patent protection for said invention in all countries.

SIGNED AT Schenectady, NY this 27th day of November, 2000.

T. Ball
Signature Of Witness

Konrad Weeber
Konrad Weeber

DECLARATION:

I, Tobias Bathen whose full post office address is:
(Name of Witness)

117 S. Main Ave, Albany, NY 12208
Address of Witness

declare:

That I was personally present and did see Konrad Weeber
who is personally known to me to be the person named in the above assignment, duly sign and execute the same.

Declared at Schenectady this 27th day of November 2000.

T. Ball
Signature of Witness

TRADUCCIÓN OFICIAL 001/2002 DE UN DOCUMENTO ESCRITO EN IDIOMA INGLÉS REALIZADA POR EDUARDO CALADO NOGUERA, TRADUCTOR OFICIAL APROBADO MEDIANTE RESOLUCIÓN 541 DEL 27 DE FEBRERO DE 1976 POR EL MINISTERIO DE JUSTICIA Y DEBIDAMENTE REGISTRADO ANTE EL MINISTERIO DE RELACIONES EXTERIORES DE LA REPÚBLICA DE COLOMBIA.
GECAN3189

TRASPASO

A cambio de un dólar y otra buena y valiosa compensación, de la cual por el presente acusamos recibo, nosotros A. Karim Younsi, ciudadano canadiense residente en 725 Wallis Drive, Peterborough, Ontario K9J 8E4 Canada y David A. Snopek, ciudadano canadiense, residente en 1158 Baker Street, Peterborough, Ontario K9H 7P9 Canada, respectivamente vendemos y traspasamos a **GENERAL ELECTRIC CANADA INC.**, con sede de negocios en 2300 Meadowvale Blvd., Mississauga, Ontario L5N 5P9, sus sucesores y cesionarios, todos los derechos, título e interés en las mejoras hechas en un **SISTEMA DE AISLAMIENTO NOMINAL DE CAMPO ELÉCTRICO PARA MÁQUINAS DINAMOELÉCTRICAS**, inventado por nosotros, tal como se describe en la solicitud de patente canadiense y en todas las solicitudes de patentes y patentes relacionadas con ese invento, en todos los países, incluyendo todas las divisiones, reemisiones, continuaciones y ampliaciones de las mismas, y todos los derechos de prioridad resultantes de la presentación de dicha patente canadiense. Igualmente autoriza y solicita a cualquier funcionario cuyo deber consista en la expedición de patentes, expedir cualquier patente sobre dichas mejoras o resultante de las mismas, en favor de **GENERAL ELECTRIC CANADA INC.**, o sus sucesores o cesionarios y acuerda que cuando se solicite y sin

contraprestación adicional, pero por cuenta de dicha compañía, comunicaremos a dicha compañía o sus representantes o nominatarios cualesquiera hechos conocidos por nosotros con relación a dichas mejoras y atestiguaremos en cualquier actuación legal, firmaremos cualesquiera documentos jurídicos, firmaremos todas las solicitudes divisionales, continuadas y reexpediciones, tomaremos todos los juramentos y haremos todo lo posible para ayudar a dicha compañía, sus sucesores, cesionarios y nominatarios para obtener y hacer cumplir cualquier protección patentaria sobre dicha invención en todos los países.

FIRMADO en Peterborough, hoy 12 de septiembre de 2000.

Firma de testigo: (ilegible) Firmado: A Karini Younsi

DECLARACIÓN:

Yo, PIERO V RONCA, cuya dirección postal completa es: 2865 Television RD, Peterborough, Ont K9L 1E9, declaro que estando presente personalmente ví a A. KARIM YOUNSI, personalmente conocido por mí, como la persona nombrada en el traspaso anterior, firmar y formalizar debidamente este documento.

Declarado en Peterborough hoy 12 de septiembre de 2000.

Firmado : (ilegible) Testigo

Firmado en Peterborough hoy 12 de septiembre de 2000. Firmado: testigo. Firmado: David A. Snopek

DECLARACIÓN:

Yo, Piero V. Ronca, cuya dirección postal completa es: 2865 Television Rd, PETERBOROUGH, ON - K9L 1E9, declaro que estando personalmente presente ví a DAVID A SNOPEK, personalmente conocido mio como la persona nombrada en el documento anterior, firmar y formalizar debidamente el mismo.

57

Declarado en Peterborough hoy 12 de septiembre de 2000.

Firmado: (firma ilegible) Testigo.

GECAN3189

TRASPASO

A cambio un dólar y otra compensación buena y valiosa, de la cual acuso recibo, yo ROBERT DRAPER, ciudadano canadiense, residente en 1510 Ravenwood Drive, Peterborough, Ontario, K9K 2J3, Canada, vendo y traspaso a **GENERAL ELECTRIC CANADA INC**, con sede de negocios en 2300 Meadowvale Blvd, Mississauga, Ontario, L5N 5P9, sus sucesores y cesionarios, todo el derecho, título e interés en las mejoras a **SISTEMA DE AISLAMIENTO NOMINAL DE CAMPO ELECTRICO PARA MÁQUINAS DINAMOELECTRICAS**, inventado por mi, tal como se describe en la solicitud de patente canadiense, número de serie 2,319,281 presentada en 14 de septiembre de 2000, y cualesquiera solicitudes de patente y patentes sobre dicho elemento en todos los países, incluyendo todas las divisiones, reexpediciones, continuaciones y ampliaciones de las mismas, y todos los derechos de prioridad resultantes de la radicación de dicha solicitud de patente canadiense. Además autorizo y solicito a cualquier funcionario cuyo deber consista en la expedición de patentes, expedir cualquier patente sobre dichas mejoras o resultante de las mismas, en favor de **GENERAL ELECTRIC CANADA INC**, o sus sucesores o cesionarios y acuerda que cuando se solicite y sin contraprestación adicional, pero por cuenta de dicha compañía, comunicaremos a dicha compañía o sus representantes o nominatarios cualesquiera hechos conocidos por nosotros con

relación a dichas mejoras y atestiguaremos en cualquier actuación legal, firmaremos cualesquiera documentos jurídicos, firmaremos todas las solicitudes divisionales, continuadas y reexpediciones, tomaremos todos los juramentos y haremos todo lo posible para ayudar a dicha compañía, sus sucesores, cesionarios y nominatarios para obtener y hacer cumplir cualquier protección patentaria sobre dicha invención en todos los países.

Firmado en Peterborough hoy 17 de noviembre de 2000.

Firma de testigo.

Firmado: Robert Draper

DECLARACIÓN:

Yo, Craig Wilson, cuya dirección postal completa es 14 Westhead Rd, Toronto, Ontario, Canada, M8W4R9, declaro que estando personalmente presente ví a Robert Draper, personalmente conocido por mí como la persona nombrada en el traspaso anterior, firmar y formalizar debidamente el mismo.

Declarado en Peterborough hoy 17 de noviembre de 2000.

Firma de testigo: (ilegible)

GECAN3189

TRASPASO

A cambio un dólar y otra compensación buena y valiosa, de la cual acuso recibo, yo KONRAD WEEBER, ciudadano austriaco, residente en 785 Riverview Rd, Rexford, NY 12148, Estados Unidos de América vendo y traspaso a **GENERAL ELECTRIC CANADA INC**, con sede de negocios en 2300 Meadowvale Blvd, Mississauga, Ontario, L5N 5P9, sus sucesores y cesionarios, todo el derecho, título e interés en las mejoras a **SISTEMA DE AISLAMIENTO NOMINAL DE CAMPO ELECTRIC**

PARA MÁQUINAS DINAMOELECTRICAS, inventado por mi, tal como se describe en la solicitud de patente canadiense, número de serie 2,319,281 presentada en 14 de septiembre de 2000, y cualesquiera solicitudes de patente y patentes sobre dicho elemento en todos los países, incluyendo todas las divisiones, reexpediciones, continuaciones y ampliaciones de las mismas, y todos los derechos de prioridad resultantes de la radicación de dicha solicitud de patente canadiense. Además autorizo a cualquier funcionario cuyo deber consista en la expedición de patentes, expedir cualquier patente sobre dichas mejoras o resultante de las mismas, en favor de GENERAL ELECTRIC CANADA INC, o sus sucesores o cesionarios y acuerda que cuando se solicite y sin contraprestación adicional, pero por cuenta de dicha compañía, comunicaremos a dicha compañía o sus representantes o nominatarios cualesquiera hechos conocidos por nosotros con relación a dichas mejoras y atestiguaremos en cualquier actuación legal, firmaremos cualesquiera documentos jurídicos, firmaremos todas las solicitudes divisionales, continuadas y reexpediciones, tomaremos todos los juramentos y haremos todo lo posible para ayudar a dicha compañía, sus sucesores, cesionarios y nominatarios a obtener y hacer cumplir cualquier protección patentaria sobre dicha invención en todos los países.

Firmado en Schenectady hoy 27 de noviembre de 2000.

Firma de testigo : T Ball. Firmado: Konrad Weeber

DECLARACIÓN:

Yo, Tobias Bathon, cuya dirección postal completa es 117 S. Main Ave., Albany NY 12208, declaro que estando personalmente presente vi a Konrad Weeber, personalmente conocido mio como la persona

nombrada en el traspaso arriba mencionado, firmar y ejecutar debidamente dicho documento.

Declarado en Schenectady, hoy 27 de noviembre de 2000.

Firmado: T. Ball, testigo.

ONTARIO

JUNTA GERENCIAL DE GABINETE

Por el presente certifico lo siguiente: BARBARA FAYE MCFADDEN, de la ciudad de Mississauga, de la municipalidad regional de Peel, provincia de Ontario, cuyo nombre aparece firmando el documento adjunto, era, al momento de firmar el mismo, NOTARIO PÚBLICO nombrado por un período de tres años a partir del 30 de agosto de 2000. Es válido solo en la municipalidad regional de Peel, y solo mientras usted esté trabajando para General Electric Canada Inc y está limitada a certificar documentos y a tomar declaraciones juradas en relación con el negocio de dicha compañía, sus subsidiarias, asociadas y afiliadas.

Además certifico que he comparado la firma de dicho notario pública que aparece en el documento adjunto con la firma espécimen de dicho notario público, radicada ante esta oficina y sinceramente opino que dicha firma es genuina y que he comparado la impresión del sello de dicho notario público que aparece en el documento adjunto con la muestra de dicho sello presentada en esta oficina y que sinceramente creo que la impresión de dicho sello es genuina.

En testimonio de lo cual, he firmado y fijado el sello de la junta del gabinete de dicha provincia en la ciudad de Toronto, en dicha provincia hoy 13 de diciembre del año 2001 de la Era Cristiana. Firma ilegible

A nombre del secretario de la junta de gabinete

Sello realzado fijado sobre plástico de color rojo oscuro en forma de estrella en cuyo centro se lee: El Gabinete de gobierno, Ontario y en el cual aparece también el escudo de Ontario.

CERTIFICADO NOTARIAL

CIUDAD DE MISSISSAUGA:

CONDADO DE PEEL:

PROVINCIA DE ONTARIO:

Yo, Barbara F. McFadden, notario público abajo firmante, por el presente certifico que los documentos adjuntos son copias verídicas y exactas de los traspasos en:

Expediente: GECAN3189C

Números de serie canadiense: 2,319,281 y 2,344,564

Fechas de radicación: 14 de septiembre de 2000 y 3 de mayo de 2001

Título: SISTEMA DE AISLAMIENTO NOMINAL DE CAMPO ELÉCTRICO PARA MÁQUINAS DINAMOELECTRICAS.

Firmado por: A. Karim Younsi, David A. Snopek, Robert Draper, Konrad Weeber

en favor de GENERAL ELECTRIC CANADA.

Firmado hoy 22 de noviembre de 2001.

Firmado: Barbara McFadden, notario público

Sello: BARBARA FAYE MCFADDEN, notario público, municipalidad regional de Peel, limitada a certificar documentos y a tomar declaraciones juradas, para General Electric Canada Inc., sus subsidiarias, asociadas y afiliadas. Vence el 30 de agosto de 2003.

La firma y funciones de Barbara Faye McFadden se encuentran autenticados mediante diligencia 422 del 14 de diciembre de 2001 por el Consulado General de Colombia en Toronto, Canada. Firmado: Marta Ligia González, cónsul general.

Sello fijado por el Ministerio de Relaciones Exteriores, diligencia 400881 del 3 de enero de 2002. Firmado: Jefe de legalizaciones, Santafé de Bogotá, D.C.

COLO-12926-801-001-1

WPCL002G. ID 2982

Bogotá, 4 de enero de 2002.

Eduardo Calado N.
Eduardo Calado Neguera
"TRADUCTOR OFICIAL"
CUB - ENECO - CUB
Res 541 Febrero de 1997

MINISTERIO DE RELACIONES
EXTERIORES
402132
Eduardo Calado
COPIA FIRMA APARECE EN EL
DOCUMENTO DESEMPAÑA
LAS FIRMAS DE LOS D.C.

NO SE ASUME
RESPONSABILIDAD DEL TEXTO
2002 JAN -8 P 12:18
JEFE DE LEGALIZACIONES
SANTAFE DE BOGOTA D.C.

SEXTO DEL CIRCULO DE SANTAFE DE
BOGOTA PARA QUE LA(S) ANTERIOR(ES) FIR-
MA(S) SEAN LEGITIMAS

Eduardo Calado Neguera

No.(s)

08 ENE. 2002

SANTAFE DE BOGOTA,

PAULO MENDEZ
BARAJAS



Ontario

THE MANAGEMENT BOARD OF CABINET

I HEREBY CERTIFY AS FOLLOWS:

BARBARA FAYE McFADDEN

of the City of Mississauga, in the Regional Municipality of Peel, in the Province of Ontario, whose name is subscribed to the attached Instrument, was, at the time of subscribing thereto, a NOTARY PUBLIC appointed for a period of three years from the 30th day of August, 2000. It is effective only in the Regional Municipality of Peel, and only while you are working for General Electric Canada Inc. and is limited to the attestation of instruments and the taking of affidavits in connection with the business of that company, its subsidiaries, associates and affiliates.

I FURTHER CERTIFY THAT I have compared the signature of the said NOTARY PUBLIC subscribed to the attached Instrument with the specimen signature of the said NOTARY PUBLIC filed in this office and verily believe the said signature to be genuine; and THAT I have compared the impression of the Seal of the said NOTARY PUBLIC appearing on the attached Instrument with the specimen of the Seal filed in this office and verily believe the impression of the Seal to be genuine.

IN TESTIMONY WHEREOF I have hereunto set my Hand and affixed the Seal of the Management Board of Cabinet of the Province of Ontario at the City of Toronto in the said Province on the thirteenth day of December

for SECRETARY OF THE MANAGEMENT BOARD

TRADUCCION N° 611210
MARIA ELVIRA MARTELO
Traductora e Intérprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia

Representación y Poder con autenticación notarial y Apostille para patentes, modelos de utilidad, diseños industriales, marcas de fábrica, nombres comerciales, enseñanzas, nombres de dominio, lemas comerciales, licencias.

Representation and Power-of-Attorney with notarial authentication and Apostille for patents, utility models, regarding GECAN3189C - Graded Electric Field Insulation System for Dynamoelectric Machine.

REPRESENTACION Y PODER

REPRESENTATION AND POWER-OF-ATTORNEY

Yo (nosotros), abajo firmado (s) / I (we), the undersigned

M.N. DAVIES

domiciliado (s) en/of **GENERAL ELECTRIC CANADA INC.**

MISSISSAUGA, ONTARIO, CANADA

heraby ratifies the patent appln. No.01.077.342 filed by **EMILIO FERRERO** on September 11, 2001, an

por el presente nombramos a **EMILIO FERRERO**, tpa. 31929; **GONZALO PERDOMO**, tpa. 831; **LUZ CLEMENCIA DE PAEZ**, tpa. 23555 y **GERMAN CAVELIER**, tpa. 832, domiciliados en la Carrera 4ª N° 7235, Bogotá, Colombia, en obediencia a lo dispuesto en el parágrafo 1º del Artículo 543 del Código de Comercio, el primero como principal y los demás como suplentes, en su orden, como mis (nuestros) representantes en todos los asuntos de propiedad industrial con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales. El primer representante suplente reemplazará al principal en caso de ausencia o impedimento temporal o definitivo de aquél. La misma regla se aplicará cuando el segundo representante suplente haya de reemplazar al primero, o el tercero al segundo. En tales casos, el representante principal, o el primero, o segundo suplente, en su caso, o ambos, declararán su intención de no ejercer la representación mediante declaración autenticada por Notario Público en Colombia, o por Notario u otro Funcionario Público, o Cónsul de Colombia, en el extranjero; y si se tratare de impedimento, con el certificado respectivo. Si alguno de los nombrados faltare definitivamente, el siguiente tomará su lugar. Cuando cesare la ausencia o impedimento del representante principal, o de su primero o segundo suplentes, en su caso, podrán ejercer la representación, en su orden, uno u otros según el caso, asumiéndola por el solo hecho de ejercerla, cesando en ese momento el ejercicio de la representación por el primero, segundo o tercer suplente en su caso.

Además, confiero (conferimos) poder a los abogados arriba nombrados, para obtener la protección de mi (nuestra) propiedad industrial y contra la competencia desleal, a cuyo efecto autorizo (amos) a los dichos apoderados para que me (nos) representen ante cualesquiera entidades o personas, ejerzan o no jurisdicción, especialmente ante las del orden administrativo, contencioso administrativo y judicial, así como los tribunales de arbitramento, en todo lo concerniente a los siguientes asuntos: a) Obtención de patentes de invención, modelos de utilidad, y diseños industriales; el registro de marcas de fábrica, colectivas, defensivas, de servicio, lemas comerciales, nombres comerciales, enseñanzas, nombres de dominio, variedades vegetales y denominaciones de origen; su renovación, traspaso, cambio de nombre o domicilio, cancelación voluntaria; y el registro de licencias de uso de esos derechos; b) Las acciones de competencia desleal, protección del consumidor, oposiciones u observaciones, cancelación administrativa y judicial, nulidad, medidas cautelares, concesión de licencias, la tutela, la protección de secretos industriales, y en general los juicios civiles, penales, administrativos o contencioso administrativos relacionados con estos derechos; acciones y procesos que promovamos o se nos

in due compliance with the terms of paragraph 1st. of article 543 of the Commercial Code, do hereby appoint **EMILIO FERRERO**, tpa. 31929; **GONZALO PERDOMO**, tpa. 831; **LUZ CLEMENCIA DE PAEZ**, tpa. 23555 and **GERMAN CAVELIER**, tpa. 832, domiciled at Carrera 4ª N° 7235, Bogotá, Colombia, the first as principal and the others as alternates, in the order of their appointment, as our representatives for all industrial property matters with faculty to receive notifications and to appoint attorneys in and out of Court. The first alternate shall replace the principal in case of his absence or of temporal or definitive impediment. The same rule will apply when the second alternate representative is to replace the first one, or when the third is to replace the first or second alternates in their turn, or both of them, second. In such cases, the principal representative, or the first or second alternates in their turn, or both of them, shall state their intention not to act as representatives through a declaration given before a Notary Public in Colombia, or before a Notary or another Public Official or a Colombian Consul abroad; and in case of impediment, the appropriate certificate shall suffice. If any of the appointees were to be definitely absent, the following alternate shall take his place. When the absence or impediment of the principal representative, or of the first or second alternate in their turn ceases, the representation can be taken again in their sequence, by the principal, the first or second alternate depending on case, and the mere fact or its exercise will suffice. The exercise of the representation by the first, second or third alternates in their turn shall end at such time.

In addition, we grant a Power of Attorney in favor of the abovesaid attorneys-at-law so that they may obtain the protection of my (our) industrial property and against the unfair competition, for which purpose I (we) authorize the said attorneys to represent me (us) before any authorities or persons, with or without jurisdiction, specially those administrative, administrative contentious and judicial, as well as before Arbitration Court, in all matters concerning the following: a) Obtainment of patents, utility models and industrial designs; the registration of trademarks, collective, defensive and service marks, slogans, commercial names, trade emblems, domain names, vegetal varieties and denominations of origin; its renewal, assignment, change of name or domicile, voluntary cancellation; and the registration of licenses of use of the above rights; b) Actions of unfair competition, protection to the consumer, oppositions or observations, administrative or Court cancellation, nullity, infringement, granting of licenses, the action for writ mandamus, the protection of trade secrets, and in general the civil, penal, and administrative suits relating to those rights; actions and suits instituted by me (us) or against me (us). In all the above matters they may substitute this Power of Attorney with any other authentic, provided that it is duly authenticated by a Notary Public or a Colombian Consul abroad.

© CAVELIER ABOGADOS
WPP0501-179 (MINUTA 12.1.1.2.5)

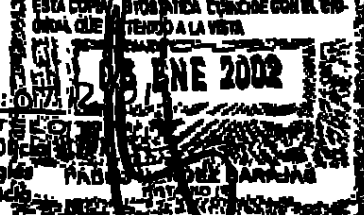
TRADUCCION No.: 017/2001

MARIA ELVIRA MASTRELO

Traductora e interprete Oficial

Idioma - Español - Inglés

Res. No. 2879 Min. Justicia



65

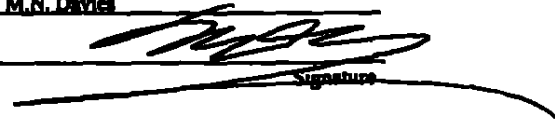
en todos los asuntos arriba determinados, puedan
admitir, transigir, conciliar, admitir los hechos del
caso, cancelar, recibir, renunciar, y ratificar los actos de
procesos.

admit the facts of the case, desist, cancel, receive, resign, and ratify acts
done by representatives without a power of attorney.

Dado y firmado hoy/Given and signed this 22 day of November, 2001

en/in Mississauga, Ontario Canada

por/by M.N. Davies

General Electric Canada Inc.
Firma 

TRADUCCION No.: 07.12/01
MARIA ELVIRA MARTELO
Traductora e Interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia



ACION NOTARIAL (SOCIEDAD)

El Notario Certifica: Que la firma que antecede de
M. N. Davies
 es auténtica; que el signatario desempeña actualmente el cargo
 de Vice-Presidente General y Secretario
 de la compañía

GENERAL ELECTRIC CANADA INC.

sociedad que actualmente existe y está organizada de acuerdo a
 las leyes de CANADA

que la dirección de dicha compañía es 2300 Meadowvale
Boulevard, Mississauga, Ontario Canada
L5N 5P9

y que el signatario tiene facultad para otorgar este documento.

Todos los hechos anteriores le constan por haber examinado los
 documentos respectivos y de todo ello da fe.

Dado y firmado en Mississauga, Ontario, Canada

El 22 de noviembre de 2001

NOTARIAL AUTHENTICATION (COMPANY)

The undersigned Notary certifies: That the preceding signature
 of M.N. Davies
 is authentic, that the signatory currently acts in the position of
Vice President General Counsel and Secretary
 of the company GENERAL ELECTRIC CANADA INC.

a company currently existing and organized under the laws of
CANADA

that the address is 2300 Meadowvale Boulevard
Mississauga, Ontario Canada L5N 5P9

and that the signatory has the power to grant this document.

The Notary Public is aware and attests to the above facts upon
 examination of the corresponding documents.

Given and signed in Mississauga, Ontario, Canada

On 22 day of November, 2001

Barbara F. McFadden
 El Notario Público - The Notary Public
 (Firma-sello) (Signature-seal)
 Barbara F. McFadden

TRADUCCION No.: 071261
 MARIA ELVIRA MARTINELO
 Traductora e Interprete Oficial
 Inglés - Español - Inglés
 Reg. No. 2879 Min. Justicia

BARBARA FAYE McFADDEN, Notary Public,
 Regional Municipality of Peel, limited to the
 attestation of instruments and the taking of
 affidavits, for General Electric Canada Inc.,
 its subsidiaries, associates and affiliates.
 Expires: August 30, 2003.

APOSTILLE

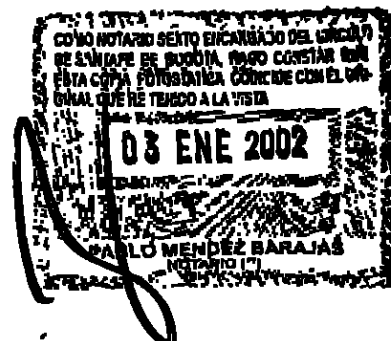
(Convention de La Haye du 5 octobre 1961)

1. Country:
 This public document
2. has been signed by
3. acting in the capacity of
4. bears the seal/stamp of

Certified

5. at 6. the
7. by
8. No.
9. Seal/stamp 10. Signature

CAVELIER ABOGADOS
 WPP0ED01-179 (MINUTA 12.1.1.2.5)





CONSULADO GENERAL DE COLOMBIA

No. 023

Toronto, Diciembre 13 del 2001

El suscrito Cónsul General de Colombia en Toronto-Canadá,

CERTIFICA:

1. Que la señora **BARBARA FAYE McFADDEN**, quien autoriza el documento anterior, ejercía legalmente en la fecha allí indicada, las funciones de Notario Público de la Provincia de Ontario, Canadá y que la firma y sello que en el documento aparecen como suyos son los que usa y acostumbra en sus actos oficiales.
2. Que ha tenido a la vista el Certificate and Articles of Amendment de la Compañía **GENERAL ELECTRIC CANADA INC.**, según el cual la mencionada Compañía existe, está domiciliada en 2300 Meadowvale Boulevard, Mississauga, Ontario, Canadá (L5N 5P9), está registrada en el Consumer and Corporate Affairs Canada, bajo el número 321517-2, está legalmente constituida en dicha Provincia y ejerce su objeto social conforme a las leyes del Canadá.
3. Que el señor **M. N. DAVIES**, quien firmó el documento precede en su carácter de Vice President, General Counsel and Secretary de la Compañía, y está debidamente autorizado para firmar y otorgar el poder adjunto.

El Consulado no asume responsabilidad alguna por el contenido del documento.

IMPUESTO DE TIMBRE:	U.S. \$ 7=
DERECHO CONSULAR:	U.S. \$ 100=
TOTAL A CANCELAR:	U.S. \$ 107=

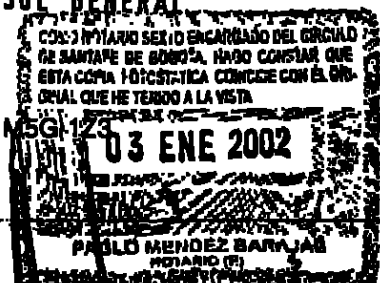
TRADUCCION No.: 07.12/01

MARIA ELVIRA MONTIEL
Traductora e Interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia

1 Dundas St. West, Suite 2108, Toronto, Ont. Canada M5G 1Z3
Tel.: (416) 977-0088

MARTALIGIA GONZALEZ

CONSUL GENERAL



Y. Delgado
MINISTERIO DE RELACIONES
EXTERIORES
P. J. J. J. J.
366698

NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2001 DEC 26 A 11:00
M. J. J. J.

JEFE DE LEGALIZACIONES
SANTAFE DE BOGOTA U.C.

CUYA FIRMA IMPARTE EN EL
DOCUMENTO DESENTENA
LAS FUNCIONES DELEGADAS

TRADUCCION No: 07.12.01
MARIA ELVIRA MASTELO
Traductora e Interprete Oficial
Ingles - Español - Ingles
Res. No. 2879 Min. Justicia

COMO NOTARIO SEÑALANDO DEL CACULO
DE SANTAFE DE BOGOTA, HAGO CONSTAR QUE
ESTA COPIA FOTOSTATICA CONCORDA CON EL ORIGINAL QUE ME TENGO A LA VISTA
03 ENE 2002
PABLO MENDOZ BARAJAS
NOTARIO (S)

63

TRADUCCIÓN OFICIAL No. 07.12/01 preparada por María, Elvira Martelo, Traductora Oficial debidamente aprobada por el Ministerio de Justicia de Colombia por Resolución 2879 de 1995 y reconocida por el Ministerio de Relaciones Exteriores.

(A continuación se traducen los sellos y legalizaciones de un documento de Representación y Poder escrito en inglés y español, por el cual M. N. DAVIES, de GENERAL ELECTRIC CANADA INC., domiciliado en Mississauga, Ontario, Canadá, ratifica la solicitud de patente No. 01.077.342 presentada por Emilio Ferrero el 11 de septiembre de 2001 y otorga poder a EMILIO FERRERO, GONZALO PERDOMO, LUZ CLEMENCIA DE PAEZ Y GERMAN CAVELIER). Dado y firmado el 22 de noviembre de 2001 en Mississauga, Ontario, Canadá. General Electric Canada Inc. (Firma ilegible). (Sello seco) GENERAL ELECTRIC CANADA INC., CANADÁ 1892.

CERTIFICADO NOTARIAL (SOCIEDAD) referente a la existencia legal de GENERAL ELECTRIC CANADA INC., otorgado en inglés y español. Dado y firmado en Mississauga, Ontario, Canadá, el 22 de noviembre de 2001. (Firma) Barbara McFadden, Notario Público. (Sello notarial en tinta) BARBARA FAYE McFADDEN, Notario Público, Municipio Regional de Peel, limitada a la certificación de instrumentos y a toda otra que se requiera para las subsidiarias, asociadas y afiliadas. Expira el 30 de agosto de 2003. (Sello seco) BARBARA FAYE McFADDEN, Notario Público,



69.
(Ilegible).

Ontario

LA JUNTA ADMINISTRATIVA DE LA SECRETARÍA DE ESTADO

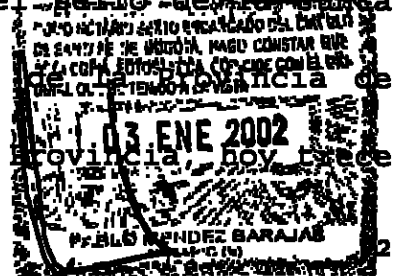
POR EL PRESENTE CERTIFICO LO SIGUIENTE:

BARBARA FAYE McFADDEN

de la Ciudad de Mississauga, en el Municipio Regional de Peel, en la Provincia de Ontario, cuyo nombre suscribe el Instrumento adjunto, era en el momento de suscribirlo un NOTARIO PÚBLICO nombrado por un período de tres año contados a partir del 30 de agosto de 2000. Es efectivo solamente en el Municipio Regional de Peel, y sólo mientras trabaje para General Electric Canada Inc. y se limita a la certificación de instrumentos y a tomar declaraciones juramentadas en relación con el negocio de la compañía, sus subsidiarias, asociadas y afiliadas.

ADEMÁS CERTIFICO QUE he comparado la firma de dicho NOTARIO PÚBLICO que aparece en el Instrumento adjunto con la muestra de dicho NOTARIO PÚBLICO registrada en esta oficina y creo firmemente que la firma es genuina; y QUE he comparado la impresión del sello de dicho NOTARIO PÚBLICO estampado en el instrumento adjunto con la muestra del sello registrado en esta oficina y creo firmemente que la impresión del sello es genuina.

EN FE DE LO CUAL, he firmado y aplicado el sello de la Junta Administrativa de la Secretaría de Estado de la Provincia de Ontario, en la Ciudad de Toronto, en dicha Provincia, hoy por



70
de diciembre, A.D. 2001.

(Firma ilegible) por EL SECRETARIO DE LA JUNTA ADMINISTRATIVA
DE LA SECRETARÍA DE ESTADO.

(En español) Certificación de la firma del notario público, de la existencia legal de GENERAL ELECTRIC CANADA INC. y de la capacidad legal de M. N. DAVIES para otorgar poder. Expedida por el Consulado de Colombia en Toronto el 13 de diciembre de 2001, bajo el No. 023. Firmado por MARTA LIGIA GONZALEZ, Cónsul General. Pagados impuesto de timbre y derechos consulares.

(Al dorso) Legalización de la firma que antecede expedida por el MINISTERIO DE RELACIONES EXTERIORES bajo el No. 366698 del 26 de diciembre de 2001, firmado por el Jefe de Legalizaciones.

Es traducción fiel y completa de la cual se deja copia en esta oficina para su confrontación.

COLO 12926-801-001-1

Id. 4

DIC. 28/01

Maria E. Martelo
TRADUCCION No. 07.12/01
MARIA ELVIRA MARTELO
Traductora e Interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia

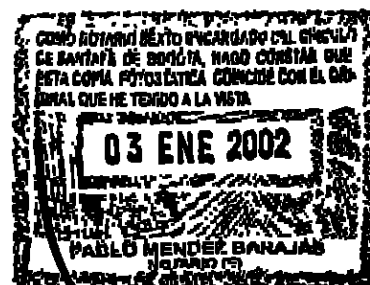
MINISTERIO DE RELACIONES
EXTERIORES

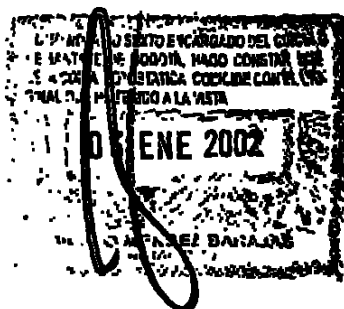
NO SE ASUME
RESPONSABILIDAD DEL TEXTO

2002 JAN - 2 11:44

JEFE DE LEGALIZACIONES
SANTAFE DE BOGOTA D.C.

2000045
Marta C. Martelo
CUMPLIDA LA FIRMA DEL
DOCUMENTO DELEGADO
LAS FUNCIONES DEL CÓNUL



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Office de la propriété
Intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An Agency of
Industry Canada

21

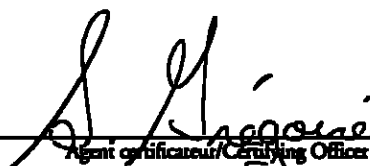
*Bureau canadien
des brevets*
Certification

La présente atteste que les documents
ci-joints, dont la liste figure ci-dessous,
sont des copies authentiques des docu-
ments déposés au Bureau des brevets.

*Canadian Patent
Office*
Certification

This is to certify that the documents
attached hereto and identified below are
true copies of the documents on file in
the Patent Office.

Specification and Drawing, as originally filed, with Application for Patent Serial No:
2,319,281 on September 14, 2000, by **GENERAL ELECTRIC CANADA INC.**, assignee
of A. Karim Younsi and David A. Snopek, for "Graded Electric Field Insulation System
for Dynamoelectric Machine."


Agent certificateur/Certifying Officer

August 13, 2001

Date

Canada

(CIPO 00)
01-12-00

OPIC  CIPO

72

GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

ABSTRACT

5 There is disclosed a groundwall insulation system for use in
dynamoelectric machines carrying voltages above 4 KV and preferably
in the order of 13.8 kV, or higher. The groundwall insulation comprises
two layers of insulation wound onto the conductors of the high voltage
winding. The first layer of insulation has a first permittivity that is
10 greater than the permittivity of the second layer of insulation wound onto
the first layer of insulation. As a consequence, at the juncture between
the first and second layers there is a sharp increase in the electric field
profile as seen through the groundwall insulation. This step increase in
the electric field profile results in the electric field adjacent the conductor
15 having a maximum magnitude that is less than that normally experienced
by insulation systems in the past. By reducing the maximum magnitude
of the local electric field profile within the groundwall insulation the life
of the insulation and hence the electrical conductor is improved while at
the same time permitting a reduction in the thickness of the groundwall
20 insulation.

GECAN3189

- 1 -

GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

Field of the Invention

The present invention relates to an insulation system for use in windings of a dynamoelectric machine. In particular it relates to an insulation comprising inner and outer layers having differing permittivities to create a more advantageous stress distribution within the dielectric.

Background of the Invention

Insulation systems for large AC dynamoelectric machines are under constant development to increase the voltages at which these machines operate while at the same time minimizing the thickness of the insulating material.

In such insulation systems it is common to utilize mica in a variety of forms from large flake dispersed on a backing material, to the product known as mica paper. While the low tensile strength of mica paper does not lend itself to use in such insulation systems, mica paper has superior corona breakdown resistance countering the coronal discharge occurring in high voltage windings that tends to shorten the life of the insulation. To compensate for the low tensile strength of the mica paper, the mica

- 2 -

paper is bonded to glass fibers which also tends to prevent the shedding of mica flakes from the mica tape during a taping operation.

More recently a corona resistant polyimide and composite insulation tape has been employed in the insulation systems. This tape has exceptional insulation qualities and good corona discharge resistance. This film may be used independently or as a backing on a mica paper, glass fiber composite tape. The addition of enhanced corona resistant tape insulation provides an insulation system which is electrically more enhanced than standard systems.

However, the magnitude and profile of the local electric field within the groundwall insulation has not been considered to date in the development of insulation systems and tapes for the groundwall. This electric field generated in the groundwall insulation as a result of the high voltage applied to the conductor has a direct effect on the insulation life. As various initiatives are in place to reduce the groundwall insulation thickness it should be understood that the effect of the electric field as it is distributed across the groundwall also has an effect on the performance of the insulation system and the life of the groundwall insulation system. Accordingly, there is a need to develop a groundwall insulation system for use in windings for dynamoelectric machines that takes into consideration the effects of the localized electric field generated in the groundwall insulation as a result of the voltage difference across the insulation.

Summary of The Invention

In accordance with the present invention there is provided an insulation system for use in windings of dynamoelectric machines that results in a graded or sharp increase in the electric field as distributed

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through the insulation from the interior of the insulation adjacent the conductor bar or conducting elements to the outer armor or grounded armor of the insulation.

It should be understood that the term "graded increase" in the electric field relates a significant change in the electric field profile across a cross section of the groundwall insulation. In accordance with the present invention, the electric field profile across a "flat" cross section exhibits a sharp step increase part way across the cross section compared with a flat electrical field profile in the past. With respect to a corner section of the insulation, the electric field profile gradually decreases away from the conductors and again exhibits a sharp step increase part way across the corner cross section.

To accomplish the forgoing aspect of the graded change in the electric field profile of the insulation of the present invention, there is provided an insulation system that has a conductor of a dynamoelectric machine which is insulated with layers of insulation. The insulation has a first inner layer of insulation and a second layer of insulation outer relative to the first inner layer. Both the first and second layers of insulation have predetermined thickness so as to provide for the proper insulation characteristic needed for the insulation itself. However, the permittivity of the first inner insulation layer is chosen to be greater than that of the second insulation layer such that the electric field in the second insulation layer increases sharply at the juncture between the first inner and second layers of insulation.

It has been determined that by providing for a relatively higher permittivity on the inner layer, the electric field adjacent the conductor has a reduced magnitude. While the overall electric field distributed

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across the insulation may not be less, it should be understood that the magnitude of any sharp occurrences of the electric field in the insulating layer adjacent the conductor are reduced. This is a considerable undertaking because the insulation is designed and developed for its weakest areas in the insulation which occur at the corners of the insulation adjacent the conductors where the highest magnitudes of electric field have been experienced in the past. Thus by reducing this magnitude in electric field, the requirements for the thickness of the insulation is reduced thereby minimizing the thickness of the insulation while not adversely effecting the voltages carried by such conductors or the insulation life. It should be understood that in accordance with the present invention it is envisaged that these conductors carry voltages in the order of 4 kV and greater.

It is also envisaged that in alternative embodiments of the present invention the insulation may comprise more than two layers of insulation applied over each other in succeeding layers where each succeeding layer has a permittivity less than the preceding layer of insulation.

A preferred application of the insulation system of the present invention is as a groundwall insulation for conductors in the winding of a dynamoelectric machine carrying voltages of 4 kV and greater. In applications where the voltage is in the order of 13.8 kV, the thickness of the groundwall insulation is in the order of 3.2 mm.

In accordance with a preferred aspect of the present invention there is provided a groundwall insulation for use on a conductor of a dynamoelectric machine that has a graded electric field profile across the groundwall insulation. The groundwall insulation comprises a first inner insulation layer and a second outer insulation layer. The first inner

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insulation layer is applied over the conductor and has a first predetermined thickness and first predetermined permittivity. The second outer insulation layer is applied over the first inner insulation layer and forms a juncture therewith. The second outer insulation layer has a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer creating the graded increase in the electric field in the groundwall insulation at the juncture of the first inner and second outer insulation layers.

Brief Description of The Drawings

For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic drawings in which:

FIG. 1 shows the cross section of a typical stator bar for a large AC dynamoelectric machine;

FIG. 2 shows the cross section of a typical stator coil for a large AC dynamoelectric machine;

FIG. 3A shows an insulating system for the stator bar of FIG. 1A using the insulating system of this invention;

FIG. 3B shows an insulating system for a stator coil of FIG. 1B using the insulating system of this invention.

FIG. 4 is a simplified partial view of the conductor of FIG. 3A showing the location of the corner and flat cross-sections for the electric field profiles of FIG 5;

FIG. 5 is a graph of the electric field profile of the groundwall insulation of the stator bar of FIG. 1; and,

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FIG. 6 is a graph of the electric field profile of the groundwall insulation of the stator bar of FIGs. 3A and 4;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows a cross section of a typical stator bar 10 for a large AC dynamoelectric machine. Bar 10 is composed of a large number of insulated conductors such as 12 which are insulated from each other by the strand insulation 14.

The conductors 12 are formed into a group after having strand insulation 14 applied thereto to provide the necessary isolation. The top and bottom surfaces of the conductor group are filled with an insulating material 13 generally referred to as a transposition filler. The group of insulated conductors 12 are next wrapped with a groundwall insulation material 16. The number of layers of insulating tape making up insulation may be from 7 to 16 layers of a mica tape insulation wound in half lap or wrapped fashion, depending on the level of operating voltage to which the conductors 12 are being subjected.

For high voltage applications, that is for voltages above 4000 volts and, preferably 13.8 kV, the preferred groundwall insulation 16 would be layers of a composite mica tape comprising a corona discharge resistant polyimide bonded to a mica type paper tape. This tape provides a good layer of insulation, and because of its corona resistant properties, provides long service life because of the resistance to corona discharge. The mica paper composites and tapes used in these hybrid systems contain a high percentage of a semi-cured resin (resin rich) which may or may not contain a corona resistant material. The wrapped bar is heated and compressed, in an autoclave or press, to allow the resin to temporarily liquefy so as to evacuate any entrapped air and eliminate any

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voids. Heat and pressure are maintained on the bar undergoing treatment so that the resin contained in the insulation is driven to gelation, bonding the insulation system together. The surface of the cured bar may next be coated with suitable materials to assure that the entire exposed surface of the bar will form an equipotential surface during machine operation.

The cured bar manufactured with the tape types as described above will function acceptably well within the design parameters of the machine for a predetermined period of time.

FIG. 2 shows the cross section for a typical coil 10b. In this instance, strands 12b of copper (six shown) are grouped together so that although strands 12 are separated from each other by the presence of strand insulation 14b, the six strands grouped into the turn, must be insulated from the other turns of the coil 10b by means of turn insulation 15b. The turn package is ultimately covered with groundwall insulation 16b.

FIG. 3A shows the cross section of a stator bar insulated in accordance with the teachings of this invention. Here the conductor bundle is composed of individual conductors 22 separated by strand insulation 24 similar to that as previously shown in FIG. 1A. The conductor bundle is then wound with several layers of composite tape. Each layer of composite tape will comprise a first inner layer 26 of insulation tape and a second insulation layer 28 of tape. These layers 26, 28 of tape each have a predetermined thickness and different permittivities. In particular the permittivity of the first inner layer is greater than that of the permittivity of the outer most layer. It should also be understood that additional third or fourth layers of tape with reduced permittivity may be employed in the present invention.

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It should be understood that these inner and outer insulation layers may comprise layers of half lapped tape composed of a composite such as mica paper backed on a glass tape backing to form layer 28. A suitable resin impregnant is present in the mica paper. This standard tape has an excellent voltage withstand capability.

The groundwall insulation comprising layers 26 and 28 may be subjected to press curing or an autoclaving curing process to eliminate any voids in the insulation layers 26 and 28 and to subsequently drive the resin impregnant to gelation.

Suitable surface coatings may be applied to the external surface of insulation layer 28 before or after cure.

FIG. 3B shows the composite groundwall insulation as it applies to coil 20 composed of three turns. In this instance, the copper conductors 22b are surrounded by strand insulation 24b. The turn insulation 25b is applied to each turn and the initial layer of groundwall insulation 26b containing the same constituents as layer 26 in FIG. 3A is applied. Finally, the layer of outer groundwall insulation 28b is applied. With the exception of the presence of the turn insulation 25b, the insulation systems of FIGS. 3A and 3B are very similar.

Referring now to FIG. 4 there is shown a simplified drawing of the conductor 25 have including the inner insulation groundwall layer 26 and the second more outer insulation groundwall layer 28 also referred to as the first and second layers 26, 28. The first layer 26 has a permittivity which is chosen to be greater than that of the second layer 28. In testing that has been done, an inner layer of tape insulation 26 was utilized having a permittivity of 6.5. The permittivity of the second more outer insulating layer 28 was chosen to be 4.2. The predetermined thickness of

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the layers was 0.096 inches or slightly less than 2.5 mm. The electric field profiles were determined at the corner shown in 40 and the flat at 42. The result in measurement for FIG. 4 is shown in graph number for FIG. 6. However, before discussing the graph for FIG. 6, reference may
5 be made to the graph for FIG. 5 which relates to the insulation shown in FIG. 1.

In FIG. 5, it is shown that the profile for the electrical field at the corner 40 diminishes in a curved slope fashion given by curve 55 starting at approximately 4200 volts per mm and this gradually decreases to the
10 3mm in thickness for this conductor insulation material. On the flat, the potential electric field is stable at approximately 2600 volts per mm. This is shown by curve 50.

Accordingly, the insulation shown in FIG. 1 has its weakest portion at the corner adjacent to the conductor where the electric field is
15 the greatest and hence the insulation has its weakest portion. Referring to FIG. 6, the graph is shown for the conductor as shown in FIG. 3A and is compared with the graph of FIG. 5 which is also provided on FIG. 6. The thickness of the two insulation systems 26 and 28 is shown. In graph 65 the maximum magnitude of the electric field is 4000 volts per
20 mm as compared to about 4200 volts per mm in FIG. 5. However, the electric field profile decreases gradually along a curve until sharp step 68 where the second layer of insulation is formed at this juncture between layers 26 and 28. Thereafter the electric field diminishes again in a curved slopping manner. With respect to the electrical field profile
25 across the flat 42, distribution layer, this is shown at 60 and can be compared to profile 50. Hence the distribution of the electric field adjacent the conductor is less for both the flat and curved portions 42 and

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40 and has a sharp graded step increase at 68 and then is greater than that for curves 50 and 55 respectively. The present invention however does provide for a reduction in the maximum magnitude of the electric field that the groundwall insulation must withstand.

5 It should be understood that the electric field profile as shown in Fig. 6 is for a winding of stator bars and that this electric field profile would be present with a step type function across the juncture of the first and second layer of insulation for stator coils and this pattern can repeat with the addition of subsequent or successive layers of insulation having
10 lower permittivities in each succeeding layer.

Further, it should be noted that the thickness of the insulation system used in FIG. 6 has been reduced significantly over that used in the prior art of FIG. 5. Hence this reduction in insulation results in material cost savings.

15 Referring again to Figures 3A and 3B, successive layers of insulation 80 and 82 are shown in ghost lines applied in succession over layer 28 in Figure 3A and layer 28b in Figure 3B. These successive layers 80, 82 if used, have declining permittivities for each layer applied further from the turn insulation 24 or groundwall insulation layers 26, 28.

20 It should be understood that alternative embodiments of the present invention may be readily apparent to a man skilled in the art in view of the above description for the preferred embodiments of this invention. For example, while the preferred embodiment relates to groundwall insulation, it is within the realm of the present invention that
25 the turn insulation 24 of Fig 3A surrounding conductor 22 may comprise the first inner layer of insulation and the second more outer layer may comprise the groundwall insulation layer 26 so long as the second layer



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26 has a lower permittivity than the layer 24. Accordingly, the scope of the present invention should not be limited to the teachings of the preferred embodiments and should be limited to the scope of the claims that follow.

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WHAT IS CLAIMED IS:

1. A winding element for use in a dynamoelectric machine surrounded by insulation, the insulation comprising:

5 a first inner insulation layer applied over a conductor, the first inner insulation layer having a first predetermined thickness and first predetermined permittivity; and

10 a second insulation layer applied over the first inner insulation layer, the second insulation layer having a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer.

2. The winding element of claim 1 wherein the first inner and second insulation layers each comprises several layers of either wrapped or lapped insulting tape.

15 3. The winding element as claimed in claim 2 wherein the first inner and second insulation layers comprise a corona discharge resistant material.

20 4. The winding element of claim 1 wherein the first insulation layer is a turn insulation layer applied to each conductor of a plurality of conductors forming the winding, and the second layer of insulation is a groundwall insulation layer applied to the plurality of conductors over the first insulation layer.

25 5. The winding element as claimed in claim 4 further comprising at least one succeeding layer of insulation applied in succession over the second layer of insulation where each succeeding layer of insulation has a permittivity that is less than a previously applied layer of insulation.

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6. The winding element as claimed in claim 1 further comprising at least one succeeding layer of insulation applied in succession over the second layer of insulation where each succeeding layer of insulation has a permittivity that is less than a previously applied layer of insulation.

7. A groundwall insulation for use on a conductor of a dynamoelectric machine having a graded electric field across the groundwall insulation, the groundwall insulation comprising:

a first inner insulation layer applied over the conductor, the first inner insulation layer having a first predetermined thickness and first predetermined permittivity; and

a second insulation layer applied over the first inner insulation layer and forming a juncture therewith; the second insulation layer having a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer creating the graded increase in the electric field in the groundwall insulation at the juncture of the first inner and second insulation layers.

8. The groundwall insulation of claim 7 wherein the first inner and second insulation layers of the groundwall insulation each comprises several layers of either wrapped or lapped insulating tape.

9 The groundwall insulation as claimed in claim 6 wherein the first inner and second insulation layers are impregnated with resin which contains particles of a corona discharge resistant material.

10. The groundwall insulation as claimed in claim 8 further comprising at least one succeeding layer of insulation applied in succession over the second layer of insulation where each succeeding

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layer of insulation has a permittivity that is less than a previously applied layer of insulation.

11. The groundwall insulation of claim 8 wherein the winding is adapted to carry voltages in excess of 4 kV.

5 12. The groundwall insulation of claim 11 wherein the winding is adapted to carry voltages of at least 13.8 kV. 13. The groundwall insulation of claim 8 wherein the thickness of the insulation is less than 3.2 mm.

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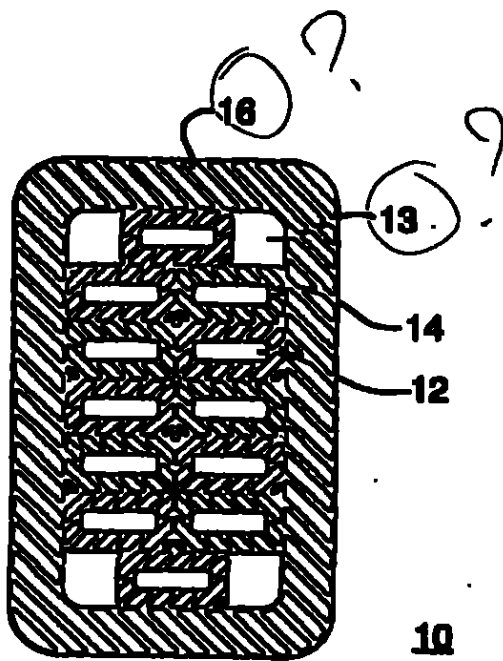


FIG.1 (PRIOR ART)

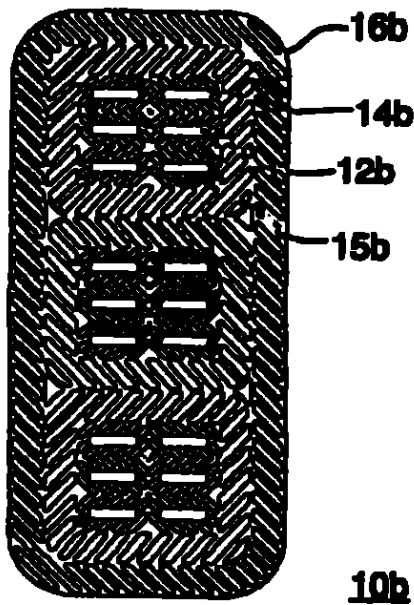


FIG. 2 (PRIOR ART)

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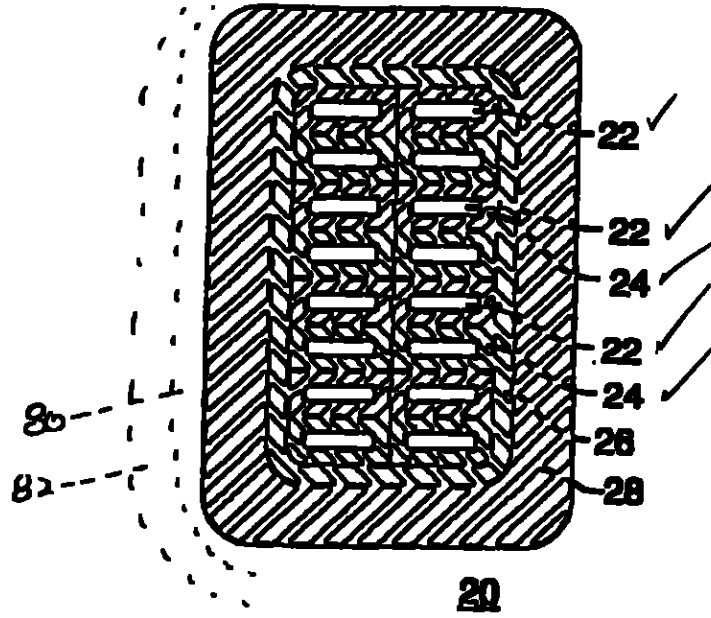


FIG. 3A

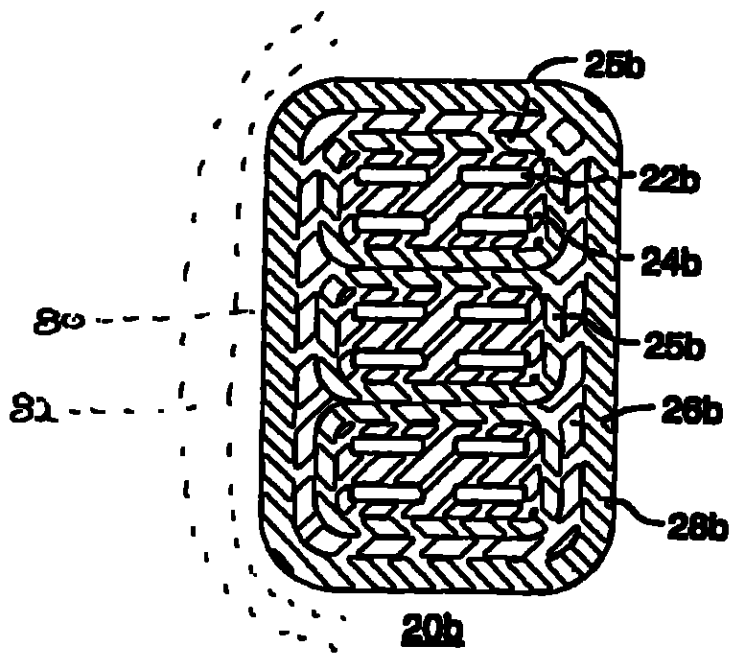


FIG. 3B

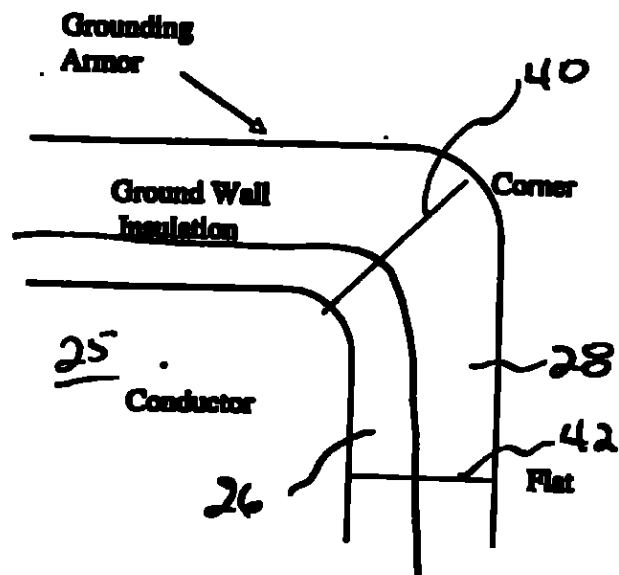


FIG 4.

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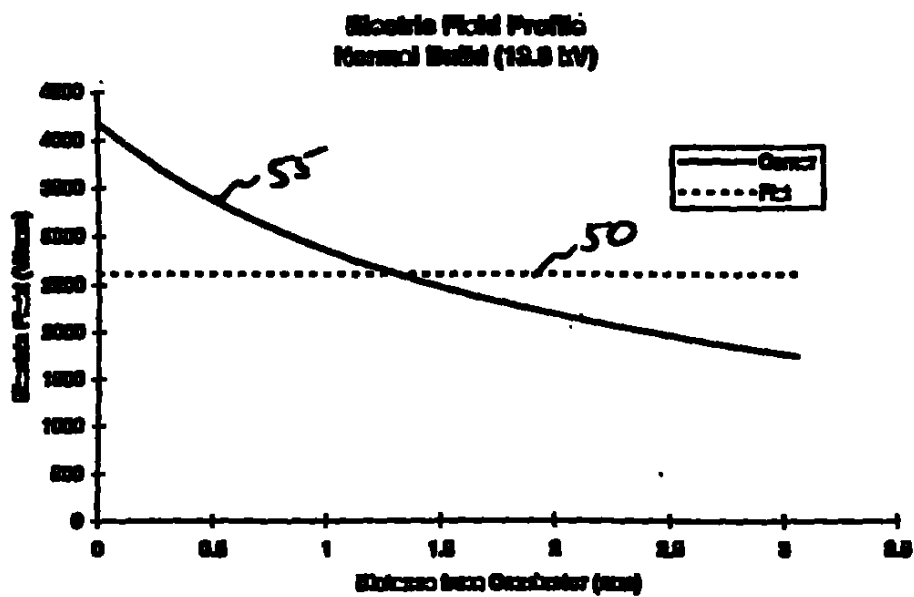


FIG. 5

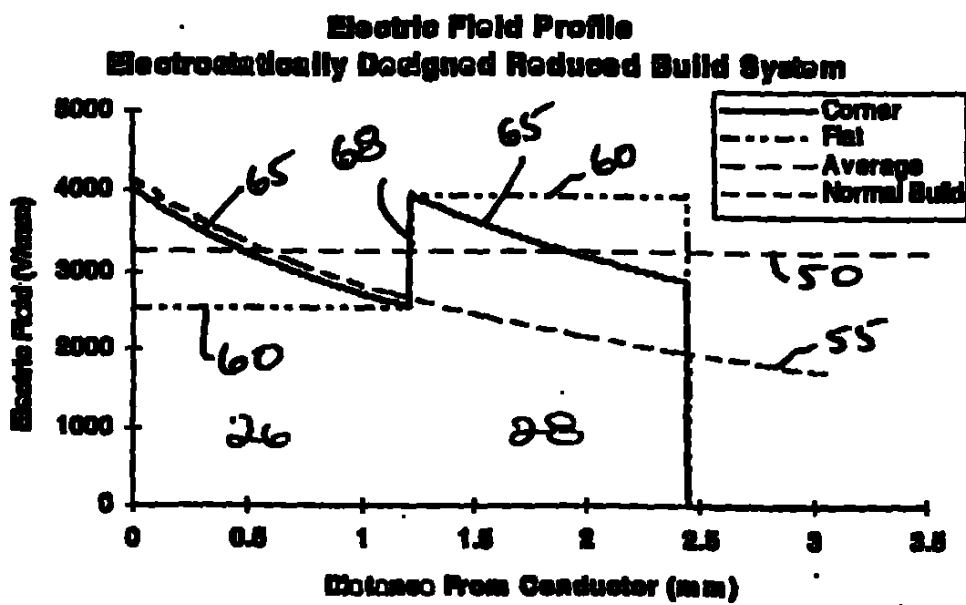


FIG. 6

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**Traducción de las reivindicaciones de la solicitud de patente
canadiense Serie Número 2.319.281:**

REIVINDICACIONES

1. Un elemento de devanado para ser usado en una máquina dinamoeléctrica rodeado por un aislamiento, el aislamiento comprende:

Una primer capa de aislamiento interior aplicada sobre un conductor, la primera capa de aislamiento interior tiene un primer espesor predeterminado y una primera permisividad predeterminada; y

Una segunda capa de aislamiento aplicada sobre la primera capa de aislamiento interior, la segunda capa de aislamiento tiene un segundo espesor predeterminado y una segunda permisividad predeterminada en donde la segunda permisividad predeterminada es menor que la primera permisividad predeterminada de la primera capa de aislamiento interior.

2. El elemento de devanado de la reivindicación 1 en donde la primera y segunda capas de aislamiento cada una comprende varias capas de cinta de aislamiento enrollada o sobrepuesta.

3. El elemento de devanado según se reivindicó en la reivindicación 2 en donde la primera capa interior y la segunda capa de aislamiento comprende un material resistente a la descarga por corona.

4. El elemento de devanado de la reivindicación 1 en donde la primera capa de aislamiento es una capa de aislamiento de espira aplicada a cada conductor de una pluralidad de conductores que forman el devanado, y la segunda capa de aislamiento es una capa de aislamiento de pared de tierra aplicada a la pluralidad de conductores sobre la primera capa de aislamiento.

5. El elemento de devanado según se reivindicó en la reivindicación 4 comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

6. El elemento de devanado según se reivindicó en la reivindicación 1 comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

7. Un aislamiento de pared de tierra para uso sobre un conductor de una máquina dinamoeléctrica que tiene un campo eléctrico graduado a través del aislamiento de la pared de tierra, el aislamiento de pared de tierra comprende:

Una primera capa de aislamiento interior aplicada sobre el conductor, la primera capa de aislamiento interior tiene un primer espesor predeterminado y una primera permisividad predeterminada; y

Una segunda capa de aislamiento aplicada sobre la primera capa de aislamiento interior y que forma una unión allí; la segunda capa de aislamiento tiene un segundo espesor predeterminado y una segunda permisividad predeterminada en donde la segunda permisividad predeterminada es menor que la primera permisividad predeterminada de la primera capa de aislamiento interior creando el incremento escalonado en el campo eléctrico en el aislamiento de pared de tierra en la unión de la primera capa interior y la segunda capa interior de aislamiento.

8. El aislamiento de pared de tierra de la reivindicación 7 en donde la primera capa interior y la segunda capa de aislamiento de pared de tierra cada una comprende varias capas sea de cinta de aislamiento enrollada o sobrepuesta.

9. El aislamiento de pared de tierra de la reivindicación 8 en donde la primera capa interior y la segunda capa de aislamiento están impregnadas con una resina que contiene partículas de un material resistente a la descarga por efecto corona.

10. El aislamiento de pared de tierra de la reivindicación 8 que comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

11. El aislamiento de pared de tierra de la reivindicación 8 en donde el devanado es adaptado para soportar voltajes por encima de 4 KV.

12. El aislamiento de pared de tierra de la reivindicación 11 en donde el devanado es adaptado para soportar voltajes de por lo menos 13,8 KV. El aislamiento de pared de tierra de la reivindicación 8 en donde el espesor del aislamiento es menor a 3,2 mm.

COLO 12926-801-001-1

JBP/Id-9



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sont des copies authentiques des docu-
ments déposés au Bureau des brevets.

This is to certify that the documents attached hereto and identified below are true copies of the documents on file in the Patent Office.

Specification and Drawing, as originally filed, with Application for Patent Serial No: 2,344,564 on May 3, 2001, by GENERAL ELECTRIC CANADA INC., assignee of A. Karim Younsi and David A. Snopek, Robert Draper and Konrad Weeber, for "Graded Electric Field Insulation System for Dynamoelectric Machine."

[Signature]
Agent certificate/Certifying Officer

August 13, 2001

Date _____

Canada

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01-12-00

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GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

ABSTRACT

There is disclosed a groundwall insulation system for use in dynamoelectric machines carrying voltages above 4 kV and preferably in the order of 13.8 kV, or higher. The groundwall insulation comprises two layers of insulation wound onto the conductors of the high voltage winding. The first layer of insulation has a first permittivity that is greater than the permittivity of the second layer of insulation wound onto the first layer of insulation. As a consequence, at the juncture between the first and second layers there is a sharp increase in the electric field profile as seen through the groundwall insulation. This step increase in the electric field profile results in the electric field adjacent the conductor having a maximum magnitude that is less than that normally experienced by insulation systems in the past. By reducing the maximum magnitude of the local electric field profile within the groundwall insulation the life of the insulation and hence the electrical conductor is improved while at the same time permitting a reduction in the thickness of the groundwall insulation.

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GRADED ELECTRIC FIELD INSULATION SYSTEM FOR DYNAMOELECTRIC MACHINE

Field of the Invention

The present invention relates to an insulation system for use in windings of a dynamoelectric machine. In particular it relates to an insulation comprising inner and outer layers having differing permittivities to create a more advantageous stress distribution within the dielectric.

Background of the Invention

Insulation systems for large AC dynamoelectric machines are under constant development to increase the voltages at which these machines operate while at the same time minimizing the thickness of the insulating material.

In such insulation systems it is common to utilize mica in a variety of forms from large flake dispersed on a backing material, to the product known as mica paper. While the low tensile strength of mica paper does not lend itself to use in such insulation systems, mica

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paper has superior corona breakdown resistance countering the coronal discharge occurring in high voltage windings that tends to shorten the life of the insulation. To compensate for the low tensile strength of the mica paper, the mica paper is bonded to glass fibers which also tends to prevent the shedding of mica flakes from the mica tape during a taping operation.

More recently a corona resistant polyimide and composite insulation tape has been employed in the insulation systems. This tape has exceptional insulation qualities and good corona discharge resistance. This film may be used independently or as a backing on a mica paper, glass fiber composite tape. The addition of enhanced corona resistant tape insulation provides an insulation system which is electrically more enhanced than standard systems.

However, the magnitude and profile of the local electric field within the groundwall insulation has not been considered to date in the development of insulation systems and tapes for the groundwall. This electric field generated in the groundwall insulation as a result of the high voltage applied to the conductor has a direct effect on the insulation life. As various initiatives are in place to reduce the groundwall insulation thickness it should be understood that the effect of the electric field as it is distributed across the groundwall also has an effect on the performance of the insulation system and the life of the groundwall insulation system. Accordingly, there is a need to develop a groundwall insulation system for use in windings for dynamoelectric machines that takes into consideration the effects of

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the localized electric field generated in the groundwall insulation as a result of the voltage difference across the insulation.

Summary of The Invention

In accordance with the present invention there is provided an insulation system for use in windings of dynamoelectric machines that results in a graded or sharp increase in the electric field as distributed through the insulation from the interior of the insulation adjacent the conductor bar or conducting elements to the outer armor or grounded armor of the insulation.

It should be understood that the term "graded increase" in the electric field relates a significant change in the electric field profile across a cross section of the groundwall insulation. In accordance with the present invention, the electric field profile across a "flat" cross section exhibits a sharp step increase part way across the cross section compared with a flat electrical field profile in the past. With respect to a corner section of the insulation, the electric field profile gradually decreases away from the conductors and again exhibits a sharp step increase part way across the corner cross section.

To accomplish the forgoing aspect of the graded change in the electric field profile of the insulation of the present invention, there is provided an insulation system that has a conductor of a dynamoelectric machine which is insulated with layers of insulation. The insulation has a first inner layer of insulation and a second layer of insulation outer relative to the first inner layer. Both the first and second layers of insulation have predetermined thickness so as to provide for the proper insulation characteristic needed for the

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insulation itself. However, the permittivity of the first inner insulation layer is chosen to be greater than that of the second insulation layer such that the electric field in the second insulation layer increases sharply at the juncture between the first inner and second layers of insulation.

It has been determined that by providing for a relatively higher permittivity on the inner layer, the electric field adjacent the conductor has a reduced magnitude. While the overall electric field distributed across the insulation may not be less, it should be understood that the magnitude of any sharp occurrences of the electric field in the insulating layer adjacent the conductor are reduced. This is a considerable undertaking because the insulation is designed and developed for its weakest areas in the insulation which occur at the corners of the insulation adjacent the conductors where the highest magnitudes of electric field have been experienced in the past. Thus by reducing this magnitude in electric field, the requirements for the thickness of the insulation is reduced thereby minimizing the thickness of the insulation while not adversely effecting the voltages carried by such conductors or the insulation life. It should be understood that in accordance with the present invention it is envisaged that these conductors carry voltages in the order of 4 kV and greater.

It is also envisaged that in alternative embodiments of the present invention the insulation may comprise more than two layers of insulation applied over each other in succeeding layers where each succeeding layer has a permittivity less than the preceding layer of insulation.

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A preferred application of the insulation system of the present invention is as a groundwall insulation for conductors in the winding of a dynamoelectric machine carrying voltages of 4 kV and greater. In applications where the voltage is in the order of 13.8 kV, the thickness of the groundwall insulation is in the order of 3.2 mm.

In accordance with a preferred aspect of the present invention there is provided a groundwall insulation for use on a conductor of a dynamoelectric machine that has a graded electric field profile across the groundwall insulation. The groundwall insulation comprises a first inner insulation layer and a second outer insulation layer. The first inner insulation layer is applied over the conductor and has a first predetermined thickness and first predetermined permittivity. The second outer insulation layer is applied over the first inner insulation layer and forms a juncture therewith. The second outer insulation layer has a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer creating the graded increase in the electric field in the groundwall insulation at the juncture of the first inner and second outer insulation layers.

Brief Description of The Drawings

For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic drawings in which:

FIG. 1 shows the cross section of a typical stator bar for a large AC dynamoelectric machine;

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FIG. 2 shows the cross section of a typical stator coil for a large AC dynamoelectric machine;

FIG. 3A shows an insulating system for the stator bar of FIG. 1A using the insulating system of this invention;

FIG. 3B shows an insulating system for a stator coil of FIG. 1B using the insulating system of this invention.

FIG. 4 is a simplified partial view of the conductor of FIG. 3A showing the location of the corner and flat cross-sections for the electric field profiles of FIG 5;

FIG. 5 is a graph of the electric field profile of the groundwall insulation of the stator bar of FIG. 1; and,

FIG. 6 is a graph of the electric field profile of the groundwall insulation of the stator bar of FIGs. 3A and 4;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows a cross section of a typical stator bar 10 for a large AC dynamoelectric machine. Bar 10 is composed of a large number of insulated conductors such as 12 which are insulated from each other by the strand insulation 14.

The conductors 12 are formed into a group after having strand insulation 14 applied thereto to provide the necessary isolation. The top and bottom surfaces of the conductor group are filled with an insulating material 13 generally referred to as a transposition filler. The group of insulated conductors 12 are next wrapped with a groundwall insulation material 16. The number of layers of insulating tape making up insulation may be from 7 to 16 layers of a mica tape insulation wound in half lap or wrapped fashion, depending on the

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level of operating voltage to which the conductors 12 are being subjected.

For high voltage applications, that is for voltages above 4000 volts and, preferably 13.8 kV, the preferred groundwall insulation 16 would be layers of a composite mica tape comprising a corona discharge resistant polyimide bonded to a mica type paper tape. This tape provides a good layer of insulation, and because of its corona resistant properties, provides long service life because of the resistance to corona discharge. The mica paper composites and tapes used in these hybrid systems contain a high percentage of a semi-cured resin (resin rich) which may or may not contain a corona resistant material. The wrapped bar is heated and compressed, in an autoclave or press, to allow the resin to temporarily liquefy so as to evacuate any entrapped air and eliminate any voids. Heat and pressure are maintained on the bar undergoing treatment so that the resin contained in the insulation is driven to gelation, bonding the insulation system together. The surface of the cured bar may next be coated with suitable materials to assure that the entire exposed surface of the bar will form an equipotential surface during machine operation.

The cured bar manufactured with the tape types as described above will function acceptably well within the design parameters of the machine for a predetermined period of time.

FIG. 2 shows the cross section for a typical coil 10b. In this instance, strands 12b of copper (six shown) are grouped together so that although strands 12 are separated from each other by the presence of strand insulation 14b, the six strands grouped into the turn, must be insulated from the other turns of the coil 10b by means of turn

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insulation 15b. The turn package is ultimately covered with groundwall insulation 16b.

FIG. 3A shows the cross section of a stator bar insulated in accordance with the teachings of this invention. Here the conductor bundle is composed of individual conductors 22 separated by strand insulation 24 similar to that as previously shown in FIG. 1A. The conductor bundle is then wound with several layers of composite tape. Each layer of composite tape will comprise a first inner layer 26 of insulation tape and a second insulation layer 28 of tape. These layers 26, 28 of tape each have a predetermined thickness and different permittivities. In particular the permittivity of the first inner layer is greater than that of the permittivity of the outer most layer. It should also be understood that additional third or fourth layers of tape with reduced permittivity may be employed in the present invention.

It should be understood that these inner and outer insulation layers may comprise layers of half lapped tape composed of a composite such as mica paper backed on a glass tape backing to form layer 28. A suitable resin impregnant is present in the mica paper. This standard tape has an excellent voltage withstand capability.

The groundwall insulation comprising layers 26 and 28 may be subjected to press curing or an autoclaving curing process to eliminate any voids in the insulation layers 26 and 28 and to subsequently drive the resin impregnant to gelation.

Suitable surface coatings may be applied to the external surface of insulation layer 28 before or after cure.

FIG. 3B shows the composite groundwall insulation as it applies to coil 20 composed of three turns. In this instance, the copper

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conductors 22b are surrounded by strand insulation 24b. The turn insulation 25b is applied to each turn and the initial layer of groundwall insulation 26b containing the same constituents as layer 26 in FIG. 3A is applied. Finally, the layer of outer groundwall insulation 28b is applied. With the exception of the presence of the turn insulation 25b, the insulation systems of FIGS. 3A and 3B are very similar.

Referring now to FIG. 4 there is shown a simplified drawing of the conductor 25 have including the inner insulation groundwall layer 26 and the second more outer insulation groundwall layer 28 also referred to as the first and second layers 26, 28. The first layer 26 has a permittivity which is chosen to be greater than that of the second layer 28. In testing that has been done, an inner layer of tape insulation 26 was utilized having a permittivity of 6.5. The permittivity of the second more outer insulating layer 28 was chosen to be 4.2. The predetermined thickness of the layers was 0.096 inches or slightly less than 2.5 mm. The electric field profiles were determined at the corner shown in 40 and the flat at 42. The result in measurement for FIG. 4 is shown in graph number for FIG. 6. However, before discussing the graph for FIG. 6, reference may be made to the graph for FIG. 5 which relates to the insulation shown in FIG. 1.

In FIG. 5, it is shown that the profile for the electrical field at the corner 40 diminishes in a curved slope fashion given by curve 55 starting at approximately 4200 volts per mm and this gradually decreases to the 3mm in thickness for this conductor insulation



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material. On the flat, the potential electric field is stable at approximately 2600 volts per mm. This is shown by curve 50.

Accordingly, the insulation shown in FIG. 1 has its weakest portion at the corner adjacent to the conductor where the electric field is the greatest and hence the insulation has its weakest portion. Referring to FIG. 6, the graph is shown for the conductor as shown in FIG. 3A and is compared with the graph of FIG. 5 which is also provided on FIG. 6. The thickness of the two insulation systems 26 and 28 is shown. In graph 65 the maximum magnitude of the electric field is 4000 volts per mm as compared to about 4200 volts per mm in FIG. 5. However, the electric field profile decreases gradually along a curve until sharp step 68 where the second layer of insulation is formed at this juncture between layers 26 and 28. Thereafter the electric field diminishes again in a curved slopping manner. With respect to the electrical field profile across the flat 42, distribution layer, this is shown at 60 and can be compared to profile 50. Hence the distribution of the electric field adjacent the conductor is less for both the flat and curved portions 42 and 40 and has a sharp graded step increase at 68 and then is greater than that for curves 50 and 55 respectively. The present invention however does provide for a reduction in the maximum magnitude of the electric field that the groundwall insulation must withstand.

It should be understood that the electric field profile as shown in Fig. 6 is for a winding of stator bars and that this electric field profile would be present with a step type function across the juncture of the first and second layer of insulation for stator coils and this pattern can

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repeat with the addition of subsequent or successive layers of insulation having lower permittivities in each succeeding layer.

Further, it should be noted that the thickness of the insulation system used in FIG. 6 has been reduced significantly over that used in the prior art of FIG. 5. Hence this reduction in insulation results in material cost savings.

Referring again to Figures 3A and 3B, successive layers of insulation 80 and 82 are shown in ghost lines applied in succession over layer 28 in Figure 3A and layer 28b in Figure 3B. These successive layers 80, 82 if used, have declining permittivities for each layer applied further from the turn insulation 24 or groundwall insulation layers 26, 28.

It is further envisaged that the inner and outer layers of insulation utilized in the present invention may comprise two tapes made from different types of mica having differing permittivities dependent upon and inherent in the choice of mica for the mica paper tape. The mica papers chosen for these tapes would be such that the difference in permittivities inherent to the mica itself would contribute to an overall resultant permittivity of each tape. In this manner, multiple tapes of differing permittivities can be utilized based on a single basic tape construction and chemistry. The most common form of mica is Muscovite that has a dielectric constant in the 6 to 8 range. Another form of mica is Phlogopite that has a dielectric constant in the 5 to 6 range. There are many different types of Mica pairings from which to select the advantageous pairing of materials. The mica may be chosen from the following: Anandite, Annite, Biotite, Bityte, Boromuscovite, Celadonite, Chernikhite, Clintonite, Ephesite, Ferri-

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annite, Glauconite, Hendricksite, Kinoshitalite, Lepidolite, Masutomilite, Muscovite, Nanpingite, Paragonite, Phlogopite, Polyolithionite, Preiswerkite, Roscoelite, Siderophillite, Sodiumphlogopite, Taeniolite, Vermiculate, Wonesite, and Zinnwaldite.

It should be understood that alternative embodiments of the present invention may be readily apparent to a man skilled in the art in view of the above description for the preferred embodiments of this invention. For example, while the preferred embodiment relates to groundwall insulation, it is within the realm of the present invention that the turn insulation 24 of Fig 3A surrounding conductor 22 may comprise the first inner layer of insulation and the second more outer layer may comprise the groundwall insulation layer 26 so long as the second layer 26 has a lower permittivity than the layer 24. Accordingly, the scope of the present invention should not be limited to the teachings of the preferred embodiments and should be limited to the scope of the claims that follow.

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WHAT IS CLAIMED IS:

1. A winding element for use in a dynamoelectric machine surrounded by insulation, the insulation comprising:

a first inner insulation layer applied over a conductor, the first inner insulation layer having a first predetermined thickness and first predetermined permittivity; and

a second insulation layer applied over the first inner insulation layer, the second insulation layer having a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer.

2. The winding element of claim 1 wherein the first inner and second insulation layers each comprises several layers of either wrapped or lapped insulating tape.

3. The winding element as claimed in claim 2 wherein the first inner and second insulation layers comprise a corona discharge resistant material.

4. The winding element of claim 1 wherein the first insulation layer is a turn insulation layer applied to each conductor of a plurality of conductors forming the winding, and the second layer of insulation is a groundwall insulation layer applied to the plurality of conductors over the first insulation layer.

5. The winding element as claimed in claim 4 further comprising at least one succeeding layer of insulation applied in succession over the second layer of insulation where each succeeding layer of insulation has a permittivity that is less than a previously applied layer of insulation.



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6. The winding element as claimed in claim 1 further comprising at least one succeeding layer of insulation applied in succession over the second layer of insulation where each succeeding layer of insulation has a permittivity that is less than a previously applied layer of insulation.

7. A groundwall insulation for use on a conductor of a dynamoelectric machine having a graded electric field across the groundwall insulation, the groundwall insulation comprising:

a first inner insulation layer applied over the conductor, the first inner insulation layer having a first predetermined thickness and first predetermined permittivity; and

a second insulation layer applied over the first inner insulation layer and forming a juncture therewith; the second insulation layer having a second predetermined thickness and second predetermined permittivity wherein the second predetermined permittivity is less than the first predetermined permittivity of the first inner insulation layer creating the graded increase in the electric field in the groundwall insulation at the juncture of the first inner and second insulation layers.

8. The groundwall insulation of claim 7 wherein the first inner and second insulation layers of the groundwall insulation each comprises several layers of either wrapped or lapped insulating tape.

9. The groundwall insulation as claimed in claim 8 wherein the first inner and second insulation layers are impregnated with resin which contains particles of a corona discharge resistant material.

10. The groundwall insulation as claimed in claim 8 further comprising at least one succeeding layer of insulation applied in

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succession over the second layer of insulation where each succeeding layer of insulation has a permittivity that is less than a previously applied layer of insulation.

11. The groundwall insulation of claim 8 wherein the winding is adapted to carry voltages in excess of 4 kV.

12. The groundwall insulation of claim 11 wherein the winding is adapted to carry voltages of at least 13.8 kV.

13. The groundwall insulation of claim 8 wherein the thickness of the insulation is less than 3.2 mm.

14. The winding element as claimed in claim 2 wherein the first inner and second insulation layers comprise mica paper tape where the mica chosen for each tape is a different type of mica.

15. The winding element as claimed in claim 14 wherein the different types of mica are chosen from the group consisting of Anandite, Annite, Biotite, Bityte, Boromuscovite, Celadonite, Chernikhite, Clintonite, Ephesite, Ferri-annite, Glauconite, Hendricksite, Kinoshitalite, Lepidolite, Masutomilite, Muscovite, Nanpingite, Paragonite, Phlogopite, Polyolithionite, Preiswerkite, Roscoelite, Siderophillite, Sodiumphlogopite, Taeniolite, Vermiculate, Wonesite, and Zinnwaldite.

16. The groundwall insulation as claimed in claim 8 wherein the first inner and second insulation layers are a mica paper tape where the mica chosen for each tape is a different type of mica.

17. The groundwall insulation as claimed in claim 16 wherein the different types of mica are chosen from the group consisting of Anandite, Annite, Biotite, Bityte, Boromuscovite, Celadonite, Chernikhite, Clintonite, Ephesite, Ferri-annite, Glauconite,

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Hendricksite, Kinoshitalite, Lepidolite, Masutomilite, Muscovite, Nanpingite, Paragonite, Phlogopite, Polylithionite, Preiswerkite, Roscoelite, Siderophillite, Sodiumphlogopite, Taeniolite, Vermiculate, Wonesite, and Zinnwaldite.

~~113~~ 113^s

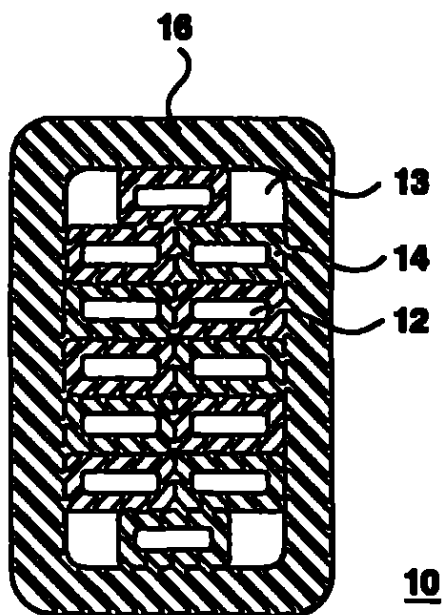


FIG. 1 (PRIOR ART)

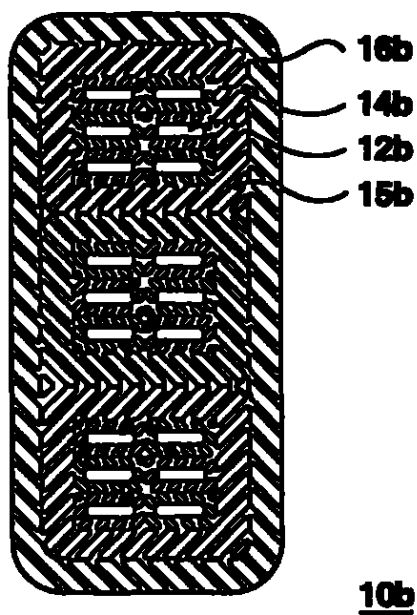


FIG. 2 (PRIOR ART)

~~114~~ 114

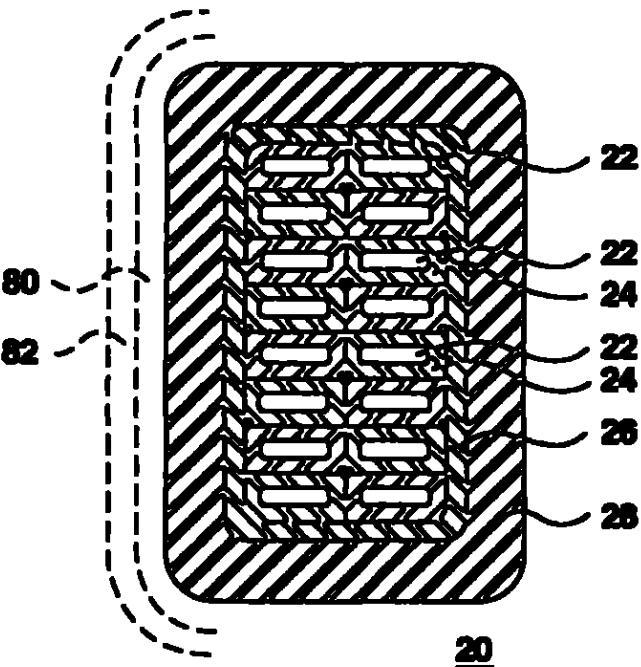


FIG. 3A

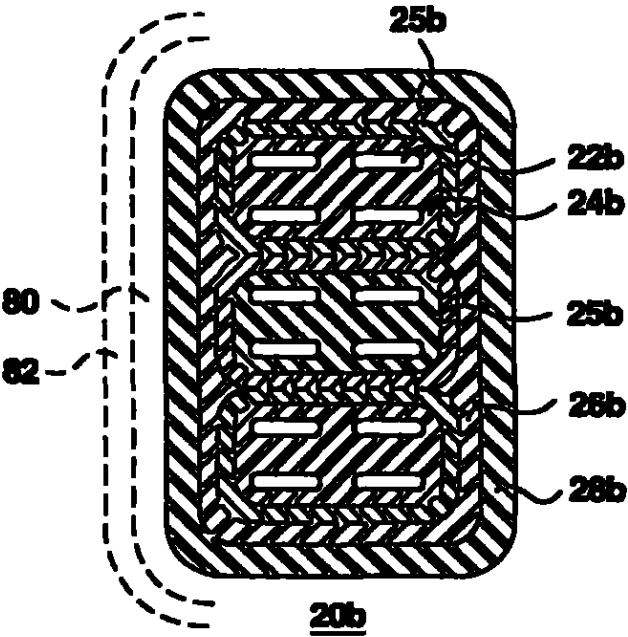


FIG. 3B

115

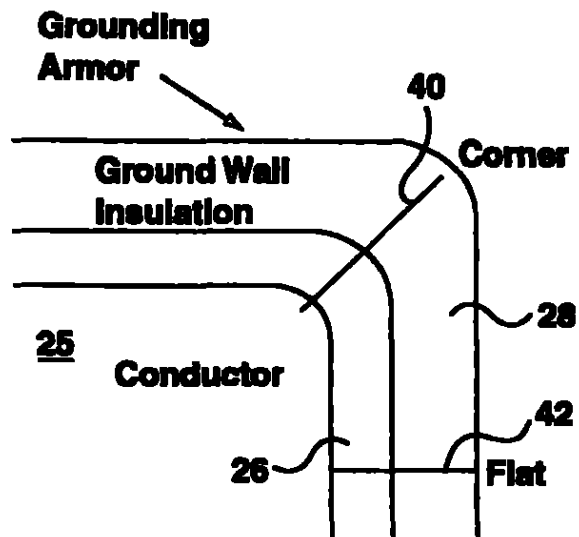


FIG. 4

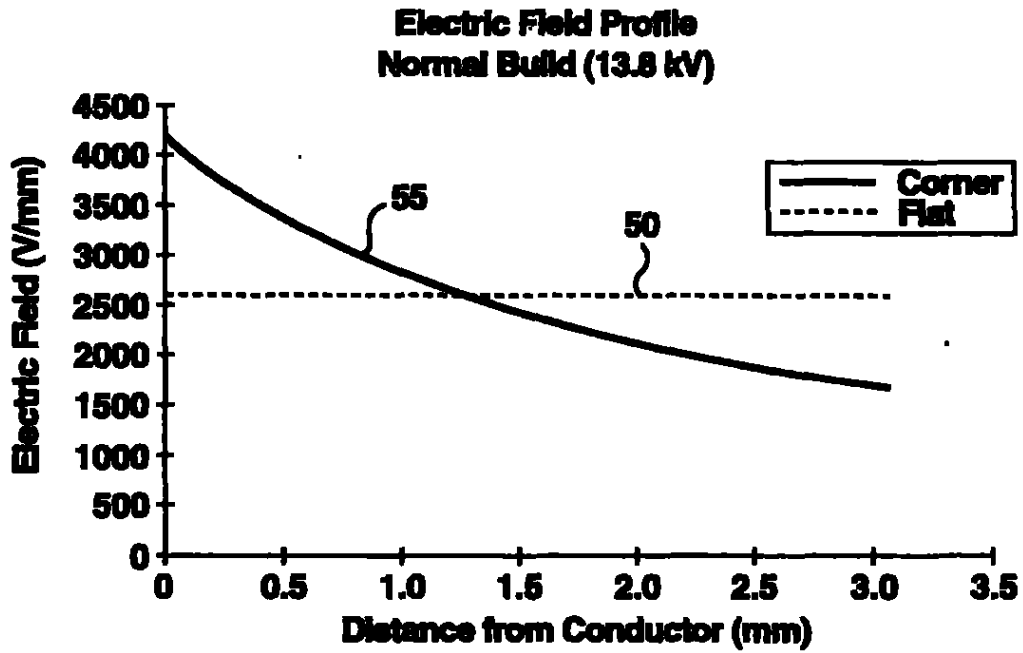


FIG. 5

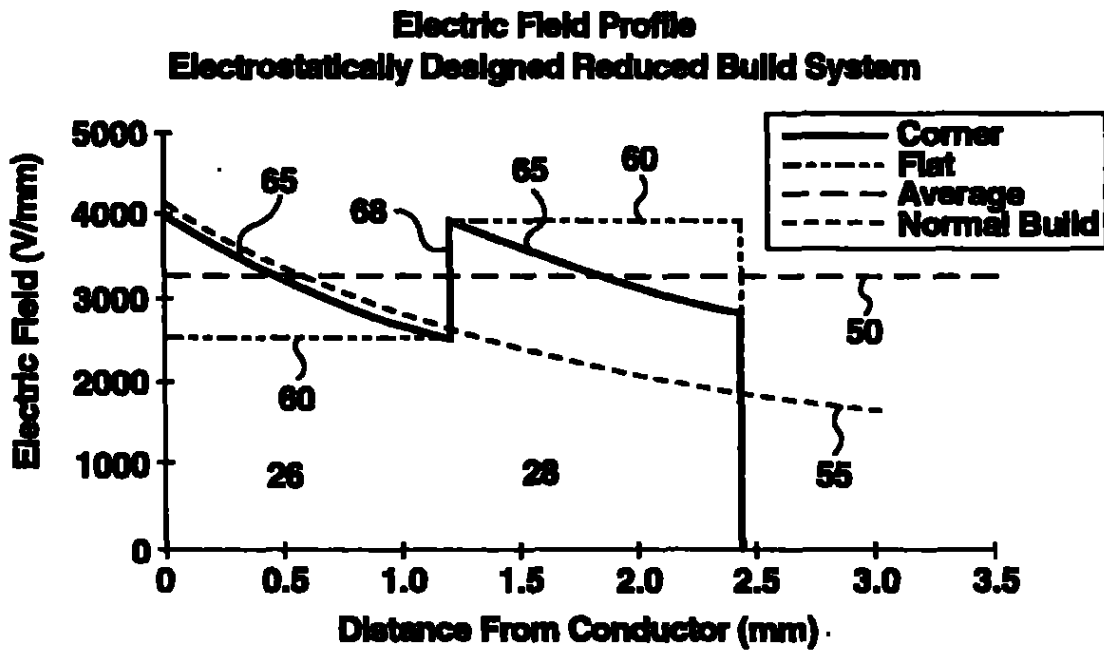


FIG. 6

Traducción de las reivindicaciones de la solicitud de patente
canadiense Serie Número 2.344.564:

REIVINDICACIONES

1. Un elemento de devanado para ser usado en una máquina dinamoeléctrica rodeado por un aislamiento, el aislamiento comprende:

Una primer capa de aislamiento interior aplicada sobre un conductor, la primera capa de aislamiento interior tiene un primer espesor predeterminado y una primera permisividad predeterminada; y

Una segunda capa de aislamiento aplicada sobre la primera capa de aislamiento interior, la segunda capa de aislamiento tiene un segundo espesor predeterminado y una segunda permisividad predeterminada en donde la segunda permisividad predeterminada es menor que la primera permisividad predeterminada de la primera capa de aislamiento interior.

2. El elemento de devanado de la reivindicación 1 en donde la primera y segunda capas de aislamiento cada una comprende varias capas de cinta de aislamiento enrollada o sobrepuesta.

3. El elemento de devanado según se reivindicó en la reivindicación 2 en donde la primera capa interior y la segunda capa de aislamiento comprende un material resistente a la descarga por corona.

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4. El elemento de devanado de la reivindicación 1 en donde la primera capa de aislamiento es una capa de aislamiento de espira aplicada a cada conductor de una pluralidad de conductores que forman el devanado, y la segunda capa de aislamiento es una capa de aislamiento de pared de tierra aplicada a la pluralidad de conductores sobre la primera capa de aislamiento.

5. El elemento de devanado según se reivindicó en la reivindicación 4 comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

6. El elemento de devanado según se reivindicó en la reivindicación 1 comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

7. Un aislamiento de pared de tierra para uso sobre un conductor de una máquina dinamoeléctrica que tiene un campo eléctrico graduado a través del aislamiento de la pared de tierra, el aislamiento de pared de tierra comprende:

Una primer capa de aislamiento interior aplicada sobre el conductor, la primera capa de aislamiento interior tiene un

primer espesor predeterminado y una primera permisividad predeterminada; y

Una segunda capa de aislamiento aplicada sobre la primera capa de aislamiento interior y que forma una unión allí; la segunda capa de aislamiento tiene un segundo espesor predeterminado y una segunda permisividad predeterminada en donde la segunda permisividad predeterminada es menor que la primera permisividad predeterminada de la primera capa de aislamiento interior creando el incremento escalonado en el campo eléctrico en el aislamiento de pared de tierra en la unión de la primera capa interior y la segunda capa interior de aislamiento.

8. El aislamiento de pared de tierra de la reivindicación 7 en donde la primera capa interior y la segunda capa de aislamiento de pared de tierra cada una comprende varias capas sea de cinta de aislamiento enrollada o sobrepuesta.

9. El aislamiento de pared de tierra de la reivindicación 8 en donde la primera capa interior y la segunda capa de aislamiento están impregnadas con una resina que contiene partículas de un material resistente a la descarga por efecto corona.

10. El aislamiento de pared de tierra de la reivindicación 8 que comprende adicionalmente por lo menos una capa sucesiva de aislamiento aplicada en sucesión sobre la segunda capa de aislamiento en donde cada capa sucesiva de aislamiento tiene una permisividad que es menor que la del aislamiento de la capa aplicada previamente.

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11. El aislamiento de pared de tierra de la reivindicación 8 en donde el devanado es adaptado para soportar voltajes por encima de 4 KV.

12. El aislamiento de pared de tierra de la reivindicación 11 en donde el devanado es adaptado para soportar voltajes de por lo menos 13,8 KV.

13. El aislamiento de pared de tierra de la reivindicación 8 en donde el espesor del aislamiento es menor a 3,2 mm.

14. El elemento de devanado según la reivindicación 2 en donde la primera capa interior y la segunda capa de aislamiento comprenden cinta de papel de mica en donde la mica se escoge para cada cinta de un tipo diferente de mica.

15. El elemento de devanado según la reivindicación 14 en donde los diferentes tipos de mica son escogidos a partir del grupo que consiste de Anandita, Annita, Biotita, Bitita, Boromuscovita, Celadonita, Chermiquita, Clintonita, Efesita, Ferrianita, Glauconita, Herdricksita, Qiunoshitalita, Lepidolita, Masutonilita, Muscovita, Nanpingita, Paragonita, Flogopita, Polilitonita, Preiwerkita, Roscolita, Siderofilita, Sodioflogopita, Taeniolita, Vermiculato, Wonesita, Zinnwaldita.

16. El aislamiento de pared de tierra según la reivindicación 8 en donde la primera capa interior y la segunda capa de aislamiento son una cinta de papel de mica en donde la mica se escoge para cada cinta de un tipo diferente de mica.



17. el aislamiento de pared de tierra según la reivindicación 16 en donde los tipos diferentes de mica se escogen a partir del grupo que consiste en Anandita, Annita, Biotita, Bitita, Boromuscovita, Celadonita, Cherniquita, Clintonita, Efesita, Ferrianita, Glauconita, Herdricksita, Quiunoshitalita, Lepidolita, Masutonilita, Muscovita, Nanpingita, paragonita, Flogopita, Polilitionita, Preiwerkita, Roscolita, Siderofilita, Sodioflogopita, Taeniolita, Vermiculato, Wonesita y Zinnwaldita.

COLO 12926-801-001-1
JBP/Id-8

122

Industria y Comercio
SUPERINTENDENCIA

NIT : 900176089-2

RECIBO OFICIAL DE CAJA : 01 - 81,215
FECHA : DICIEMBRE 29 DE 2001

SUPERINDUSTRIA Y COMERCIO
Radicación : 01077342 00000002 Folios: 03
Fecha (HUB): 2002-01-11 17:37:17
Trámite : 002 PATENTES D 1 REGISTRO/ 444 RESPUESTA
Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
AVELIO ABOGADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	6482966	28/12/2001	16.313.920.00

***** CONCEPTO *****

ANT. HISTORICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-03 CAMBIO DE MODALIDAD Y MODIFICA	12 MARCAS Y LENAS COMERCIALES	73.440.00
	TOTAL :	\$ 73.440.00

DM: SETENTA Y TRES MIL CUATROCIENTOS CUARENTA PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No.

Camara 13 No. 27-00 Pisos 5, 7 y 10
Conmutador 382 0840
Fax 350 5220
E-mail: info@sic.gov.co
www.sic.gov.co
Bogotá, D.C., Colombia

06 42926-001-001-1



Industria y Comercio
SUPERINTENDENCIA

NIT : 800176089-2

SUPERINTENDENCIA Y COMERCIO

Radicación : 01077342 00000002

Folios: 03

Fecha (VCD): 2002-01-11 17:37:17

Trámite : 002 PATENTES D 1 REGISTRO/ 444 REPUESTA

Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

CERTIFICACION DE EXCEDENTE : 02 - 343
FECHA : ENERO 9 DE 2002

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
AVELIO ARGABO	CONSIGNACION	BANCO POPULAR	050-00110-6	6482963	08/01/2002	1.219.502.00

***** CONCEPTO *****

ANT. CONTABILITICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-09 OTROS SERVICIOS DE PROPIEDAD I 99 OTROS SERVICIOS ADMINISTRATIVOS	4.560.00
	TOTAL :	\$ 4.560.00

DM: CUATRO MIL QUINIENTOS SESENTA PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No.

ESTA CERTIFICACION DE EXCEDENTE DE PAGO SOLO PODRA SER UTILIZADA
COMO PARTE DE LA CANCELACION DE UNA TARIFA VIGENTE Y NO PODRA SER
SUSTITUIDA POR NINGUN RECIBO.

Carrera 13 No. 27-00 Pisos 5, 7 y 10
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Bogotá, D.C., Colombia

Colo 12926 - 801 - 001 - 1.

2do. EXAMEN DE FORMA PATENTE DE INVENCION

Folio 126

Radicación no 01-77342
Concepto Técnico no. 408
Clasificación Internacional de Patentes : H02 K 15/10

Practicado el examen de acuerdo a lo establecido en el Art. 38 de la Decisión 486 se determinó que esta solicitud de Patente de Invención:

- | | | |
|-------------------------------------|---------------|---|
| ☒ | SI [✓] NO [] | Contiene un resumen de la invención (Art.26-e). |
| ☒ | SI [✓] NO [] | Contiene el título o nombre de la invención (Art.27-d). |
| ☒ | SI [✓] NO [] | Contiene la descripción de la invención (Art.28-b). |
| ☒ | SI [✓] NO [] | NO ES APLICABLE [] Contiene los dibujos necesarios para comprender la invención (Art.26-d) |
| ☒ | SI [✓] NO [] | Contiene una o más reivindicaciones. (Art.26-c). |
| ☒ | SI [] NO [] | NO ES APLICABLE [✓] Han sido desarrollados los productos y/o procedimientos a partir de recursos genéticos o de sus productos derivados de los que cualquiera de los Países Miembros es país de origen. (Art. 28- h). |
| ☒ | SI [] NO [] | NO ES APLICABLE [✓] Los productos y/o procedimientos han sido obtenidos o desarrollados a partir de los conocimientos tradicionales de las comunidades indígenas, afroamericanas, o locales de los países miembros, de acuerdo a lo establecido en la Decisión 391 y sus modificaciones y reglamentaciones vigentes.(Art.26-i). |
| ☒ | SI [] NO [✓] | La invención se refiere a un producto relativo a un material biológico. (Art.26-j). |
| ☒ | SI [✓] NO [] | La prioridad coincide con la materia reivindicada. |
| ☒ | SI [✓] NO [] | CUMPLE LOS REQUISITOS TÉCNICOS |

OBSERVACIONES Y OTROS: SI [✓] NO [] ver hoja(s) anexa(s)

1. Anexa nuevo dibujos de las figuras 1 a 6 con la correcciones, folios 44 al 47
2. Adjunta arte final, folio 48
3. Anexa documento de prioridad de solicitudes canadienses con las cuales invoca prioridad, folios del 71 al 123.

EXAMINADOR TÉCNICO
202048

Bogotá D. C. Marzo 18 de 2003.

~~Folio 127~~

2020
Bogotá DC

Doctor(a)
EMILIO FERRERO
Apoderado(a)

REFERENCIA: Radicación No. 01 77342
Trámite 002
Evento 001
Actuación 416
Oficio No. 0831
Folios 001

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en los artículos 26 y 27 de la Decisión 486 de la Comisión de la Comunidad Andina, y en las demás disposiciones vigentes sobre la materia, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial, conforme lo establece el artículo 40 de la misma Decisión.

Cúmplase

Dado en Bogotá DC, a los 12 JUL 2003


ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones

202048

Carrera 13 No. 27-00 Piso 5 y 10
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