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(54) Current transformer for power supply and method for manufacturing the same

Stromwandler für Netzteil und Herstellungsverfahren dafür

Transformateur de courant pour alimentation électrique et son procédé de fabrication

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a current transformer for power supply and a method for manufacturing the same, and more particularly, to a current transformer for power supply capable of smoothly performing power supply and preventing damage of a subject to be supplied with power, and a method for manufacturing the same.

2. Description of the Background Art

[0002] Generally, a current transformer for power supply is referred to as a current transformer (CT) or a relaying current transformer. The current transformer is mainly used as a power source of a current system or a power system in electric power distributing equipment, or a power source of a trip coil or an over current relay (OCR) in an air circuit breaker (ACB).

[0003] As shown in FIGS. 1 and 2, a current transformer for power supply comprises a core 20 having a loop shape, bobbins 30 coupled to each other so that the core 20 can be received therein, and coils 40 wound on the bobbins 30. A primary conductor 10 passes through inside of the coil 20, and the core 20 is formed by insulation-laminating square-ring shaped plates. The bobbins 30 are coupled to each other in a facing manner so that the primary conductor 10 can be disposed therebetween inside the core 20. The coil 40 is wound on each of the bobbins 30.

[0004] However, the conventional current transformer for power supply has the following problems.

[0005] First, a saturation phenomenon occurs at a large current region, thus to induce a high voltage to both ends of the coil 40 and to flow a large current. Accordingly, a power supply subject, such as an over current relay, may be damaged.

[0006] In order to prevent the power supply subject from being damaged due to flow of a large current, a protecting device (or a protecting circuit) has to be additionally provided at the power supply subject.

[0007] Furthermore, in order to reduce a current applied to the coil 40, the number of turns (windings) of the coil 40 has to be increased. Accordingly, a required amount of the coil 40, and the number of the bobbins 30 are increased, thereby increasing the fabrication cost and increasing the entire size of the current transformer for power supply. EP 1 394 823 A (SIEMENS AG [DE]) 3 March 2004 (2004-03-03) discloses a transformer to acquire the current flowing in a primary conductor. For that, the transformer has a core 3 with an air-gap 4. The section with the air-gap is surrounded by a secondary coil 5. A further magnetic branch 6 forms a magnetic bypass for the section of the core 3, surrounded by secondary coil 5.

SUMMARY OF THE INVENTION

[0008] Therefore, it is an object of the present invention to provide a current transformer for power supply capable of smoothly supplying power and preventing damage of a power supply subject, and a method for manufacturing the same.

[0009] It is another object of the present invention to provide a current transformer for power supply capable of smoothly supplying power at a small current, and capable of preventing a voltage from excessively rising at a large current more than a preset level, and a method for manufacturing the same.

[0010] It is still another object of the present invention to provide a current transformer for power supply capable of reducing the number of turns of a coil and an entire size thereof, and a method for manufacturing the same.

[0011] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a current transformer for power supply, comprising: a first core formed of a magnetic substance, and having a loop shape with a gap at one side thereof; and at least one supporting core formed of a magnetic substance, and disposed at one or more sides of the first core so as to block the gap.

[0012] The first core includes a straight portion, and the gap is formed at the straight portion.

[0013] The first core includes segment cores each having the straight portion and a curved portion extending from one end of the straight portion. Each supporting core includes a straight portion corresponding to the straight portion of the first core, and a curved portion having a length longer than one of the curved portions of the segment cores. A supporting core is disposed at each of both sides of the first core in a thickness direction. Each supporting core is disposed so that the one curved portion thereof can come in contact with two curved portions of the segment cores.

[0014] The current transformer for power supply further comprises a coil disposed around the gap. The current transformer for power supply may further comprise a second core formed of a magnetic substance, having a shape corresponding to the first core, and disposed at one or more sides of the first core.

[0015] The second core may include a straight portion and a curved portion corresponding to the straight portion and the curved portion of the first core.

[0016] The current transformer for power supply may further comprise a supporting core having a shape corresponding to the first core or the second core, and disposed at one or more sides of the first core or the second core.

[0017] The supporting core may be disposed at both outer sides of the first core and the second core in a thickness direction.

[0018] To achieve these and other advantages and in accordance with the purpose of the present invention, as

embodied and broadly described herein, there is also provided a method for manufacturing a current transformer for power supply, comprising: forming a core having a loop shape with a gap at one region thereof; and winding a coil around the gap.

[0019] The step of forming a core comprises forming segment cores facing each other to form a gap therebetween.

[0020] The step of forming a core further comprises disposing a supporting core formed of a magnetic substance at one or more sides of the segment cores so as to block the gap.

[0021] The step of forming a core may further comprise disposing a second core formed of a magnetic substance and having a loop shape at one or more sides of the segment cores so as to block the gap.

[0022] Before the disposing a second core, the step of forming a core may further comprise forming a second core by forming segment cores facing each other and having a close loop.

[0023] The method may further comprise disposing a supporting core outside the second core.

[0024] Before the forming a core, the method may further comprise providing a bobbin. In the step of forming a core, the segment cores may be inserted into the bobbin so as to form the gap.

[0025] Before the winding a coil, the method may further comprise disposing a bobbin around the gap.

[0026] The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

[0028] In the drawings:

FIG. 1 is a sectional view of a current transformer for power supply in accordance with the conventional art;

FIG. 2 is a lateral view of FIG. 1;

FIG. 3 is an exploded perspective view of a current transformer for power supply according to a first embodiment of the present invention;

FIG. 4 is a planar view showing a coupled state of the current transformer for power supply FIG. 3;

FIG. 5 is a bottom view of FIG. 4;

FIG. 6 is a frontal view of a power supply unit of FIG. 3;

FIG. 7 is a perspective view of a core of FIG. 6;

FIG. 8 is a frontal view of a first core of FIG. 7;

FIG. 9 is a frontal view of a supporting core of FIG. 7;

FIG. 10 is a perspective view of a core of a current transformer for power supply according to a second embodiment of the present invention;

FIG. 11 is a frontal view of a second core of FIG. 10;

FIG. 12 is a view showing a modification example of a process for coupling a core to a bobbin of the current transformer for power supply according to a first embodiment of the present invention;

FIG. 13 is a view showing another modification example of a process for coupling a core to a bobbin of the current transformer for power supply according to a first embodiment of the present invention; and

FIG. 14 is a view showing a relation between a primary current and a secondary current of the current transformer for power supply according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0029] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0030] Hereinafter, a current transformer for power supply, and a method for manufacturing the same will be explained in more detail.

[0031] As shown in FIGS. 3 to 5, a current transformer for power supply comprises a case 120 having a receiving space therein, a power supply unit 140 for supplying a current induced by a primary conductor 110 to a power supply subject such as an over current relay (OCR), a current measuring unit 181 for measuring a current flowing on the primary conductor 110, and a PCB 191 connected to the power supply unit 140 and the current measuring unit 181, respectively.

[0032] A primary conductor coupling portion 122 for coupling the primary conductor 110 is formed at the case 120. And, the current measuring unit 181 implemented as a circular Rogowski coil is disposed around the primary conductor coupling portion 122. An insulating member 185 is disposed at one side (an upper side in FIG. 3) of the current measuring unit 181. The PCB 191 is fixedly-coupled by a screw 193 between the current measuring unit 181 and the power supply unit 140. A connector 135 is formed at one region of the case 120 so as to be electrically connected to the PCB 191 and a power supply subject.

[0033] As shown in FIG. 6, the power supply unit 140 includes a core 141 disposed around the primary conductor 110, a bobbin 171 coupled to the core 141, and a coil 175 wound on the bobbin 171. The coil 175 is received in the case 120 having one opened side. A cover 130 is coupled to the case 120 by a screw 133 thus to cover the coil 175.

[0034] As shown in FIG. 7, the core 141 includes a first core 151 formed of a magnetic substance, and having a loop shape with a gap (G) at one side thereof; and supporting cores 161 formed of a thin plate type magnetic

substance, and disposed at one or more sides of the first core 151 so as to block the gap (G). The number of plates of the first core 151, and each thickness of the supporting cores 161 are controlled according to a capacity of a rated current.

[0035] As shown in FIG. 8, the first core 151 is formed as one pair of segment cores 155 face each other so as to form a gap (G) therebetween. The segment cores 155 of the first core 151 are formed by insulation-laminating plates, each plate having a straight portion 156 and a curved portion 157 curved from one end of the straight portion 156. The straight portion 156 of the segment core 155 is formed to be separated from a center line (C_L) of the first core 151 by a certain distance (G/2). Accordingly, when the two segment cores 155 are disposed to be symmetrical to each other based on the center line (C_L) so that ends of the two curved portions 157 come in contact with each other, a gap (G) is formed between the two straight portions 156.

[0036] The supporting cores 161 have a shape corresponding to the first core 151, and include straight portions 163 and curved portions 165 curved from each one end of the straight portions 163. As shown in FIG. 7, the straight portions 163 of the supporting cores 161 are formed to cover the entire length of the straight portions 156 of the first core 151 including the gap (G). As shown in FIG. 9, the curved portions 165 of the supporting cores 161 are formed to have a length longer than the curved portions 157 of the segment cores 155 of the first core 151 by being extended from the center line (C_L). That is, the curved portions 165 of the supporting cores 161 are formed to have a length extending enough to block an interface region between two ends of the two curved portions 157 of the two segment cores 155 of the first core 151. The supporting cores 161 are disposed so that the two curved portions 165 thereof can come in contact with the two curved portions 157 of the two segment cores 155 of the first core 151.

[0037] Under the configuration, the straight portion 156 of the first core 151 is inserted into the bobbin 171, and the supporting cores 161 are disposed at both sides of the first core 151. Then, contact regions between two ends of the straight portions 156 of the first core 151 and the two curved portions 157 are coupled to each other by an argon welding, etc.

[0038] Once a current flows to the primary conductor 110, a magnetic flux is induced to the core 141, and a secondary current is generated at the coil 175. The secondary current is supplied to a power supply subject such as an over current relay (OCR) connected to the connector 135 via the PCB 191.

[0039] Hereinafter, a current transformer for power supply according to a second embodiment of the present invention will be explained with reference to FIGS. 10 and 11. The same configuration and components as those of the first embodiment will be explained with reference to the same reference numerals of the first embodiment for convenience. As shown in FIG. 10, a core 211 includes a first core 151 formed of a magnetic substance, and having a loop shape with a gap (G) at one side thereof; and a second core 221 formed of a magnetic substance, having a shape corresponding to the first core 151, and disposed at one or more sides of the first core 151. As aforementioned, the first core 151 has two segment cores 155. The first core 151 and the second core 221 are respectively formed by insulation-laminating thin magnetic plates, and the number of plates can be controlled according to a capacity of a rated current.

[0040] The second core 221 is composed of one pair of segment cores 225 symmetrical to each other. The segment cores 225 of the second core 221 are formed by insulation-laminating magnetic plates, each magnetic plate having a straight portion 226 and a curved portion 227 curved from one end of the straight portion 226.

[0041] One pair of supporting cores 161 are coupled onto each outer circumference of the first core 151 and the second core 221 in a thickness direction. Each of the supporting cores 161 is formed of a magnetic substance, and includes a straight portion 163 and a curved portion 165. The two curved portions 165 of the supporting cores 161 are contact-coupled to the curved portions 157, 227 of the first and second cores 151,221. Here, the supporting cores 161 may be formed of a non-magnetic substance.

[0042] Under the configuration, the straight portions 156, 226, 163 of the first core 151, the second core 221, and the supporting cores 161 are inserted into the bobbin 171. Then, contact regions of the supporting cores 161 with two ends of the straight portions 156 of the first core 151 and the two curved portions 157 are welded one another, thereby integrally coupling the first core 151, the second core 221, and the supporting cores 161 one another.

[0043] Hereinafter, a modification example of a current transformer for power supply according to a first embodiment of the present invention will be explained with reference to FIG. 12.

[0044] As shown in FIG. 12, a current transformer for power supply comprises a first core 255 formed of a magnetic substance, and having a loop shape with a gap at one side thereof; and a supporting core 261 formed of a magnetic substance, and coupled to the first core 255 so as to block one or more sides of the gap (G) of the first core 255.

[0045] The first core 255 includes one 'U'-shaped curved portion 257; and two straight portions 256 linearly curved from both ends of the curved portion 257, and having a predetermined gap (G) therebetween. The first core 255 is formed by insulation-laminating thin plates.

[0046] The supporting core 261 is linearly formed to have a length corresponding to the two straight portions 256 of the first core 255. Here, the length of the supporting core 261 can be controlled.

[0047] A bobbin 271 is coupled to the straight portions 256 of the first core 255 so as to wind a coil thereon. The bobbin 271 is composed of a first member 273 and a

second member 275 coupled to each other in a facing manner in a thickness direction. Guide portions 274, 276 are respectively formed at both ends of the first and second members 273, 275 so as to be protruding in a width direction and extending in a circumference direction.

[0048] Under the configuration, the first and second members 273, 275 are coupled to each other so that the straight portions 256 of the first core 255 can be received therein. Then, a coil is wound on the first and second members 273, 275 coupled to each other.

[0049] Hereinafter, another modification example of a current transformer for power supply according to a first embodiment of the present invention will be explained with reference to FIG. 13.

[0050] As shown in FIG. 13, a current transformer for power supply comprises a first core 255 formed of a magnetic substance, and having a loop shape with a gap at one side thereof; and a second core 281 formed of a magnetic substance, having a shape corresponding to the first core 255, and disposed at one or more sides of the first core 255.

[0051] The first core 255 includes a 'U'-shaped curved portion 257; and straight portions 256 linearly curved from both ends of the curved portion 257, and having a predetermined gap (G) therebetween.

[0052] The second core 281 is formed to have a closed loop shape, which includes straight portions 283 corresponding to the straight portions 256 of the first core 255, and curved portions 285 formed to connect two ends of the straight portions 283. The second core 281 is disposed at both sides of the first core 255 in a thickness direction. Here, the second core 281 may be disposed at one side of the first core 255.

[0053] A bobbin 271 is coupled to the straight portions 256, 283 of the first and second cores 255, 281 so as to wind a coil thereon. The bobbin 271 is composed of a first member 273 and a second member 275 coupled to each other in a facing manner under a state that the straight portions 256, 283 are interposed therebetween.

[0054] Under the configuration, the first and second cores 255, 281 are coupled to each other by a welding, etc., and the first and second members 273, 275 are coupled to each other in a facing manner so that the straight portions 256, 283 of the first and second cores 255, 281 can be received therein. Then, a coil is wound on the first and second members 273, 275 coupled to each other.

[0055] Hereinafter, with reference to FIG. 14, will be explained a relation between a primary current and a secondary current of the current transformer for power supply according to the present invention.

[0056] Referring to FIG. 14, as indicated by the curved line L1, in the conventional current transformer for power supply, a secondary current linearly-increases in proportional to a primary current at a small current region. When the primary current increases, a saturation phenomenon easily occurs. Here, if the saturation phenomenon occurs at a large current region, a RMS (root mean square) value does not increase but a current peak value increases. As a result, a power supply subject such as an OCR (over current relay) may be damaged.

[0057] Referring to FIG. 14, as indicated by the curved line L2, in the current transformer for power supply according to a first embodiment of the present invention, a secondary current non-linearly increases in proportional to a primary current. When a small current flows to the primary conductor 110, a small secondary current can be stably supplied to a power supply subject. If a primary current increases, a secondary current non-linearly increases. In the case that a large current such as an abnormal current flows to the primary conductor 110, a magnetic flux is limited due to the gap (G) of the core thus to limit the size of the secondary current. Accordingly, damage of a power supply unit such as OCR due to a large current can be prevented.

[0058] Referring to FIG. 14, as indicated by the curved line L3, in the current transformer for power supply according to a second embodiment of the present invention, a secondary current increases in proportional to a primary current. The secondary current of the second embodiment is smaller than the conventional one, but is larger than that of the first embodiment due to a gap (G) smaller than the gap (G) of the first embodiment.

[0059] Referring to FIG. 14, as indicated by the curved line L4, when the size of the gap (G) of the first embodiment is increased, the secondary current can be made to be small and a saturating time can be prolonged.

[0060] As aforementioned, in the current transformer for power supply and the method for manufacturing the same according to the present invention, a gap is formed at the core to limit a magnetic flux thus to reduce the secondary current, thereby preventing damage of a power supply unit such as OCR due to a large current.

[0061] Furthermore, in the current transformer for power supply and the method for manufacturing the same according to the present invention, the amount of a coil can be reduced by limiting a magnetic flux induced to the core, the manufacturing cost can be reduced by reducing the number of bobbins, and the entire size of the current transformer can be decreased.

[0062] Additionally, in the current transformer for power supply, power is stably supplied to a power supply subject at a small current region, and a magnetic flux induced to the core is properly controlled at a large current region. Accordingly, damage of the power supply unit due to a large current can be prevented.

[0063] The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatuses. This description is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. The features, structures, methods, and other characteristics of the exemplary embodiments described herein may be combined in various ways to obtain additional and/or alternative exemplary embodiments.

[0064] As the present features may be embodied in several forms without departing from the characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalents of such metes and bounds are therefore intended to be embraced by the appended claims.

Claims

1. A current transformer for power supply, comprising:

a first core (151) formed of a magnetic substance, and having a loop shape with a gap (G) at one side thereof; and
at least one supporting core (161) formed of a magnetic substance, and disposed at at least one side of the first core so as to block the gap (G), and a coil (175) disposed around the gap (G), wherein

the first core (151) comprises a straight portion (156), and the gap (G) is formed at the straight portion (156), wherein
the first core (151) comprises segment cores (155) each having the straight portion (156) and a curved portion (157) extending from one end of the straight portion (156), **characterized in that** reach supporting core comprises:

a straight portion (163) corresponding to the straight portion (156) of the first core (151); and
a curved portion (165) having a length longer than one of the curved portions (157) of the segment cores (155), and a supporting core (161) is disposed at each of both sides of the first core (151) in a thickness direction so that its one curved portion (165) can come in contact with two curved portions (157) of the segment cores (155).

2. The current transformer for power supply of claim 1, further comprising a second core (221) formed of a magnetic substance, having a shape corresponding to the first core (151), and disposed at one or more sides of the first core (151).

3. A method for manufacturing the current transformer for power supply, according to claim 1, comprising:

forming a core (141; 211) having the first core (151) and the at least one supporting core (161); and
winding a coil (175) around the gap (G), wherein

the step of forming the core (141; 211) comprises forming segment cores (155) facing each other to form the gap (G) there between,
characterized in that
the step of forming the core (141; 211) further comprises disposing the at least one supporting core (161) formed of the magnetic substance at at least one side of the segment cores (155) so as to block the gap (G) and to contact one curved portion (165) of each supporting core (161) with two curved portions (157) of the segment cores (155).

4. The method of claim 3, wherein the step of forming the core (211) further comprises disposing a second core (221) formed of a magnetic substance and having a loop shape at least one side of the segment cores (155) so as to block the gap (G).

5. The method of claim 4, before disposing the second core (221), further comprising forming the second core (221) by forming segment cores (225) facing each other and having a close loop.

6. The method of claim 4, further comprising providing a bobbin (171) before forming the core (141; 211), wherein in the step of forming the core (141; 211), the segment cores (155) are inserted into the bobbin (171) so as to form the gap (G) in the bobbin (171).

7. The method of one of claims 3 to 6, further comprising disposing the bobbin (171) around the gap (G) before the winding the coil (175).

Patentansprüche

1. Stromtransformer zur Leistungsversorgung, umfassend:

einen ersten Kern (151), der aus einer magnetischen Substanz gebildet ist und eine Schleifenform mit einem Spalt (G) an einer Seite davon aufweist; und
zumindest ein Trägerkern (161), der aus einer magnetischen Substanz gebildet ist und an zumindest einer Seite des ersten Kerns angeordnet ist, um den Spalt (G) zu blockieren und eine Spule (175), die um den Spalt (G) angeordnet ist, wobei
der erste Kern (151) einen geraden Abschnitt

(156) umfasst und der Spalt (G) in dem geraden Abschnitt (156) gebildet ist, wobei
der erste Kern (151) Segmentkerne (155) umfasst, die jeweils einen geraden Abschnitt (156) und einen gekrümmten Abschnitt (157), welcher sich von einem Ende des geraden Abschnitts (156) erstreckt aufweisen, **dadurch gekennzeichnet, dass** jeder Trägerkern umfasst:

einen geraden Abschnitt (163), der dem geraden Abschnitt (156) des ersten Kerns (151) entspricht;
einen gekrümmten Abschnitt (165), der eine Länge aufweist, die länger ist als einer der gekrümmten Abschnitte (157) der Segmentkerne (155), und
wobei ein Trägerkern (161) an jeder von beiden Seiten des ersten Kerns (151) in eine Dickenrichtung so angeordnet ist, dass sein gekrümmter Abschnitt (165) mit zwei gekrümmten Abschnitten (157) der Segmentkerne (155) in Kontakt treten kann.

2. Stromtransformer zur Leistungsversorgung nach Anspruch 1, wobei der Stromtransformer ferner einen zweiten Kern (221), der aus einer magnetischen Substanz gebildet ist, umfasst, der eine Form aufweist, welche dem ersten Kern (151) entspricht und an einer oder an mehreren Seiten des ersten Kerns (151) angeordnet ist.

3. Verfahren zum Herstellen eines Stromtransformers zur Leistungsversorgung gemäß Anspruch 1, umfassend:

Bilden eines Kerns (141; 211), der einen ersten Kern (151) und den zumindest einen Trägerkern (161) aufweist; und
Winden einer Spule (175) um den Spalt (G), wobei
der Schritt des Bildens des Kerns (141; 211) ein Bilden von Segmentkernen (155), die einander gegenüberstehen, um den Spalt (G) dazwischen zu bilden, umfasst,
dadurch gekennzeichnet, dass
der Schritt des Bildens des Kerns (141; 211) ferner ein Anordnen des zumindest einen Trägerkerns (161), welcher aus der magnetischen Substanz gebildet ist, an zumindest einer Seite des Segmentkerns (155) um den Spalt (G) zu blockieren und um einen gekrümmten Abschnitt (165) jedes Trägerkerns (161) mit zwei gekrümmten Abschnitten (157) des Segmentkerne (155) zu kontaktieren umfasst.

4. Verfahren nach Anspruch 3, wobei der Schritt des Bildens des Kerns (211) ferner ein Anordnen eines zweiten Kerns (221) umfasst, welcher aus einer magnetischer Substanz gebildet ist und eine Schleifenform aufweist, an zumindest einer Seite der Segmentkerne (155), um den Spalt (G) zu blockieren.

5. Verfahren nach Anspruch 4, wobei das Verfahren vor dem Anordnen des zweiten Kerns (221) ferner ein Bilden des zweiten Kerns (221) durch Bilden von Segmentkernen (225), die einander gegenüberstehen und eine geschlossene Schleife aufweisen, umfasst.

6. Verfahren nach Anspruch 4, wobei das Verfahren ferner ein Bereitstellen einer Rolle (171) umfasst, bevor der Kern (141; 211) gebildet wird, wobei in dem Schritt des Bildens des Kerns (141; 211), die Segmentkerne (155) in die Rolle (171) eingefügt werden, um den Spalt (G) in der Rolle (171) zu bilden.

7. Verfahren nach einem der Ansprüche 3 bis 6, wobei das Verfahren ferner ein Anordnen der Rolle (171) um den Spalt (G), bevor die Spule (175) gebunden wird umfasst.

Revendications

1. Un transformateur de courant pour une alimentation de puissance, comprenant :

un premier noyau (151) formé d'une substance magnétique et présentant une forme en boucle avec un interstice (G) sur un de ses côtés ; et
au moins un noyau support (161) formé d'une substance magnétique et disposé sur au moins un côté du premier noyau de manière à bloquer l'interstice (G), et un enroulement (175) disposé autour de l'interstice (G), dans lequel le premier noyau (151) comprend une partie rectiligne (156) et l'interstice (G) est formé au niveau de la partie rectiligne (156), dans lequel
le premier noyau (151) comprend des segments de noyau (155) dont chacun possède la partie rectiligne (156) et une partie courbée (157) s'étendant à partir d'une extrémité de la partie rectiligne (156),
caractérisé en ce que chaque noyau support comprend :

une partie rectiligne (163) correspondant à la partie rectiligne (156) du premier noyau (151) ; et
une partie courbe (165) ayant une longueur supérieure à l'une des parties courbes (157) des segments de noyau (155),
et un noyau support (161) est disposé à chacune des deux extrémités du premier noyau (151) dans une direction de l'épaisseur de

sorte que sa partie courbe (165) puisse venir en contact avec deux parties courbes (157) des segments de noyau (155).

2. Le transformateur de courant pour alimentation de puissance de la revendication 1, comprenant en outre un second noyau (221) formé d'une substance magnétique, présentant une forme correspondant au premier noyau (151) et disposé sur un ou plusieurs côtés du premier noyau (151).

3. Un procédé de fabrication du transformateur de courant pour alimentation de puissance selon la revendication 1, comprenant :

la formation d'un noyau (141 ; 211) possédant le premier noyau (151) et le au moins un noyau support (161) ; et
le bobinage d'un enroulement (175) autour de l'interstice (G), dans lequel l'étape de formation du noyau (141 ; 211) comprend la formation de segments de noyau (155) se faisant face l'un à l'autre pour former entre eux l'interstice (G),
caractérisé en ce que
l'étape de formation du noyau (141 ; 211) comprend en outre le placement du au moins un noyau support (161) formé de la substance magnétique sur au moins un côté des segments de noyau (155) de manière à bloquer l'interstice (G) et mettre en contact une partie courbe (165) de chaque noyau support (161) avec deux parties courbes (157) des segments de noyau (155).

4. Le procédé de la revendication 3, dans lequel l'étape de formation du noyau (211) comprend en outre le placement d'un second noyau (221) formé d'une substance magnétique et présentant une forme en boucle sur au moins un côté des segments de noyau (155) de manière à bloquer l'interstice (G).

5. Le procédé de la revendication 4, comprenant en outre, avant le placement du second noyau (221), la formation du second noyau (221) par formation de segments de noyau (225) faisant face l'un à l'autre avec une boucle fermée.

6. Le procédé de la revendication 4, comprenant en outre l'obtention d'une bobine (171) avant la formation du noyau (141 ; 211), dans lequel à l'étape de formation du noyau (141 ; 211), les segments de noyau (155) sont insérés dans la bobine (171) de manière à former l'interstice (G) dans la bobine (171).

7. Le procédé de l'une des revendications 3 à 6, comprenant en outre le placement de la bobine (171) autour de l'interstice (G) avant le bobinage de l'enroulement (175).

FIG. 1

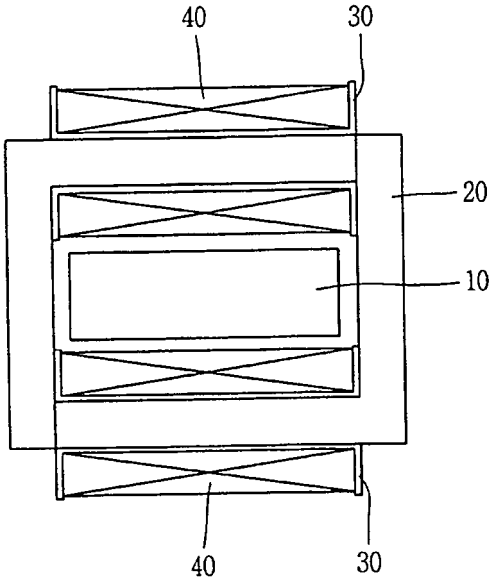


FIG. 2

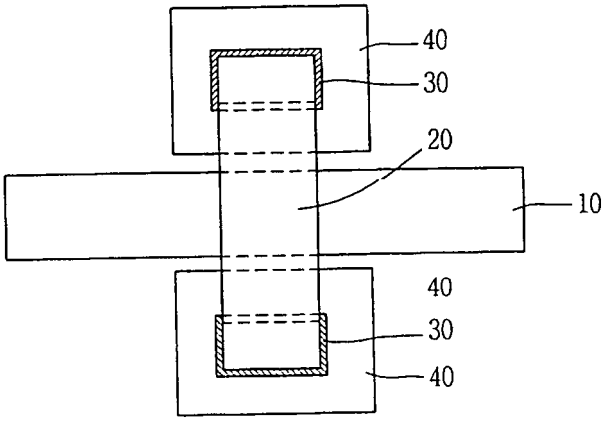


FIG. 3

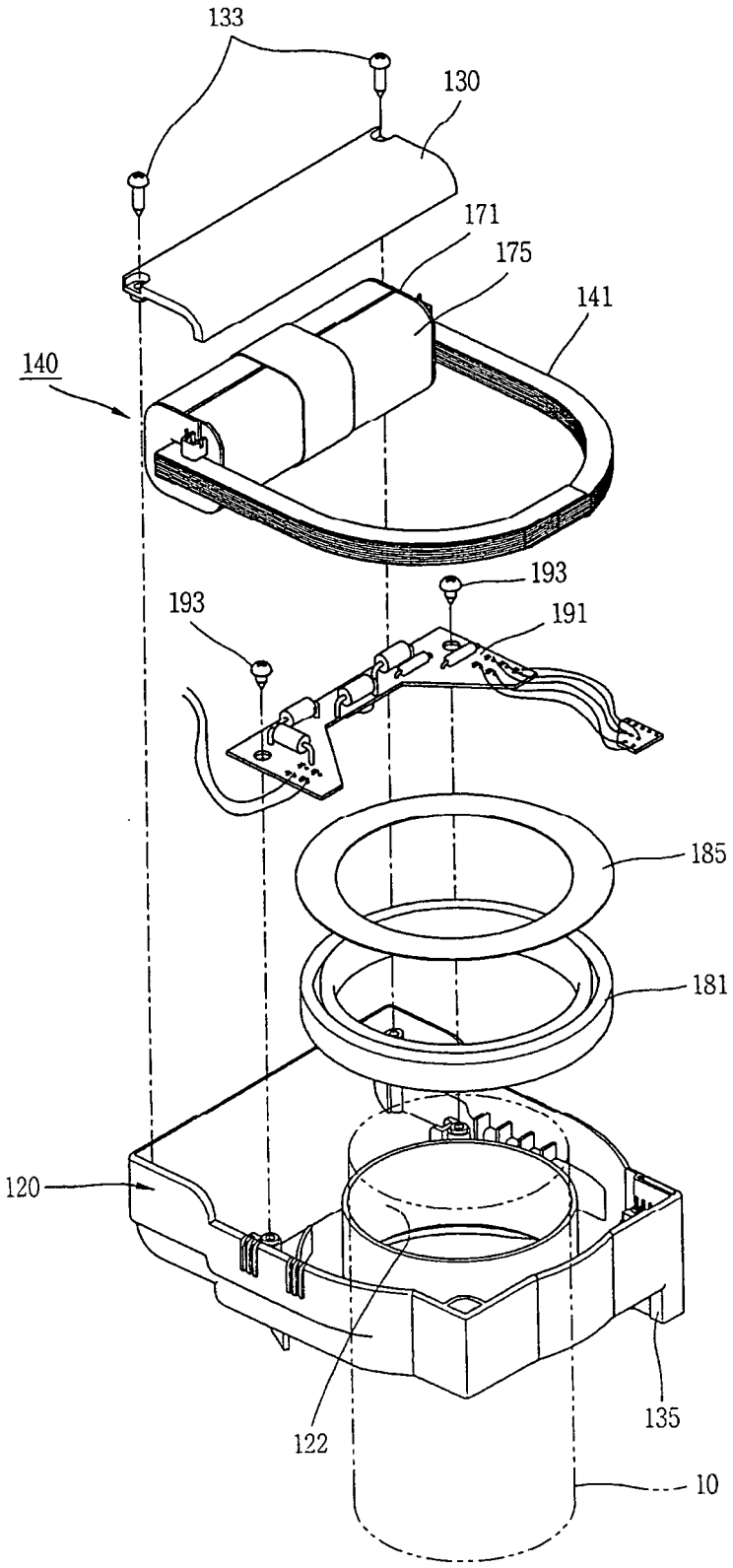


FIG. 4

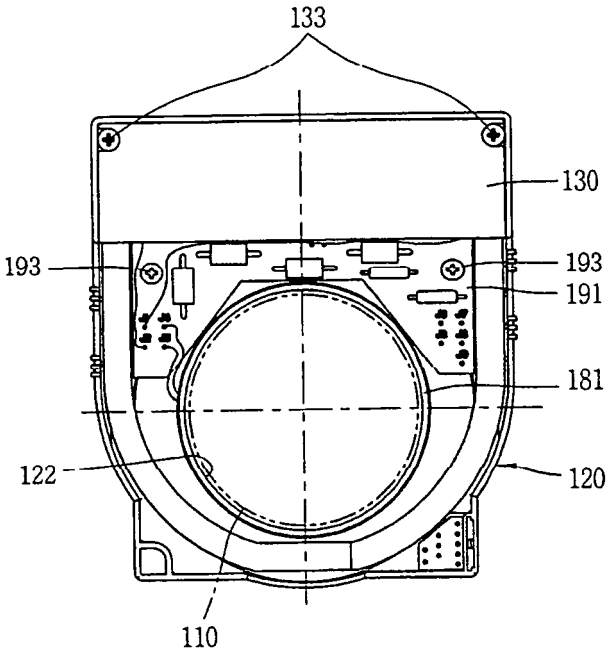


FIG. 5

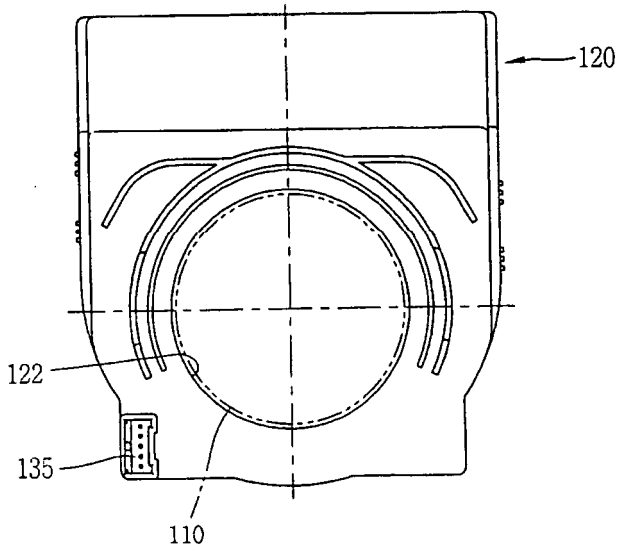


FIG. 6

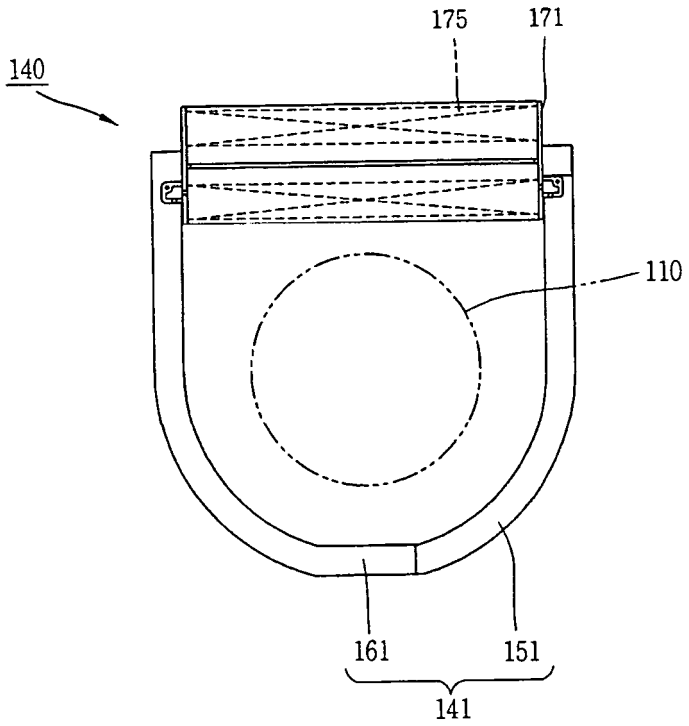


FIG. 7

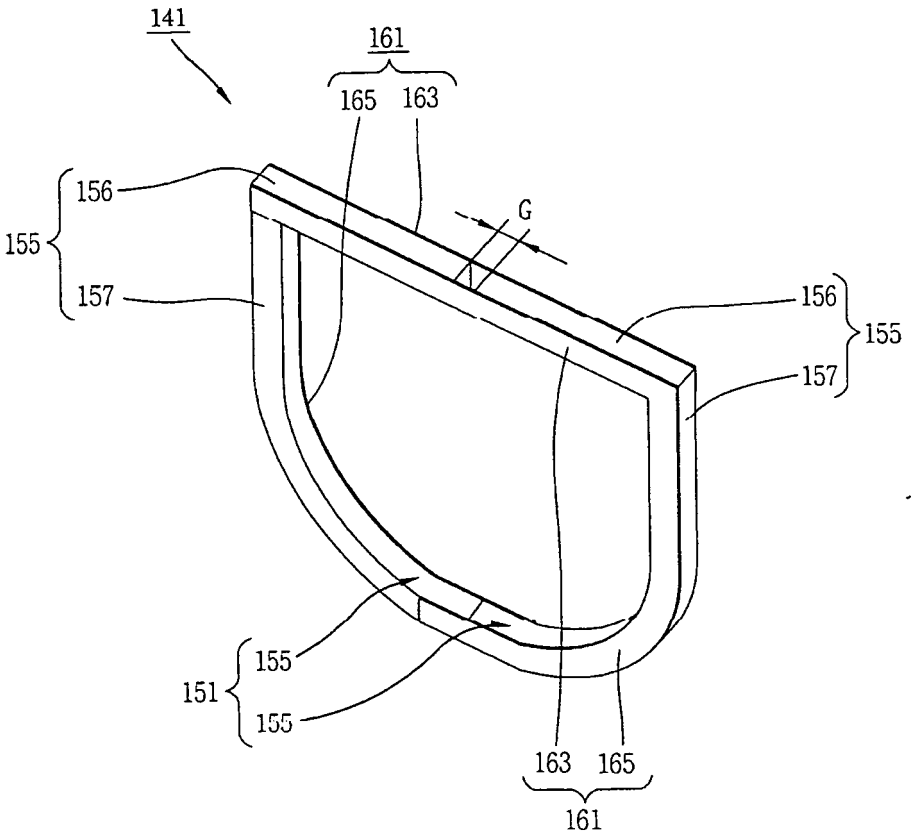


FIG. 8

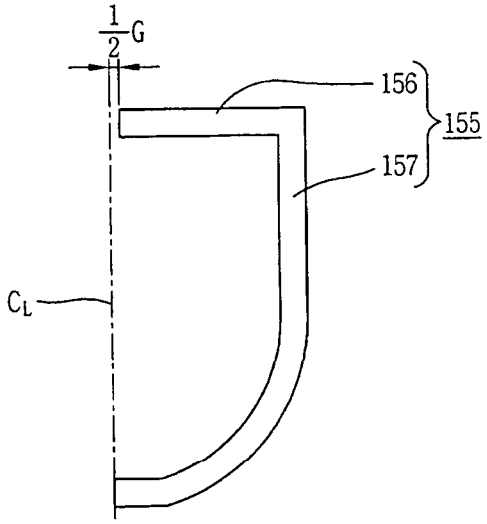


FIG. 9

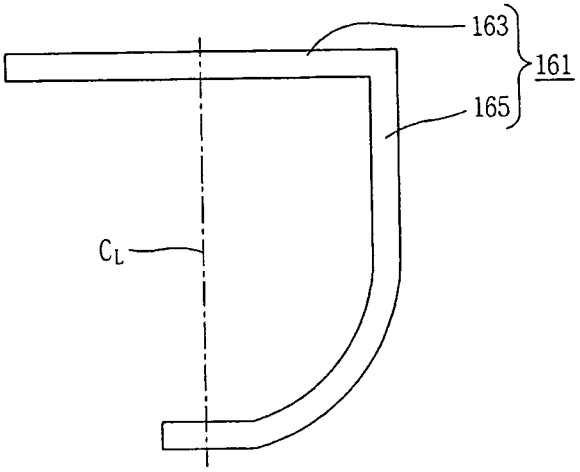


FIG. 10

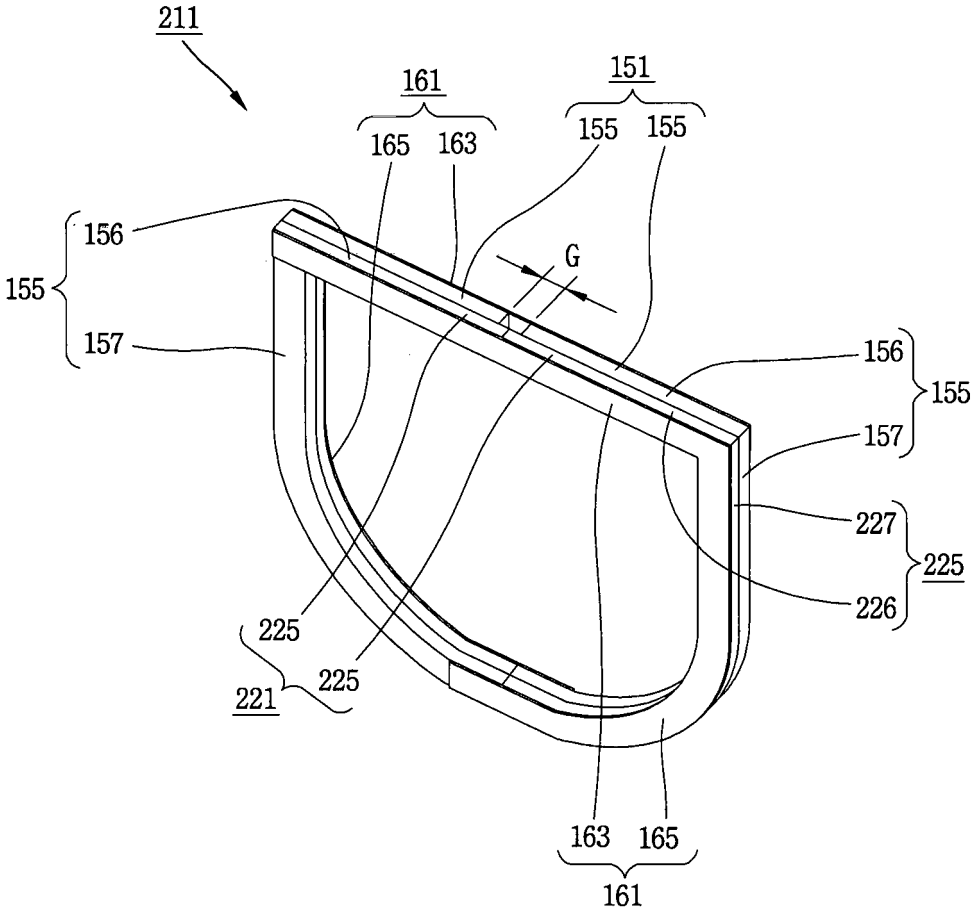

211
161
165
163
151
155
155
156
155
157
G
156
155
157
227
225
226
225
225
221
163
165
161

FIG. 11

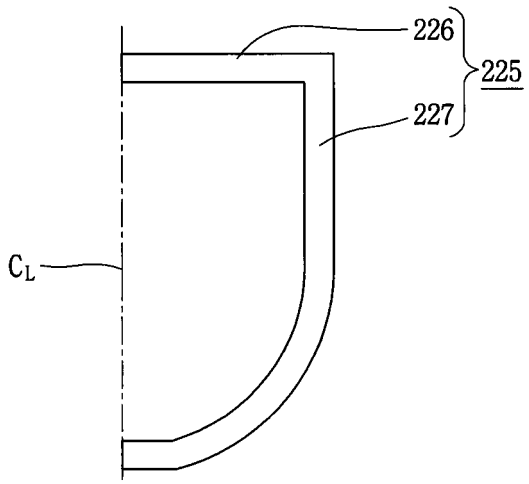

226
225
227
C_L

FIG. 12

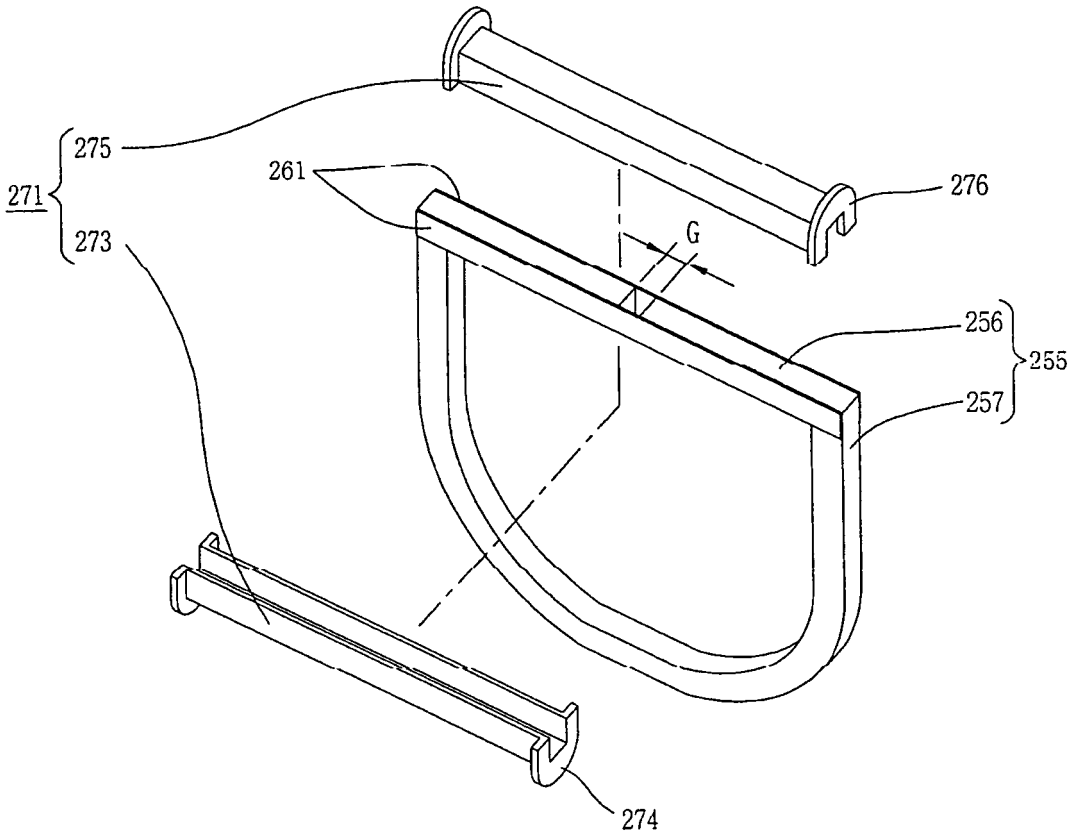


FIG. 13

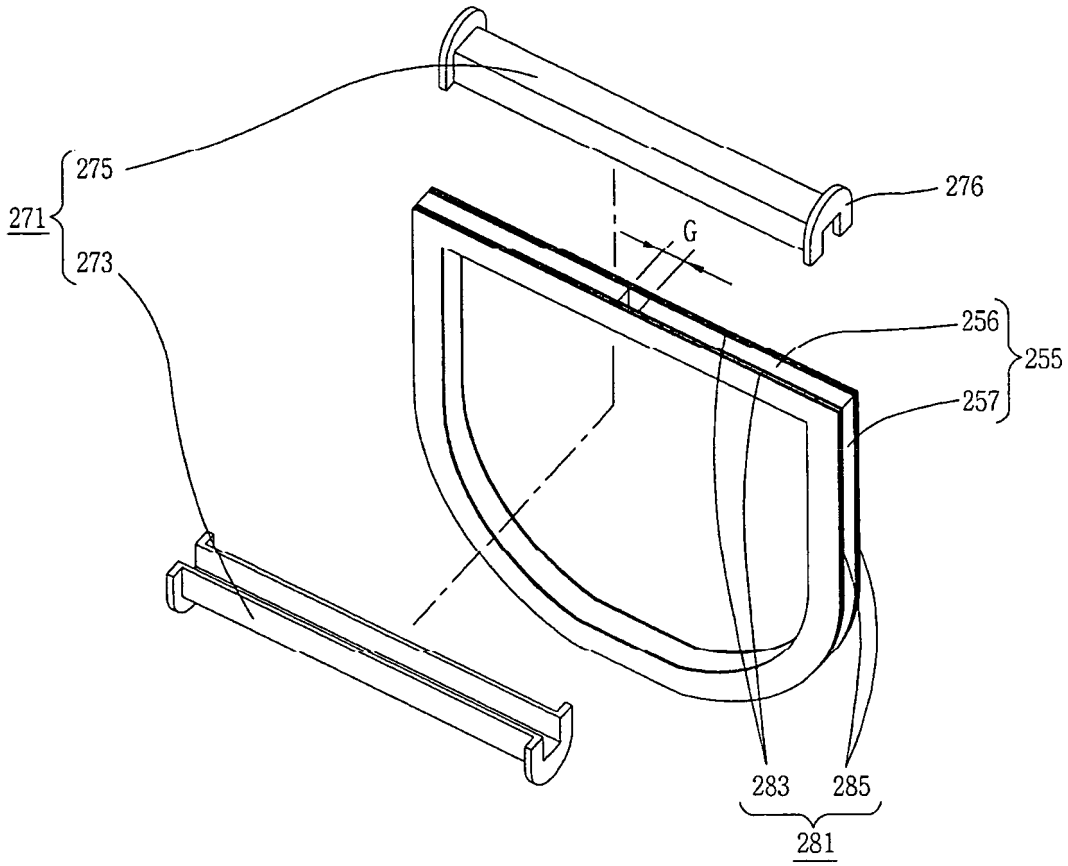
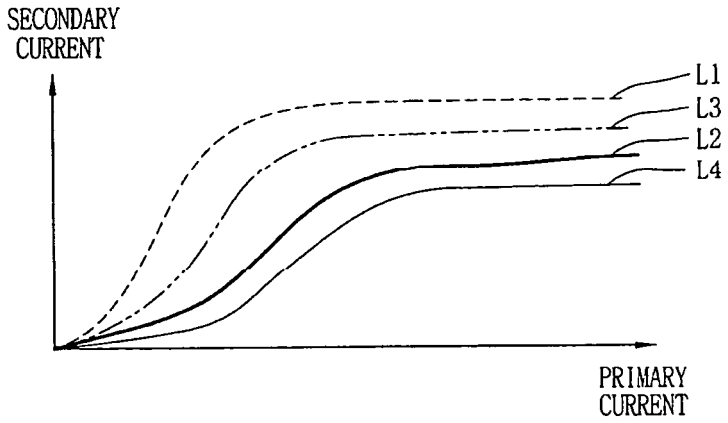


FIG. 14



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Patent documents cited in the description

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