US 20100033283A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2010/0033283 A1**

(43) **Pub. Date: Feb. 11, 2010**

Long

(54) **ELECTROMOTIVE RECTIFICATION SYSTEM**

(75) Inventor: **John M. Long**, Cumming, GA (US)

Correspondence Address:
BRYAN W. BOCKHOP, ESQ.
BOCKHOP & ASSOCIATES, LLC
2375 MOSSY BRANCH DR.
SNELLVILLE, GA 30078 (US)

(73) Assignee: **CUTT-A-WATT ENTERPRISES, LLC**, Cumming, GA (US)

(21) Appl. No.: **12/504,763**

(22) Filed: **Jul. 17, 2009**

Related U.S. Application Data

(60) Provisional application No. 61/083,402, filed on Jul. 24, 2008.

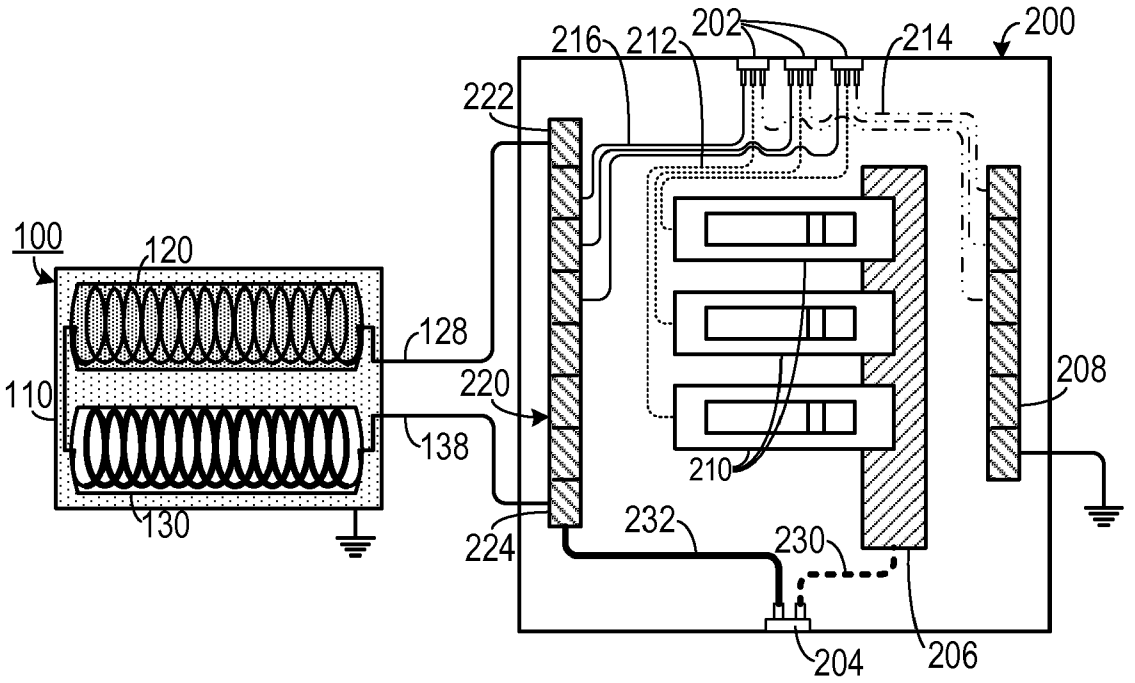
Publication Classification

(51) **Int. Cl.**
H01F 27/00 (2006.01)

(52) **U.S. Cl.** **336/83**

(57) **ABSTRACT**

An AC neutral bus electromotive power rectification unit includes a first coil unit and a second coil unit. The first coil unit includes a first conductive wire coil having a first end and an opposite second end. The conductive coil is disposed in a first non-conductive tube and is suspended in a ferrous matrix. The second coil unit includes a second conductive wire coil having a first end and an opposite second end. The first end of the second coil unit is electrically coupled to the first end of the first coil unit. The second coil unit is disposed in a second non-conductive tube and is surrounded by a non-conductive material.



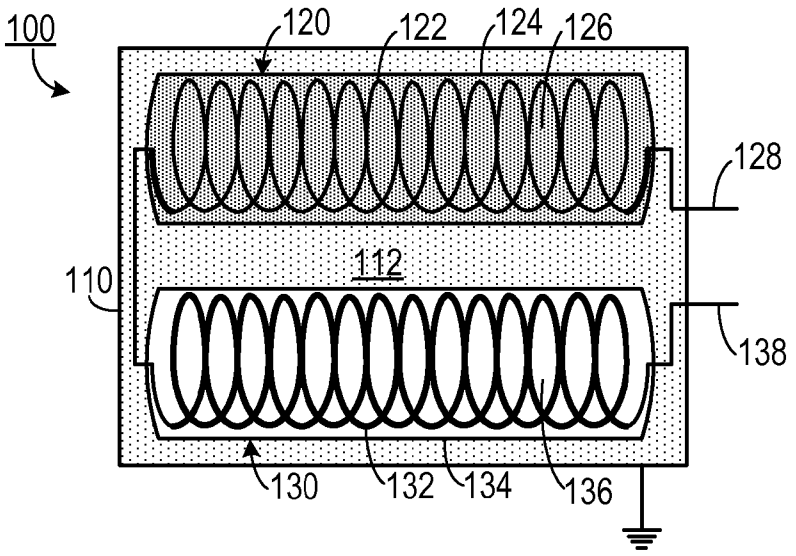

100
120
122
124
126
128
112
110
138
130
132
134
136

FIG. 1

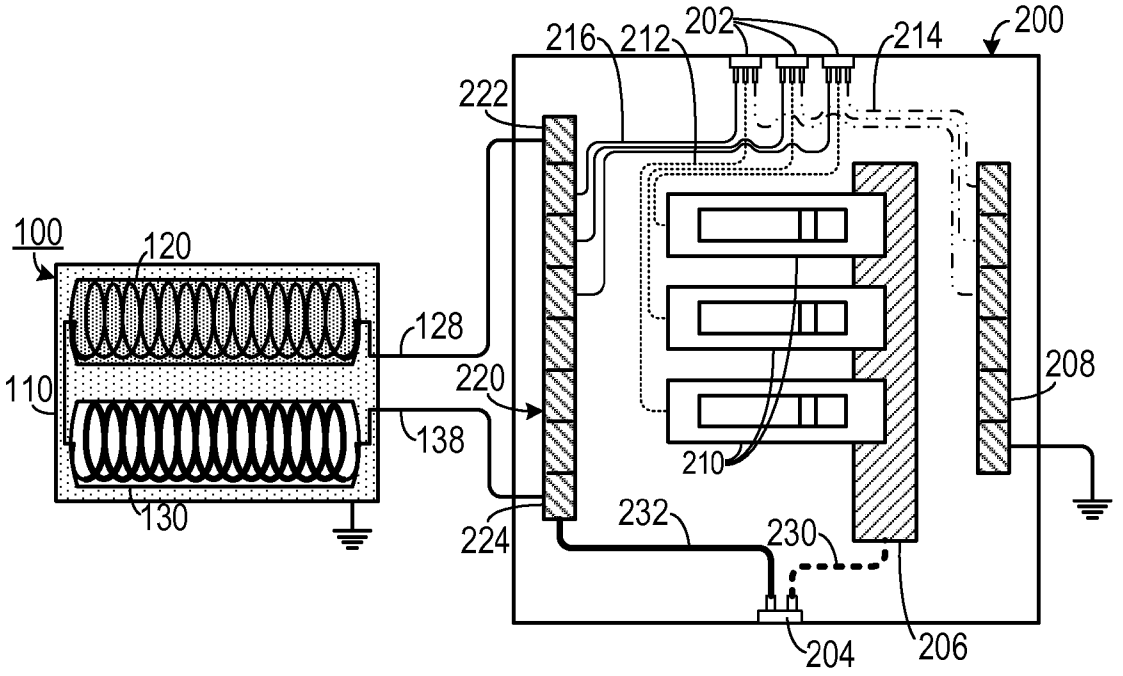

216
212
202
214
200
222
100
120
128
110
220
138
208
210
130
232
230
224
204
206

FIG. 2

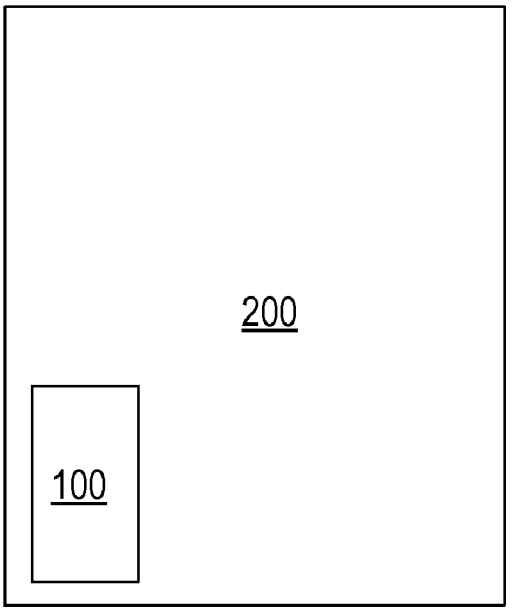


FIG. 3

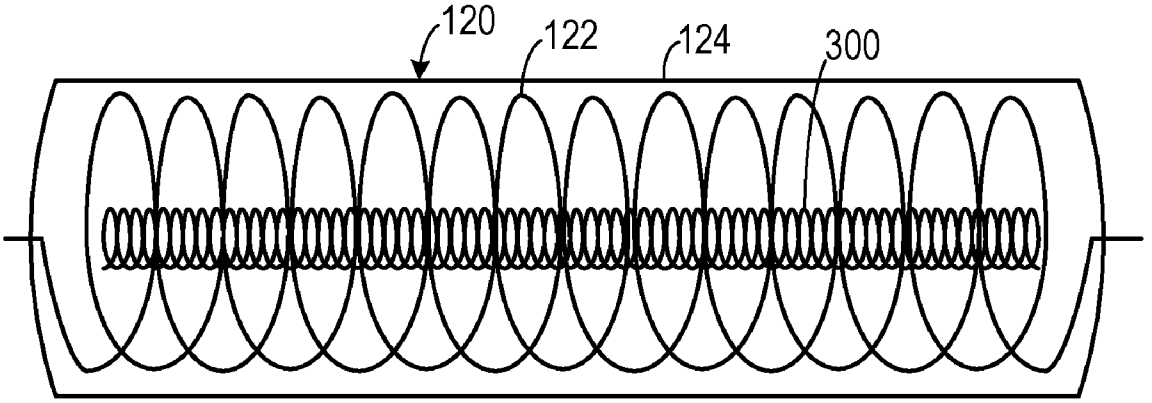


FIG. 4

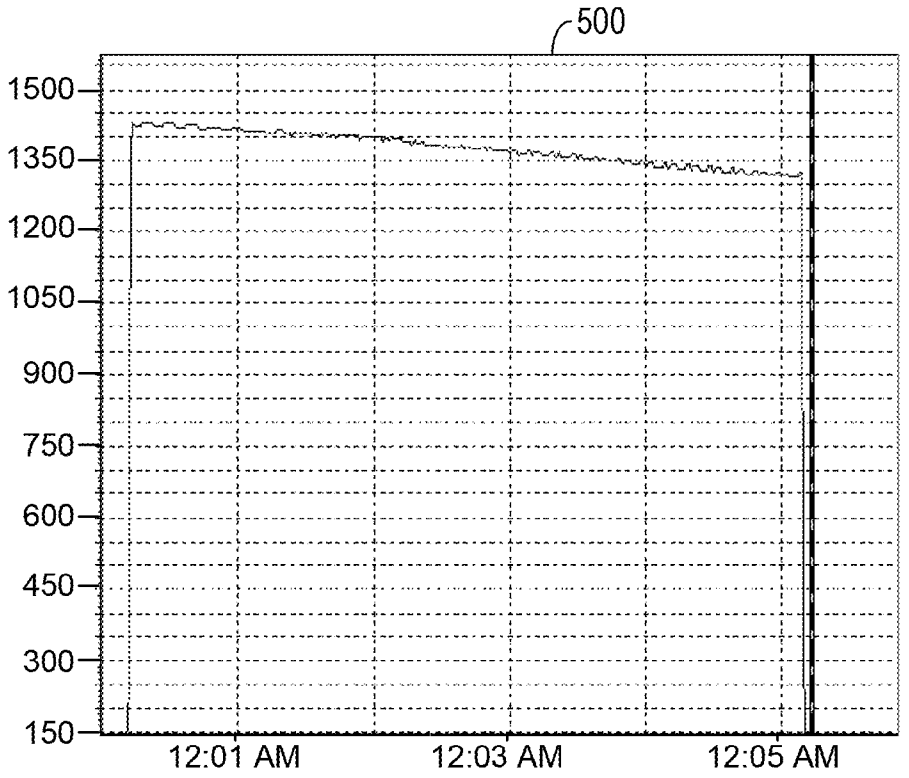

500
1500
1350
1200
1050
900
750
600
450
300
150
12:01 AM
12:03 AM
12:05 AM

FIG. 5A

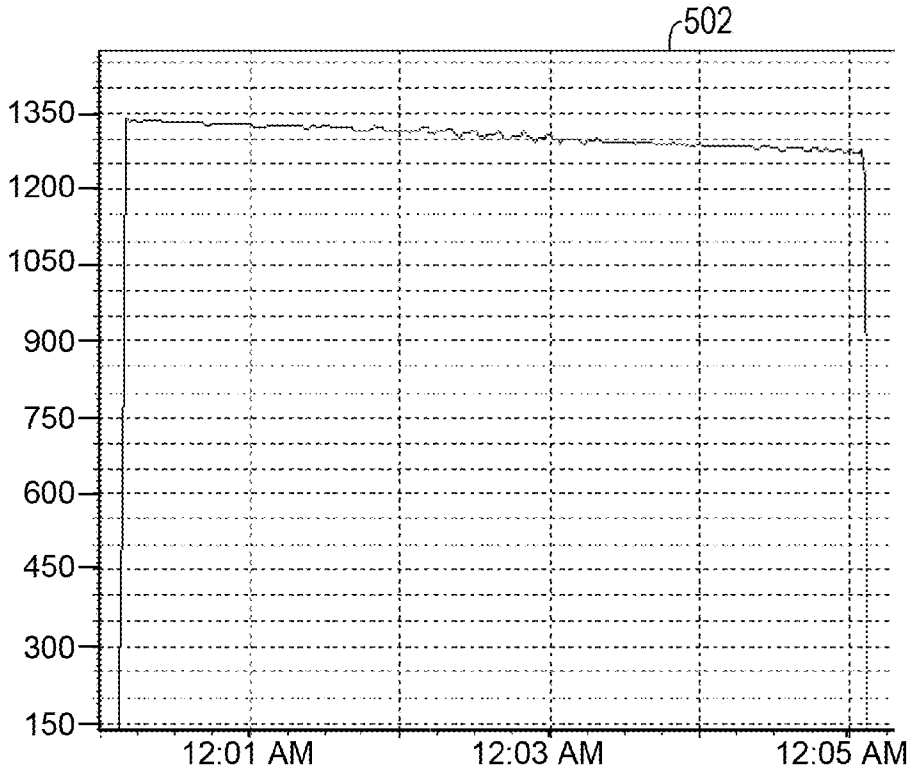

502
1350
1200
1050
900
750
600
450
300
150
12:01 AM
12:03 AM
12:05 AM

FIG. 5B

ELECTROMOTIVE RECTIFICATION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/083,402, filed Jul. 24, 2008, the entirety of which is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to electrical systems and, more specifically, to an electrical system used in cooperation with an electrical power distribution system.

[0004] 2. Description of the Prior Art

[0005] Electrical power systems typically employ a "hot" electrical conductor that delivers current to a location and a "neutral" conductor that allows return of electrical current to its source. Due to mechanical inefficiencies in many household appliances and in industrial machinery, short transient variations in return current can be experienced on the neutral conductor. These transients can make electrical power usage less efficient.

[0006] Therefore, there is a need for a system that minimizes the effects of power transients on neutral conductors.

SUMMARY OF THE INVENTION

[0007] The disadvantages of the prior art are overcome by the present invention which, in one aspect, is an AC neutral bus electromotive power rectification unit that includes a first coil unit and a second coil unit. The first coil unit includes a first conductive wire coil having a first end and an opposite second end. The conductive coil is disposed in a first non-conductive tube and is suspended in a ferrous matrix. The second coil unit includes a second conductive wire coil having a first end and an opposite second end. The first end of the second coil unit is electrically coupled to the first end of the first coil unit. The second coil unit is disposed in a second non-conductive tube and is surrounded by a non-conductive material.

[0008] In another aspect, the invention is an AC neutral bus electromotive power rectification device for use with a neutral bus bar in an electrical power distribution box, in which a plurality of inside neutral wires are coupled to the neutral bus bar and in which one outside neutral wire is coupled to the neutral bus bar. A first coil unit includes a first conductive wire coil having a first end and an opposite second end, The conductive coil is disposed in a first non-conductive tube and is suspended in a ferrous matrix. The second end of the first coil unit is electrically coupled to the neutral bus bar at a first position in which every neutral wire coupled to the neutral bus bar lies between the first position and a second position at which an outside neutral wire is coupled to the neutral bus bar. The second coil unit includes a second conductive wire coil having a first end and an opposite second end. The first end of the second coil unit is electrically coupled to the first end of the first coil unit. The second coil unit is disposed in a second non-conductive tube and is surrounded by a non-conductive material. The second end of the second coil unit is electrically coupled to the second position at which an outside neutral wire is coupled to the neutral bus bar.

[0009] In yet another aspect, the invention is an electrical power distribution unit that includes an electrical power distribution box, which includes a neutral bus bar. A plurality of inside neutral wires is coupled to the neutral bus bar between a first position and an opposite second position. An outside neutral wire is coupled to the neutral bus bar adjacent to the second position. A first coil unit includes a first conductive wire coil having a first end and an opposite second end. The conductive coil is disposed in a first non-conductive tube and is suspended in a ferrous matrix. The second end of the first coil unit is electrically coupled to the neutral bus bar at the first position. A second coil unit includes a second conductive wire coil having a first end and an opposite second end. The first end of the second coil unit is electrically coupled to the first end of the first coil unit. The second coil unit is disposed in a second non-conductive tube and is surrounded by a non-conductive material. The second end of the second coil unit is electrically coupled to adjacent to the second position. The first coil unit and the second coil unit are both disposed in a housing. The housing is filled with an insulating material.

[0010] These and other aspects of the invention will become apparent from the following description of the preferred embodiments taken in conjunction with the following drawings. As would be obvious to one skilled in the art, many variations and modifications of the invention may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWINGS

[0011] FIG. **1** is a schematic diagram of an embodiment of an electromotive rectification system.

[0012] FIG. **2** is a schematic diagram of an embodiment of an electromotive rectification system coupled to an electric power distribution panel.

[0013] FIG. **3** is a schematic diagram of an embodiment of an electromotive rectification system integrated with an electric power distribution panel.

[0014] FIG. **4** is a schematic diagram of an alternate embodiment of a first coil unit.

[0015] FIG. **5**A is a graph showing power consumption recorded at a breaker box connected to a single appliance operating over time without the invention being employed.

[0016] FIG. **5**B is a graph showing power consumption recorded at a breaker box connected to a single appliance operating over time with the invention being employed.

DETAILED DESCRIPTION OF THE INVENTION

[0017] A preferred embodiment of the invention is now described in detail. Referring to the drawings, like numbers indicate like parts throughout the views. Unless otherwise specifically indicated in the disclosure that follows, the drawings are not necessarily drawn to scale. As used in the description herein and throughout the claims, the following terms take the meanings explicitly associated herein, unless the context clearly dictates otherwise: the meaning of "an," and "the" includes plural reference, the meaning of "in" includes "in" and "on."

[0018] As shown in FIG. **1**, one representative embodiment of a electromotive rectification system **100** includes a housing **110**, preferably made of a conductive material such as a metal that is grounded, in which is disposed a first coil unit **120** and a spaced-apart second coil unit **130**. In an alternate embodi-

ment, the housing **110** could include a non-conductive material, such as a plastic or fiberglass.

[0019] The first coil unit **120** includes a non-insulated conductive coil **122**. In a residential embodiment, the coil **122** includes a 10-gauge or a 12-gauge solid copper wire coil including about 13 to 14 turns and having an inside diameter of about 5/16 inches. A first contact **128** extends from the housing **110**. The coil **122** is disposed in a non-conductive tube **124**, such as a poly-vinyl chloride (PVC) tube **124** and is suspended in micro-scale ferrous filings **126**.

[0020] The second coil unit **130** includes an insulated conductive coil **132**. In a residential embodiment, the coil **132** includes a 10-gauge or a 12-gauge solid copper or aluminum wire coil including about 13 to 14 turns and having an inside diameter of about 5/16 inches. A second contact **138** extends from the housing **110**. The coil **132** is disposed in a non-conductive tube, such as a poly-vinyl chloride (PVC) tube **134** and is suspended in air **136** or another insulating medium.

[0021] While the first coil unit **120** and the second coil unit **130** are shown being disposed in parallel in the housing **110**, the relative orientation of these units is not important. The coil units **120** and **130** may be suspended in an insulating material **112**, such as epoxy, to provide mechanical stability to the units.

[0022] As shown in FIG. **2**, the electromotive rectification system **100** is coupled to a breaker panel **200** (sometimes referred to as an "electric power distribution panel"). The breaker panel **200** would typically include several inside power cables **202**, each including a hot wire **212**, a ground wire **214** and a neutral wire **216**. Each hot wire **212** is coupled to a breaker **210**, which is coupled to a hot power bus bar **206**. Each ground wire **214** is coupled to a ground bus bar **208** that is grounded. Each neutral wire **216** is coupled to a neutral bus bar **220**.

[0023] An outside cable **204** brings electricity from a power utility to the breaker panel **200**. The outside cable includes an outside hot wire **230** and an outside neutral wire **232**.

[0024] The first contact **128** is coupled neutral bus bar **220** at a first neutral contact **222** and the second contact **138** is coupled neutral bus bar **220** at a second neutral contact **224**. The first neutral contact **222** is electrically spaced apart from the second neutral contact **224** so that all neutral wires **216** contact the neutral bus bar **220** between the first neutral contact **222** and the second neutral contact **224**.

[0025] As shown in FIG. **3**, the electromotive rectification system **100** may be integrated with the breaker panel **200**.

[0026] As shown in FIG. **4**, in one alternate embodiment, the first coil unit **120** would not employ ferrous filings, but would employ a mag wire coil **300** that is electrically isolated from the coil **122**.

[0027] In one experimental embodiment, as shown in FIGS. **5**A-**5**A power consumption during a four minute period was recorded at a breaker box while a single household appliance was operated. The power consumption **500**, shown in FIG. **5**A, while the invention was not connected to the breaker box was about 5% greater than the power consumption **502**, shown in FIG. **5**B, while the invention was connected to the breaker box.

[0028] The above described embodiments, while including the preferred embodiment and the best mode of the invention known to the inventor at the time of filing, are given as illustrative examples only. It will be readily appreciated that many deviations may be made from the specific embodiments disclosed in this specification without departing from the spirit and scope of the invention. Accordingly, the scope of the invention is to be determined by the claims below rather than being limited to the specifically described embodiments above.

What is claimed is:

1. An AC neutral bus electromotive power rectification unit, comprising:

a. a first coil unit, including a first conductive wire coil having a first end and an opposite second end, the conductive coil disposed in a first non-conductive tube and suspended in a ferrous matrix; and

b. a second coil unit, including a second conductive wire coil having a first end and an opposite second end, the first end of the second coil unit being electrically coupled to the first end of the first coil unit, the second coil unit disposed in a second non-conductive tube and surrounded by a non-conductive material.

2. The AC neutral bus electromotive power rectification unit of claim **1**, wherein the first conductive wire coil and the second conductive wire coil each comprise between ten and fifteen turns of copper wire.

3. The AC neutral bus electromotive power rectification unit of claim **1**, wherein the ferrous matrix comprises a plurality of micro-scale ferrous filings.

4. The AC neutral bus electromotive power rectification unit of claim **1**, wherein the first non-conductive tube and the second non-conductive tube comprise poly vinyl chloride.

5. The AC neutral bus electromotive power rectification unit of claim **1**, further comprising a housing in which the first coil unit and the second coil unit are both disposed.

6. The AC neutral bus electromotive power rectification unit of claim **5**, wherein the housing is filled with an insulating material.

7. The AC neutral bus electromotive power rectification unit of claim **6**, wherein the insulating material comprises epoxy.

8. An AC neutral bus electromotive power rectification device for use with a neutral bus bar in an electrical power distribution box, in which a plurality of inside neutral wires are coupled to the neutral bus bar and in which one outside neutral wire is coupled to the neutral bus bar, comprising:

a. a first coil unit, including a first conductive wire coil having a first end and an opposite second end, the conductive coil disposed in a first non-conductive tube and suspended in a ferrous matrix, the second end of the first coil unit electrically coupled to the neutral bus bar at a first position in which every neutral wire coupled to the neutral bus bar lies between the first position and a second position at which an outside neutral wire is coupled to the neutral bus bar; and

b. a second coil unit, including a second conductive wire coil having a first end and an opposite second end, the first end of the second coil unit being electrically coupled to the first end of the first coil unit, the second coil unit disposed in a second non-conductive tube and surrounded by a non-conductive material, the second end of the second coil unit electrically coupled to the second position at which an outside neutral wire is coupled to the neutral bus bar.

9. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **8**, wherein the first conductive wire coil and the second conductive wire coil each comprise between ten and fifteen turns of copper wire.

10. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **8**, wherein the ferrous matrix comprises a plurality of micro-scale ferrous filings.

11. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **8**, wherein the first non-conductive tube and the second non-conductive tube comprise poly vinyl chloride.

12. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **8**, further comprising a housing in which the first coil unit and the second coil unit are both disposed.

13. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **12**, wherein the housing is filled with an insulating material.

14. The AC neutral bus electromotive power rectification device for use with a neutral bus bar of claim **13**, wherein the insulating material comprises epoxy.

15. An electrical power distribution unit, comprising:

a. an electrical power distribution box including a neutral bus bar, a plurality of inside neutral wires being coupled to the neutral bus bar between a first position and an opposite second position, an outside neutral wire coupled to the neutral bus bar adjacent to the second position;

b. a first coil unit, including a first conductive wire coil having a first end and an opposite second end, the conductive coil disposed in a first non-conductive tube and suspended in a ferrous matrix, the second end of the first coil unit electrically coupled to the neutral bus bar at the first position;

c. a second coil unit, including a second conductive wire coil having a first end and an opposite second end, the first end of the second coil unit being electrically coupled to the first end of the first coil unit, the second coil unit disposed in a second non-conductive tube and surrounded by a non-conductive material, the second end of the second coil unit electrically coupled to adjacent to the second position; and

d. a housing in which the first coil unit and the second coil unit are both disposed, the housing filled with an insulating material.

16. The electrical power distribution unit of claim **15**, wherein the first conductive wire coil and the second conductive wire coil each comprise between ten and fifteen turns of copper wire.

17. The electrical power distribution unit of claim **15**, wherein the ferrous matrix comprises a plurality of micro-scale ferrous filings.

18. The electrical power distribution unit of claim **15**, wherein the first non-conductive tube and the second non-conductive tube comprise poly vinyl chloride.

19. The electrical power distribution unit of claim **15**, wherein the insulating material comprises epoxy.

* * * * *