

CERTIFICATION OF TRANSLATION

I, _____Somin Kim_____, hereby declare:

That I possess knowledge of the Korean and English languages. The English Language document attached hereto, is, to the best of my knowledge and belief, a true and accurate translation of the KR19950005819 publication, also attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made of information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Signature _____

Printed Name _____Somin Kim_____

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(54) Title of Application	Contactless Charge System of Radio-telephone
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Abstract:

None.

Representative drawing:

FIG. 1

Specification

[TITLE OF THE INVENTION]

Contactless Charge System of a Radio-telephone

[DESCRIPTION OF DRAWINGS]

FIG. 1 is a block diagram of a contactless charge system of a radio-telephone according to the present invention.

FIG. 2 is a detailed circuit diagram of a contactless charge system according to an embodiment of the present invention.

FIGs. 3A and 3B are charging control flowcharts of a charger and a portable device according to the present invention.

[DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS]

The present invention relates to a charge system of a radio-telephone. More specifically, the present invention relates to a contactless charge system of a radio-telephone for charging a battery in a portable device without contact between a charger of a radio-telephone and a voltage terminal of the portable device.

Due to progress of the communication industry, current voice communication is gradually developing from wired terminal communication connected to wire communication channels to radio terminal communication using radio-telephones.

Radio-telephones may be broadly classified into portable radio-telephones for mobile communication using the radio-telephone call method and radio channels, and cordless-phones which use existing wired communication channels and wherein the cord between the hand-set and the body of the telephone has been replaced with a wireless connection.

The aforementioned radio-telephone and cordless-phone require a user to carry around a portable device capable of voice calls in order to communicate, and thus use a rechargeable battery as a power source for operating an internal electronic (electric) circuit. Thus, when a battery in a portable device is discharged to a voltage equal to or less than a predetermined level, it becomes necessary to charge the battery for smooth communication.

Ordinarily, a battery inside a portable device for making calls from a radio-telephone is charged using a charger. The charge function of a radio-telephone uses a method of transmitting power (voltage) using mechanical contact between a charge terminal of a portable device and a power transmitting terminal of a charger. That is, a battery of the portable device is charged while an electrically conductive voltage terminal connected to the battery, and a voltage output terminal of the charger, which outputs charging voltage and has a terminal spring structure, are in contact with each other.

However, as described above, a conventional circuit for charging a battery in a portable device with a voltage through mechanical (physical) contact between a power terminal of the portable device and a voltage output terminal of a charger has the following problems:

First, a power terminal of a portable device and a voltage output terminal of a charge device are formed of metal having good conductivity, and thus, the power terminals are oxidized or electrical contact is not achieved due to attachment of impurities, etc., thereby losing a charge function.

Second, when an anomaly occurs in the internal charge circuit, the current flowing inside the charge device may be output through the charging terminal, and user carelessness may result in electric shock. Third, there is the concern that the portable telephone may be damaged due to static electricity generated at the charge terminal of the charger.

Thus, an objective of the present invention is to provide a contactless charge system of a radio-telephone for charging a battery in a portable device, the system having no mechanical contact between a charger and a portable device.

Another objective of the present invention is to provide a system for charging a battery in a portable device by inductively coupling a voltage from a charger to a portable device.

Yet another objective of the present invention is to provide a contactless charge system for detecting a voltage of a rechargeable battery to control the charge between the charger and the portable device.

To achieve the above-stated objectives, the present invention comprises a charging device which comprises: a voltage switching unit that performs switching in response to a switching control signal SCTL having a predetermined period and switches and outputs a direct voltage at a certain level as an alternating voltage; and, an induced voltage generating unit which generates an induced voltage having an electromagnetic field corresponding to the alternating current output from the voltage switching unit, and a portable device in which is installed an induced voltage rectifying unit for detecting an induced voltage guided to an electromagnetic field from the induced voltage generating unit and rectifying the induced voltage to a DC voltage at a predetermined level, where the rectified output is connected to a rechargeable battery inside the portable device.

In the present invention, which is configured as explained in the foregoing, an electromagnetic field output from the induced voltage generating unit of the charging device is inductively coupled to the induced voltage rectifying unit within the portable device when the portable device is placed on the charging device. Here, the induced voltage rectifying unit in the portable device detects an induced voltage proportional to a time change ratio of a flux linkage and rectifies the detected induced voltage to a DC voltage at a predetermined level, and the rectified voltage is applied to the rechargeable battery inside the portable device. Thus, a voltage from the charge device is transferred to the battery inside the portable device for voice communication via an inductive coupling method.

Among the aforementioned components, the induced voltage generating unit corresponds to a charge voltage generating means for generating an induced voltage of an electromagnetic field corresponding to a current of the AC voltage. The induced voltage rectifying unit corresponds to an induced voltage detecting and rectifying unit for detecting an induced voltage of the electromagnetic field and rectifying the same to a DC voltage at a predetermined level, and alternatives to such operation will become self-evident through the following explanation of operation.

Hereinafter, the operation of an embodiment of the present invention will be described in detail with reference to the accompanying drawings.

FIG. 1 is a block diagram of a contactless charge system of a radio-telephone according to the present invention and shows an embodiment of a cordless radio-telephone in which a base unit 12 is connected to a wired channel, that is, a telephone line 14, and a radio channel is formed between the base unit 12 and a portable device (Hand-set Unit) 18 to perform radio communication between the base unit 12 and the portable device 18.

In the operation of the present embodiment of the present invention, an example of a radio-telephone comprised of a base unit 12 and a portable device 18 as that shown in FIG. 1 will be explained, however the same operation also applies to a mobile communication radio-telephone for radio-telephone calls using a radio channel. For example, when the portable device 18 is a mobile-phone for transmitting and receiving a voice signal to and from a radio channel, a charge device comprised of a power supply 20, a power transmitter 28, and a charge switch 30 may achieve the same operation.

In FIG. 1, the base unit 12 is comprised of a line interface 22 connected to the telephone line 14, a line interface 22 interfacing with the telephone line 14 under predetermined control, a radio unit 26 for demodulating and outputting a signal of a voice band that is wave-received and modulating and wave-transmitting a signal in the received voice band, an audio and logic unit 24 that is connected between the line interface 22 and the radio unit 26 and which interfaces audio and simultaneously controls the base unit 12, a power supply 20 that regulates a voltage (above 12 VDC) at a predetermined voltage through a power line 16 and provides the regulated voltage to each unit, a charge switch 30 that is switched by the mounting of the portable device 18 to output a start charge signal, and a power transmitter 28 for generating an induced voltage in response to the switching of the charge switch 30 of a voltage from the power supply 20. Here, the induced voltage output from the power transmitter 28 refers to an electromagnetic field.

The portable device 18 is comprised of a radio unit 34 for receiving and demodulating-outputting a transmitted signal, and wave-transmitting the received signal in a voice band, an audio and logic unit 36 that processes and regenerates-outputs a signal in a voice band that is demodulated and output from the radio unit 34 and supplies the received voice signal to the radio unit 34 and simultaneously controls the portable device 18, a battery 32 for providing an operating voltage to the radio unit 34 and the audio and logic unit 36, and a contactless charging unit 38 for detecting and rectifying an induced voltage output from the power transmitter 28 in the base unit 12 and applying the induced voltage as a charge voltage of the battery 32.

Among the elements of the portable device 18, the battery 32 is a rechargeable storage battery, and the line interface 22, the audio and logic unit 24, the radio unit 26 and the power supply 20 of the base unit 12, and a receiver 34 and the audio and logic unit 36 of the portable device 18 are voice processing circuits of a general-purpose radio-telephone.

As for charging of the battery 32 of the portable device 18 configured as shown in FIG. 1, the battery may be recharged only when the portable device 18 is installed on the base unit 12 having a charge function. First, with reference to FIG. 1, an example of the operation of the present invention will now be described.

Now, when power is input to the power line 16 from outside, the power supply 20 regulates the input power and provides the same to each of the circuits 22 to 28 in the base unit 12. In such an operational state, when a portion of the

contactless charging unit 38 of the portable device 18 is mounted (positioned) on the power transmitter 28 of the base unit 12, a charge switch 30 of the base unit 12 is started (turned "on") by the mounting of the portable device 18.

The power transmitter 28 of the base unit 12 converts a voltage which is input to a line 40 into an AC voltage in response to the "on" switching of the charge switch 30, converts the AC voltage into an electromagnetic field, and outputs the same as an induced voltage. Here, the contactless charging unit 38 in the portable device 18 detects and rectifies the induced voltage that is converted and output to the electromagnetic field from the power transmitter 28 of the base unit 12, and outputs the induced voltage as a DC voltage. The voltage rectified by the contactless charging unit 38 is applied as a charge voltage for the battery 32. Thus, when the portable device 18 is installed on the base unit 12, the contactless charging unit 38 of the portable device 18 rectifies the induced voltage which is output from the power transmitter 28 of the base unit 12 to charge the battery 32.

When the portable device 18 is separated from the base unit 12, the charge switch 30 is turned "off", and in this case, the power transmitter 28 detects the "off" state of the charge switch 30 and blocks output of the induced voltage. Thus, when the portable device 18 is separated from the base unit 12, operation of the contactless charging unit 28 and the power transmitter 28 are stopped to stop charging the battery 32.

Thus, it may be seen that the power transmitter 28 in the base unit 12 corresponds to a charge voltage generating means for converting a voltage supplied from the power supply 20 into an induced voltage of an electromagnetic field and outputting the induced voltage as a charge voltage. Further, it may be seen that the contactless charging unit 38 within the portable device 18 corresponds to the induced voltage detecting and rectifying means, which detects and rectifies the induced voltage generated at the power transmitter 28, which is the means by which the charging voltage is generated, to charge the voltage of the battery 32.

FIG. 2 is a detailed circuit diagram of a contactless charge system according to an embodiment of the present invention and shows the elements of the power transmitter 28, the charge switch 30, the contactless charging unit 38, and the battery 38 of FIG. 1 in further detail.

In the drawings, 42 is a constant voltage unit for regulating a voltage input to the power line 40 and outputting the voltage as a constant voltage, and includes a regulator 62 for regulating an input power voltage (Vcc) to outputting the same as a predetermined voltage, and noise removing capacitors 58 and 60 which are connected between the input and terminal ends of the regulator 62.

44 is a voltage switching unit for switching a power voltage at a predetermined level in response to an input of a control signal SCTL with a predetermined period and converting and outputting an AC voltage. The voltage switching unit 44 includes a first transistor 64 connected between a voltage supplying line (VSL) and an alternating current line (AVL) and switched by input of a power control signal, and a second transistor 70 connected between a base and a ground of the first transistor 64, switched in response to input of a control signal (SCTL) of a predetermined period, and supplying a power control signal to the first transistor 64.

According to an embodiment of the present invention, a transistor is used as the device for switching power in response to the control signal (SCTL), but any electronic switch having the same function may be used.

46 is an induced voltage generating unit for outputting an induced voltage of an electromagnetic field corresponding to current of an AC voltage output from the voltage switching unit 44. The induced voltage generating unit 46 for generating an induced voltage of an electromagnetic field corresponding to current of an input AC voltage includes a core 76 and a coil 77 wound around the core 76 a predetermined number of times and connected between the AVL and the ground. The induced voltage generating unit 46 as configured above corresponds to an induced voltage generating means.

74 is a thermostatic switch that is switched depending on a temperature of heat generated from the induced voltage generating unit 46 and is short-circuited when an ambient temperature of the core 76 increases to a specific temperature.

48 is a first microcomputer for providing the control signal (SCTL) to a control terminal of the voltage switching unit 44 in response to input of a hand-set status signal (HSS) of the aforementioned charge switch 30, and blocking output of the control signal (SCTL) according to a heat detection signal of the thermostatic switch 74.

Reference numeral 50 is an induced voltage rectifying unit for detecting, rectifying, and outputting an induced voltage generated from the induced voltage generating unit 46 when the portable device 18 is installed on the base unit 12. The induced voltage rectifying unit 50 corresponds to an induced voltage detecting means for detecting and rectifying the induced voltage output from the induced voltage generating means inside the aforementioned charge voltage generating means. The induced voltage rectifying unit 50 includes a core 78 and a coil 79 wound around the core 78, and includes an induced voltage detecting unit 81 that is inductively coupled to the induced voltage generating unit 46, and a rectifier 80 for rectifying a voltage output from the coil 79 of the induced voltage detecting unit 81.

52 is a charging unit configured in such a way that a resistor 84 and a diode 86 are connected in series to each other between the battery 32 and an output terminal of the rectifier 80, and which outputs a charge voltage of the battery 32 using output of the rectifier 80 in one direction.

54 is a battery voltage detector and includes first and second voltage splitters 89 and 93 for comparing a voltage of an input terminal of the charging unit 52 with a voltage of an output terminal and clocking the result, and a comparator 96 for comparing outputs of the first and second voltage splitters 89 and 93 and outputting a charge state signal (VDL). In addition, 56 is a second microcomputer and is a microcomputer for controlling the portable device 18.

FIG. 3A is a flowchart of an operation of the base unit 12 of FIG. 1 and is a control flowchart of the first microcomputer 48. FIG. 3B is a flowchart of an operation of the portable device 18 and is a flowchart of an operation of the second microcomputer 56.

Hereinafter, the second operation will be described with reference to FIGs. 1, 3A, and 3B which are detailed circuit diagrams according to exemplary embodiments of the present invention, where it is assumed that the base unit 12 and the portable device 18 are separated from each other.

Now, when a DC voltage (about 12 VDC) at a predetermined level is input to the power voltage input line 16 of FIG. 1, the power supply 20 supplies the power voltage input to the line 16 to each circuit in the base unit 12. In this case, the power transmitter 28 inputs a power voltage through the line 40. The power of the line 40 may be filtered by a capacitor 58 in the constant voltage unit 42 and is input to the regulator 62. The regulator 62 (which is a model No. 78×8 regulator series according to the present invention) regulates the input voltage of 12 VDC and outputs the voltage to the power supplying line (VSL).

In the above operating state, the first microcomputer 48 in the power transmitter 28 outputs a low control signal SCTL to an output port P1 to block supply of current in operation 100 of FIG. 3A. In this case, a transistor 70 is "turned off" according to the "low" control signal (SCTL) of the first microcomputer 48, and a transistor 64, a base of which is connected to a collector of the transistor 70, is also "turned off". Thus, in an initial operation, a DC voltage of the voltage supplying line (VSL) is blocked by the transistor 64.

A first microcomputer 48 that performs an operation 100 in FIG. 3A scans an input port P3 in an operation 102 and searches for whether or not the portable device 18 is installed on the base unit 12 [whether or not the charge switch 30 is turned "on"]. A hand-set status signal (HSS) generated from a connection node of the charge switch 30 and a pull-up resistor 45 connected between the power voltage Vcc and the ground is input to the input port P3 of the first microcomputer 48.

When the portable device 18 is separated from the base unit 12, the charge switch 30 is turned "off", and when the two devices are coupled to each other, the charge switch 30 is switched "on". When the two devices are coupled to each other, the core 78 of the induced voltage detecting unit 81 installed on the contactless charging unit 38 in the portable device 18 is positioned on an opposite surface of the core 76 of the induced voltage generating unit 46 in the power transmitter 28 and is space-coupled thereto. Thus, when the two devices are coupled to each other, the induced voltage generating unit 46 of the power transmitter 28 and the induced voltage detecting unit 81 of the contactless charging unit 38 are inductively coupled to each other in the manner that primary and secondary circuits of a general transformer are inductively coupled to each other.

In operation 102 above, if the logic of the hand-set status signal (HSS) input to the input port P3 is "high", the charge switch 30 is determined to be "off" and the aforementioned operation 100 is re-performed. In the above state, according to a user action, when the portable device 18 is installed on the base unit 12, the charge switch 30 is switched "on" according to mechanical input. In this case, the logic of the hand-set status signal (HSS) may be transitioned to "low" from "high". According to the above operation, when the logic of the input port P3 of the first microcomputer 48 is "low", the first microcomputer 48 recognizes the portable device 18 as installed on the base unit 12 in order to initiate charging.

The first microcomputer 48 that recognizes a charge initiation state outputs a control signal SCTL having a period of about 10 KHZ to the output port P1 during an operation 104 and outputs power information indicating a charge state to the line 49. In this case, the power information of the line 49 is applied to the audio and logic unit 24, and power information applied to the audio and logic unit 24 is modulated by the radio unit 26 and is wirelessly transmitted to the portable device 18. The radio unit 34 of the portable device 18 demodulates the spread power information and inputs the information to the audio and logic unit 36 in the portable device 18. The audio and logic unit 36 in the portable device 18 that receives the power information signal inputs the received power information to the second microcomputer 56 in the contactless charging unit 38 through the line 37.

The second microcomputer 56 that receives the power information transmitted from the first microcomputer 48 of the base unit 12 reads the output VDL of the comparator 96 and searches for whether or not a charge voltage of the battery 32 is normal in an operation 120 of FIG. 3B. The control signal (SCTL) output from the output port P1 is applied to a base of the transistor 70 through a resistor 72 and switches "on/off" the transistor 70 around ten thousand times per second. In this case, a potential of a collector terminal of the transistor 70 is switched between "low" and "high" depending on a period of the control signal (SCTL), and the signal is applied to a base of the transistor 64. Thus, when the control signal (SCTL) having a period of about 10 KHZ is output from the output port P1 of the first microcomputer 48, AC power having a period of about 10 KHZ is generated from a collector of the transistor 64. The AC voltage of 10 KHZ generated from the collector of the transistor 64 is applied to the coil 77 wound in the induced voltage generating unit 46 through the alternating current line (AVL). When current of an AC voltage that alternates with a period of 10 KHZ flows in the coil 77, an electromagnetic field is generated around the coil 77, and a portion of a magnetic line of force is linked with the coil 79 wound around the core 78 in the induced voltage detecting unit 81.

In this case, AC flowing in the coil 77 in the induced voltage generating unit 46 changes over time, and thus, an AC voltage depending on a time change ratio of flux linkage is induced at both terminals of the coil 79 in the induced voltage detecting unit 81. That is, according to the principle of inductive coupling, an AC voltage in the coil 77 is inductively output to opposite ends of the coil 79 in the induced voltage detecting unit 81. The AC voltage output from the opposite terminals of the coil 79 is applied to an AC voltage terminal of a bridge diode 80, and is output with full-wave rectification. The DC voltage which is full-wave rectified at the bridge diode 80 is smoothened out by a capacitor 82 and is output as a ripple current voltage (IDC).

In this case, the rectified voltage IDC is input to a first voltage splitter 89, simultaneously limited to a predetermined level through the resistor 84 and the diode 86, then applied to the battery 32. That is, the battery 32 is charged. In the above case, the resistor 84 is a current limiter resistor, and the diode 86 is a diode for preventing countercurrent when the voltage IDC is lower than a voltage of the battery 32.

The first voltage splitter 89 for inputting the rectified voltage IDC splits the voltage IDC into a reference voltage V1 at a predetermined level using internal resistors 88 and 90, and inputs the voltage to an inverse terminal (-) of the comparator 46. A charge level detection voltage V2 from a split voltage circuit 93 which is connected between the cathode and ground of the diode 86 and which splits and detects the voltage of an output node of the charging unit 52 is applied to the non-inverting terminal (+) of the comparator 96. In this case, the reference voltage V1 is constant and the charge level detection voltage V2 varies depending on a charge voltage level of the battery 32. Thus, when the first microcomputer 48 outputs the control signal (SCTL) of 10 KHZ to an output port P1, a charge voltage via inductive coupling between the induced voltage generating unit 46 and the induced voltage detecting unit 81 is applied to the battery 32 to initiate charge of the battery 32.

Meanwhile, the first microcomputer 48 which has performed the aforementioned operation 104 of FIG. 3A reads a state signal of the thermostatic switch 74 which is input to input port P2, and searches for whether or not the temperature is normal. In this case, the thermostatic switch 74 is a switch that is switched by detecting heat generated by the induced voltage generating unit 46. When the induced voltage generating unit 46 is overloaded, the temperature increases to a predetermined temperature, causing the internal switch to be opened. When the thermostatic switch 74 is opened, the input port P2 of the first microcomputer 48 is converted to a "high" state level from "low".

In the course of operation 106, the first microcomputer 48 searches for the output status of the thermostatic switch 74 whose operation is as described above, and when an input signal of the port P2 is "low", the temperature is determined to be normal, and when the input signal of the port P2 is "high", the temperature is determined to be abnormal. If the result of the search in operation 106 is an abnormal temperature (overheated temperature), the first microcomputer 48 jumps to operation 112 to block the control signal (SCTL) of 10 KHZ which is output to the output port P1. When the control signal (SCTL) is blocked, both the transistors 64 and 70 with respect to the voltage switching unit 44 are switched "off" to block a voltage of the AC line (AVL).

When the temperature is determined to be normal in operation 106, the first microcomputer 48 scans the input port P3 and searches for the status of the charge switch 30 in the process of operation 108. In operation 108, when the charge switch 30 is switched "off" and the hand-set status signal (HSS) is input as "high", the portable device 18 is determined to be separated and the aforementioned operation 112 is performed. In operation 108, when the charge switch 30 is turned "on", the first microcomputer 48 analyzes the data input to line 49 in operation 110 and searches whether or not the portable device is normal. In this case, the data input to the line 49 is input as data that is wirelessly transmitted from the portable device 18 when the battery 32 is completely charged. If analysis of input data in operation 110 indicates the portable device is abnormal (i.e. charge is incomplete), the first microcomputer 48 jumps to the aforementioned step 106 to continuously generate a charge voltage, and when the portable device is normal, the first microcomputer 48 jumps to operation 112 to stop charging.

When a charge level of the battery 32 is increased through the aforementioned operation, the charge level detection voltage V2 of a second voltage splitter 93 increases, and when the detection voltage V2 becomes higher than the reference voltage V1, the output VDL of the comparator 96 is transitioned to logic "high" from logic "low" and is input to the second microcomputer 56.

Here, in the aforementioned operation 120 of FIG. 3B, the second microcomputer 56 that scans the output VDL of the comparator 96 and searches for whether or not the charge voltage is normal determines that the charge voltage of the battery 32 is normal. That is, a voltage of the battery 32 is determined to be completely charged to a set voltage level, and a charge completion alarm signal is output through line 37 in operation 122. The charge completion alarm signal through line 37 is transmitted to the base unit 12 through the audio and logic unit 36 and the radio unit 34, and the radio unit 25 and the audio and logic unit 24 of the base unit 12 receive and demodulate the signal and input the signal to the first microcomputer 48 through the line 49. The first microcomputer 48 that receives a data signal through the line 49 determines that the charge completion signal is received from the portable device 18 in the aforementioned operation 110 of FIG. 3A (the portable device is normal), and performs operation 112.

Thus, in the present invention according to the above embodiments, a battery begins to be charged from a time point when the portable device 18 operated at an operating voltage of the battery is installed on the base unit 12, and the charge operation may be automatically stopped either by communication between devices or overheating of the devices.

As described above, according to the present invention, a battery may be charged with a voltage through a configuration based on inductive coupling, thereby preventing loss of charge function, which may occur in a charging method involving electric contacts, and preventing risk of electric shock, allowing for stable charging.

(57) Claims

Claim 1. A contactless charge system for a radio-telephone capable of radio communication using voltage from a battery, comprising a portable device including:

a charge voltage generating means which generates an induced voltage of an electromagnetic field corresponding an alternating current input with a predetermined period; and

an induced voltage detection rectifier installed on the charge voltage generating means and inductively coupled thereto, and configured to detect the generated induced voltage of the electromagnetic field and rectify the voltage to a predetermined level, then provides the rectified voltage as a charge voltage of the battery,

characterized in that when the portable device is installed on the charge voltage generating means, the battery is charged by via inductive coupling using a voltage obtained by detecting and rectifying the induced voltage of the electromagnetic field.

Claim 2. The charge system for a radio-telephone of Claim 1, wherein the charge voltage generating means includes a voltage switch switched in response to input of a control signal SCTL with a predetermined periodicity and which converts

and outputs a DC voltage at a predetermined level as an AC voltage, and an induced voltage generating means which generates an inductive voltage of an electromagnetic field corresponding to an alternating voltage current output from the voltage switch.

Claim 3. The contactless charge system for a radio-telephone of Claim 2, wherein the induced voltage detecting and rectifying means includes an induced voltage detecting means which detects as a pulse voltage an induced voltage of an electromagnetic field generated by the induced voltage generating means, and a rectifier which rectifies the pulse voltage detected from the induced voltage detecting means and provides the voltage as a charge voltage for the battery.

Claim 4. The contactless charge system for a radio-telephone of Claim 2, wherein the voltage switch includes a first switch which switches the DC voltage at a predetermined level in response to input of a switching signal and inputs AC voltage to the induced voltage generating means, and a second switch which provides a switching control signal to the first switch in response to input of the control SCTL with a predetermined period.

Claim 5. The contactless charge system for a radio-telephone of any one of Claims 2, 3, or 4, wherein the induced voltage generating means includes a core 76 and a coil 77 wound around the core 76 a predetermined number of times and connected to a voltage output terminal of the voltage switch, and is characterized in that it generates a magnetic flux line of an electromagnetic field corresponding to the input alternating voltage current as an induced voltage.

Claim 6. The contactless charge system for a radio-telephone of Claim 5, wherein the induced voltage detecting means includes a core 78 and a coil 79 wound around the core 78 a predetermined number of times, and is characterized in that it is linked with the magnetic flux line from the coil 77, and in that it inputs to the rectifier an AC voltage proportional to a time change ratio of the flux linkage.

Claim 7. A contactless charge system for a radio-telephone capable of radio communication using voltage from a battery, comprising :

a charge voltage generating device including a charge control pulse generator which generates a pulse sequence with a predetermined period in response to input of a charge initiation signal, a voltage switch which converts and outputs a DC voltage at a predetermined level into an AC voltage in response to input of the generated pulse sequence, and a voltage generator which generates a charge voltage of an electromagnetic field corresponding to the AC current; and

a portable voice communication device which is installed on the charge voltage generating device and inductively coupled thereto, and which includes a charge voltage detector which detects the charge voltage of the generated electromagnetic field and rectifies the same to a voltage at a predetermined level, and which provides the rectified voltage as a charge voltage of the battery,

and characterized in that when the portable device is installed on the charge voltage generating means, the battery is charged by an induced voltage via inductive coupling.

Claim 8. The contactless charge system for a radio-telephone of Claim 7, wherein the charge voltage generating means further comprises a charge switch that is switched when the portable device is installed on the charge voltage generating means and generates the charge initiation control signal, and is characterized in the charge voltage is generated only when the portable device is installed.

Claim 9. The contactless charge system for a radio-telephone of Claim 8, characterized in that it further comprises a temperature-sensitive pulse controller which outputs a pulse output blocking control signal to the charge control pulse generator to block generation of the charge voltage in response the temperature of the charge voltage generating means rising to a preset temperature.

Claim 10. The contactless charge system for a radio-telephone of Claim 9, characterized in that the charge voltage detector includes a voltage detector which detects as a pulse voltage a charge voltage of an electromagnetic field generated from the charge voltage generating means, and a rectifier which rectifies the pulse voltage detected from the voltage detector and provides the voltage as a charge voltage of the battery.

Claim 11. The contactless charge system for a radio-telephone of Claim 9, characterized in that the voltage switch includes a first switch which switches the DC voltage at a predetermined level in response to a switching signal input and provides an AC voltage to the voltage generator, and a second switch which provides a switching control signal to the first switch in response to input of the control signal SCTL with a predetermined period.

Claim 12. The contactless charge system for a radio-telephone of any one of Claims 10 and 11, characterized in that the voltage generator includes a core 76 and a coil 77 wound around the core 76 a predetermined number of times and connected to a voltage output terminal of the voltage switch, and generates a magnetic flux line of an electromagnetic field corresponding to the current of the input AC voltage.

Claim 13. The contactless charge system for a radio-telephone of Claim 12, wherein the charge voltage detector includes an induced voltage detecting means that includes a core 78 and a coil 79 wound around the core 78 a predetermined number of times, is linked with the magnetic flux line from the coil 77, and detects an AC voltage proportional to a time change ratio of the flux linkage, and a rectifier connected between the induced voltage detecting means and the battery which rectifies the detected AC voltage and supplies the AC voltage to the battery.

Claim 14. A contactless charge system for a cordless radio-telephone, the system including a base unit connected to a telephone line and a portable device with integrated battery, wherein:

the base unit is comprised of a first transmission and reception device operated by an operating voltage at a predetermined level, and which wirelessly transmits a signal from the telephone line and transmits wave-received signals through the telephone line; and a charge voltage generating means which generates an induced voltage of an electromagnetic field corresponding to input of the operating voltage at a predetermined level; and,

the portable device is comprised of a second transmission and reception device operated by the voltage of the battery and which transmits and receives voice signals through the telephone line through wireless communication with the

base unit; and an induced voltage detecting means which detects and rectifies the induced voltage of the electromagnetic field and provides the same as a charge voltage of the battery,

and the system is characterized in that when the portable device is mounted on the base unit, the charge voltage generating means and the induced voltage detecting means are inductively coupled, so that the induced voltage from the charge voltage generating means is detected by the induced voltage detecting means and converted into a DC voltage at a predetermined level which charges the battery.

Drawings
FIG. 1

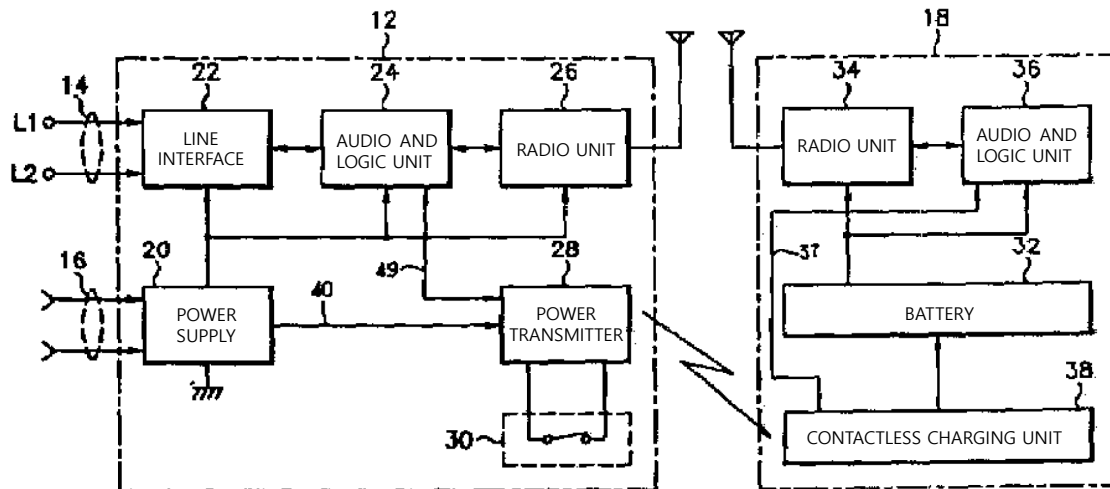


FIG. 2

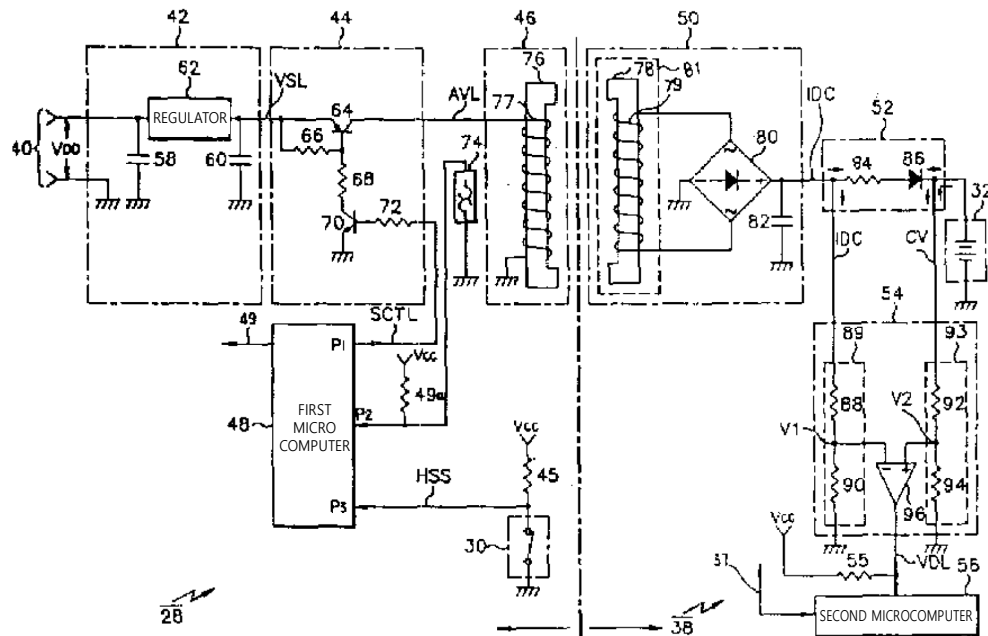


FIG. 3A

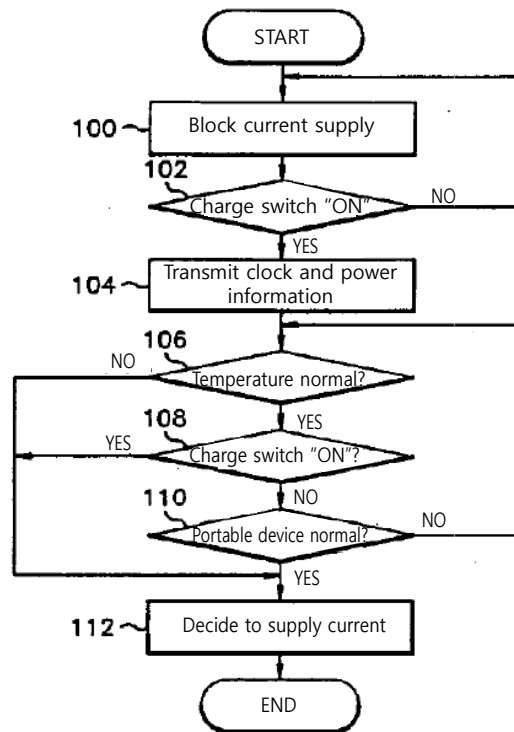


FIG. 3B

