

Exhibit F-1

Invalidity of U.S. Patent No. 9,048,696 in view of US2008/0079392A1 (“’392 Baarman”)

As described in detail below, **’392 Baarman** anticipates and/or renders obvious claims 1-7, 9-11, and 14 (the “Asserted Claims”) of U.S. Patent No. 9,048,696 (“the ’696 Patent”) under 35 U.S.C. §102 and/or §103, either alone or in combination with other prior art references, and/or in combination with the knowledge of a person of ordinary skill. This invalidity claim chart is based on Defendant Anker’s present understanding of the Asserted Claims and Plaintiff Powermat Technologies Ltd. (“Powermat”) apparent construction of the Asserted Claims in its Preliminary Infringement Contentions (“Infringement Contentions”).

’392 Baarman was originally filed on September 14, 2007, and published on April 4, 2008, and thus is available as prior art at least under pre-AIA 35 USC §§ 102 and/or 103. In addition, the following secondary references (collectively the “**Secondary Refs**”) are available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103. U.S. Patent No. 5,536,979 (“’979 McEachern”) was issued July 16, 1996, and thus is also available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103. Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) was published as of February 2004, and thus is also available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103. U.S. Patent No. 2007/0236169 (“’169 Purdy”) was filed on June 14, 2007, and thus is also available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103. U.S. Patent No. 7,106,078 (“’078 Frank”) was issued September 12, 2006, and thus is also available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103. Digital Systems, Principles and Applications, 10th Edition (“Tocci”) was published as of January 1, 2006, and this is also available as prior art under at least pre-AIA 35 USC §§ 102 and/or 103.

The following invalidity chart includes references to the structure, function, operation, and/or features of the technology described in **’392 Baarman** and/or **Secondary Refs**. The cited portions of **’392 Baarman** and/or the **Secondary Refs** are merely illustrative, and Anker reserves the right to rely on alternative or additional evidence, including uncited portions of **’392 Baarman** and/or the **Secondary Refs**. Where the chart below states that **’392 Baarman** and/or the **Secondary Refs** “describes” or “provides for” a limitation, such disclosure may be express, inherent, or implicit. To the extent it is found **’392 Baarman** and/or the **Secondary Refs** does not expressly disclose certain limitations in the asserted claim, such limitations are inherent. Anker reserves the right to present direct evidence of the structure, function, operation, and/or features of the technology described in **’392 Baarman** and/or the **Secondary Refs** (including product samples, source code, and/or witness testimony) and/or its prior art status, and to present alternative or additional documents concerning the same as evidence that the technology described in **’392 Baarman** and/or the **Secondary Refs** anticipates and/or renders obvious the Asserted Claims of the ’696 Patent.

Although Defendant notes that there is no longer a rigid requirement regarding motivation to combine under *KSR Int’l Co. v. Teleflex Inc.*, Defendant provides the following statements regarding motivation to combine out of an overabundance of caution. 550 U.S. 398, 127 S.Ct. 1727, 1742 (2007). Multiple teachings, suggestions, and/or reasons to modify any of the references and/or to combine any two or more of the references in Exhibits 343-A through 343-G come from many sources, including the prior art (specific and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obvious to try, the nature of the problem faced, and/or knowledge possessed by one of ordinary skill. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combination represents the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry, and the desire to improve features and performance, would motivate the addition of features to systems as they become available, become less expensive, become more commonly used, provide better performance, reduce costs, size or weight, or predictably achieve other clearly desirable results.

This chart is subject to all reservations, objections, and disclaimers in Anker’s Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety. This chart may apply claim constructions that Powermat appears to use for its infringement theories with which Anker disagrees, and nothing stated herein shall be treated as an admission or suggestion that Anker agrees with Powermat regarding the scope of the Asserted Claims, Powermat’s apparent claim constructions, or the accuracy of any particular claim construction. Anker reserves all rights to challenge any of the claim terms herein under 35 U.S.C. § 112, including by arguing that they are indefinite, are not supported by the written description, and/or are not enabled. Anker further reserves all rights to amend this invalidity claim chart without leave of court pursuant to the Court’s Scheduling Order, or upon a showing of good cause.

Claim	Limitation	
Claim 1		
[1.pre]	An inductive power outlet operable to transfer power to an inductive power receiver, said inductive power outlet comprising:	'392 Baarman discloses an inductive power outlet operable to transfer power to an inductive power receiver. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at Abstract. “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” ’392 Baarman at [0011]. “An inductive charging system in accordance with an embodiment of the present invention is shown in FIG. 2. The inductive charging system 4 is configured to inductively charge a battery having a nonlinear charging profile, such as a Li-Ion battery.” ’392 Baarman at [0032]. To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
[1.a]	a platform for supporting said inductive	'392 Baarman discloses a platform for supporting said inductive power receiver. For example: “Charging of batteries with an inductive power supply is well-known. Inductive charging of batteries for electric automobiles as well as the charging of small electric appliance batteries such as those for toothbrushes has met some amount of success. Because inductive charging does not require a physical connection between

	power receiver;	the battery and the charger, the charging is considerably more convenient. However, not all batteries are easily charged inductively. Lithium-ion batteries (Li-Ion) are one such type of battery.” ’392 Baarman at [0001]. “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at Abstract. “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” ’392 Baarman at [0011]. “An inductive charging system in accordance with an embodiment of the present invention in shown in FIG. 2. The inductive charging system 4 is configured to inductively charge a battery having a nonlinear charging profile, such as a Li-Ion battery.” ’392 Baarman at [0032]. To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
[1.b]	at least one primary inductive coil embedded in said platform;	’392 Baarman discloses at least one primary inductive coil embedded in said platform. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at Abstract. “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a

		secondary circuit for inductively receiving the charging power and applying that power to a battery.” ’392 Baarman at [0011]. “An inductive charging system in accordance with an embodiment of the present invention in shown in FIG. 2. The inductive charging system 4 is configured to inductively charge a battery having a nonlinear charging profile, such as a Li-Ion battery.” ’392 Baarman at [0032]. To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
[1.c]	an alignment mechanism configured to facilitate alignment between said primary inductive outlet and said inductive power receiver	’392 Baarman discloses an alignment mechanism configured to facilitate alignment between said primary inductive outlet and said inductive power receiver. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at Abstract.

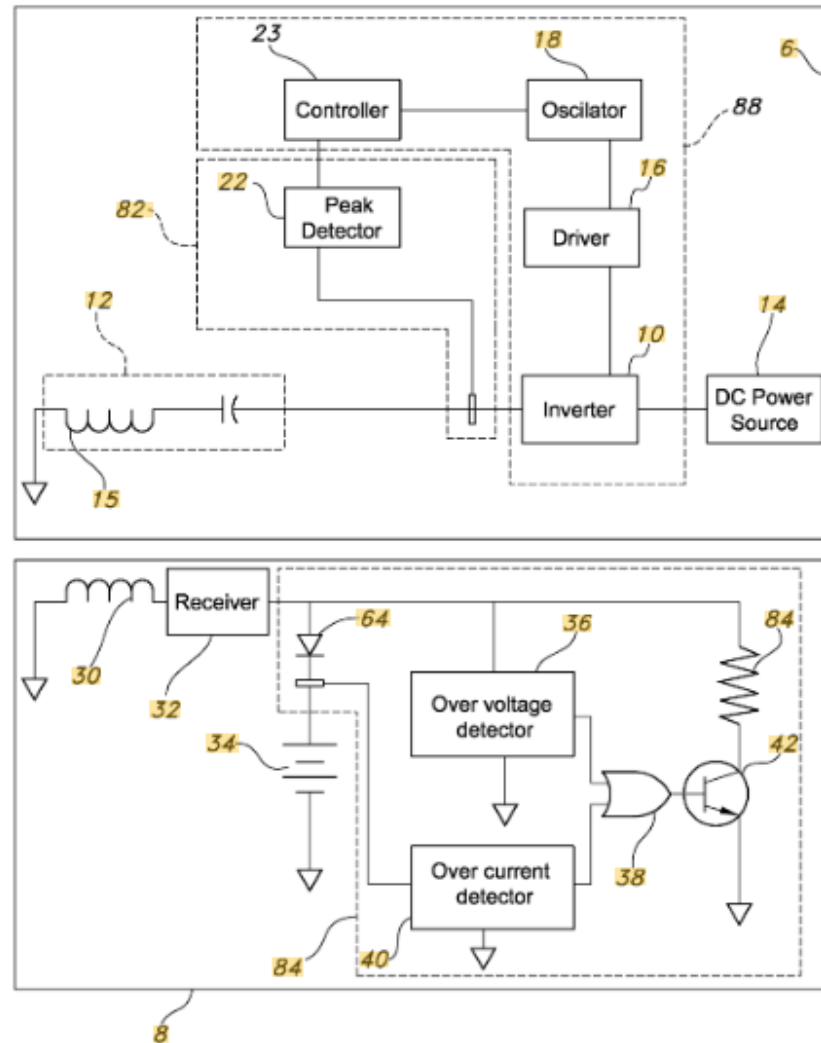


FIG. 2

Baarman at Fig. 2.

	“An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at Abstract. “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” ’392 Baarman at [0011]. “The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at [0011]. “In another aspect, the present invention also provides a method for operating an inductive charging system having a charger circuit with a primary coil and a secondary circuit with a secondary coil. The method generally includes the steps of detecting whether a battery is present in the secondary circuit and charging the battery by way of one or more charging cycles. The charging step generally includes the steps of: applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit. In this way, the frequency of the power applied to the primary coil is changed in order to optimize the charging for the battery. Several charging cycles may be necessary to fully charge the battery.” ’392 Baarman at [0016]. “The charger circuit 6 generally includes a primary coil 15, a frequency controller 80 for applying power to the primary coil at a desired frequency and a feedback detector 82 for receiving feedback from the secondary circuit 8.” ’392 Baarman at [0032]. “The driver 16 in turn operates at a frequency set by the oscillator 18. The oscillator 18 is, in turn, controlled by the controller 20.” ’392 Baarman at [0033].
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“In the illustrated embodiment, the primary coil 15 and the secondary coil 30 are loosely coupled. Because the two are loosely coupled in this embodiment, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled. An exemplary power transfer curve for the coils 15, 30 is shown in FIG. 3. In this embodiment, the power transfer is highest when the inverter 10 is operating at resonance.” ’392 Baarman at [0038].

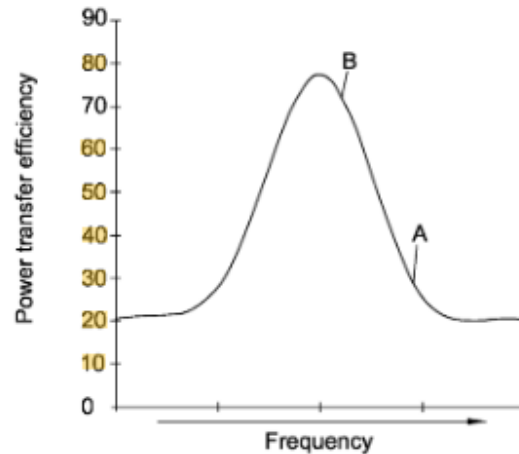


FIG. 3

’392 Baarman at Fig. 3.

To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.

For example, Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) discloses an alignment mechanism configured to facilitate alignment between said primary inductive outlet and said inductive power receiver.

		“Abstract—This paper presents the practical details involved in the design and implementation of a contactless battery charger that employs a pair of neighboring printed circuit board (PCB) windings as a contactless energy transfer device. A prototype contactless battery charger developed for application with cellular phones is used as an example to address the design considerations for the PCB windings and energy transfer circuit, plus demonstrates the performance of the contactless charger adapted to a practical application system.” Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Abstract. “More recently, an attempt [4], [5] was made to utilize the inductive coupling between two neighboring PCB windings as a means of a contactless energy transfer. In the aforementioned study, two separate PCB windings (each built on a single-sided PCB) are placed closely in parallel, as shown in Fig. 1(a), to make them function as an energy transfer device. The feasibility of a contactless energy transfer using PCB windings was reported in [4], and the idea of adapting this contactless energy transfer scheme to battery charging circuits for portable electronics was presented in [5] along with preliminary results on such an application. Fig. 1(b) shows the configuration of the contactless battery charger proposed in [5] for application to cellular phones.” Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at 140.
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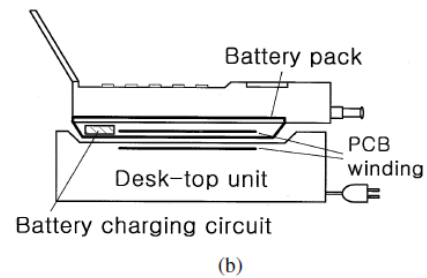
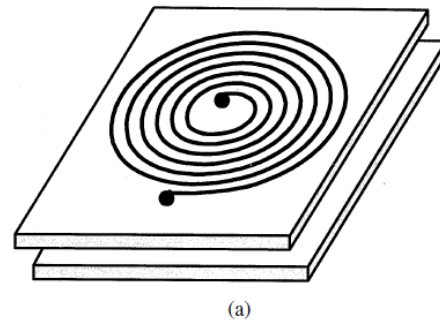
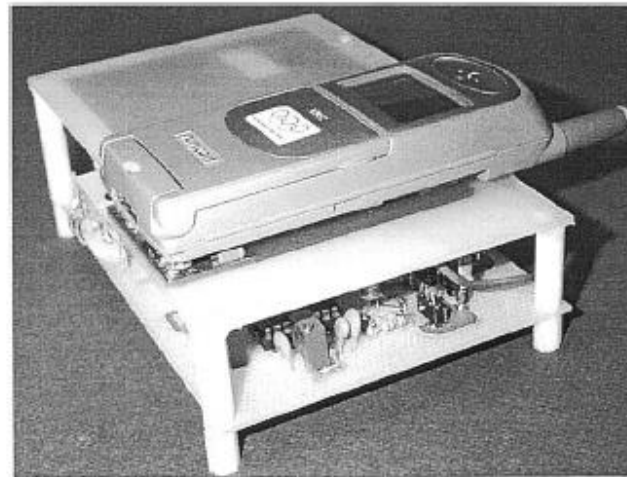
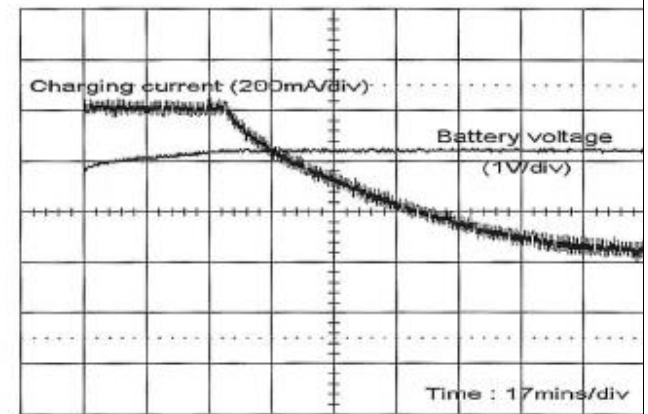


Fig. 1. Neighboring PCB windings and contactless charger for cellular phones. (a) Neighboring PCB windings. (b) Contactless charger developed for cellular phones.

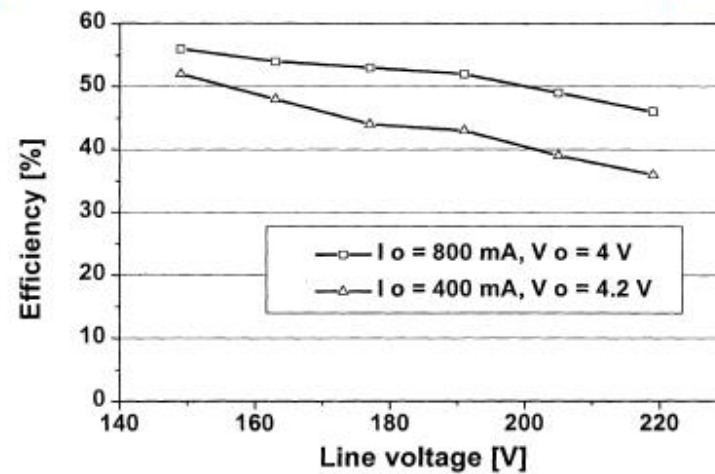
Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Fig. 1.



(a)



(b)



(c)

Fig. 9. Prototype charger and its performance. (a) Prototype charger in operation. (b) Charging profile. (c) Efficiency.

		Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Fig. 9. One of ordinary skill in the art would have been motivated to combine '392 Baarman with Choi because at the time of the alleged invention insufficient alignment of the secondary inductor with the primary inductor was a common problem with a well-known solution. In particular, common problems with maintaining the correct alignment of the secondary inductor with the primary inductor were known to persons of ordinary skill in the art, and using an alignment mechanism to maintain the correct alignment and improve the efficiency of the inductive transfer system was a well-known solution to achieve improved performance. One such known method being to provide an alignment mechanism configured to facilitate alignment between an inductive outlet and an inductive power receiver such that an inductive couple is formed between a primary inductive coil and a secondary inductive coil.
[1.d]	such that an inductive couple is formed between said primary inductive coil and a secondary inductive coil of said inductive power receiver, said inductive couple having a	'392 Baarman discloses an inductive couple is formed between said primary inductive coil and a secondary inductive coil of said inductive power receiver, said inductive couple having a characteristic resonant frequency. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at Abstract. “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” '392 Baarman at [0011]. “The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at [0011].

	characteristic resonant frequency; and	“In another aspect, the present invention also provides a method for operating an inductive charging system having a charger circuit with a primary coil and a secondary circuit with a secondary coil. The method generally includes the steps of detecting whether a battery is present in the secondary circuit and charging the battery by way of one or more charging cycles. The charging step generally includes the steps of: applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit. In this way, the frequency of the power applied to the primary coil is changed in order to optimize the charging for the battery. Several charging cycles may be necessary to fully charge the battery.” ’392 Baarman at [0016]. “The charger circuit 6 generally includes a primary coil 15, a frequency controller 80 for applying power to the primary coil at a desired frequency and a feedback detector 82 for receiving feedback from the secondary circuit 8.” ’392 Baarman at [0032]. “The driver 16 in turn operates at a frequency set by the oscillator 18. The oscillator 18 is, in turn, controlled by the controller 20.” ’392 Baarman at [0033]. “In the illustrated embodiment, the primary coil 15 and the secondary coil 30 are loosely coupled. Because the two are loosely coupled in this embodiment, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled. An exemplary power transfer curve for the coils 15, 30 is shown in FIG. 3. In this embodiment, the power transfer is highest when the inverter 10 is operating at resonance.” ’392 Baarman at [0038].
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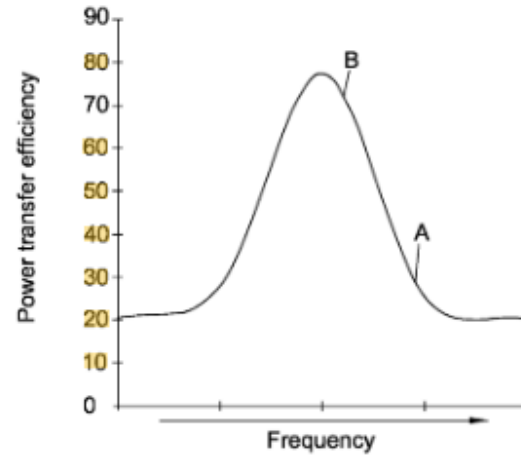


FIG. 3

'392 Baarman at Fig. 3.

To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.

For example, Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) discloses an alignment mechanism configured to facilitate alignment between said primary inductive outlet and said inductive power receiver.

“Abstract—This paper presents the practical details involved in the design and implementation of a contactless battery charger that employs a pair of neighboring printed circuit board (PCB) windings as a contactless energy transfer device. A prototype contactless battery charger developed for application with cellular phones is used as an example to address the design considerations for the PCB windings and energy transfer circuit, plus demonstrates the performance of the contactless charger adapted to a practical

		application system.” Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Abstract. “More recently, an attempt [4], [5] was made to utilize the inductive coupling between two neighboring PCB windings as a means of a contactless energy transfer. In the aforementioned study, two separate PCB windings (each built on a single-sided PCB) are placed closely in parallel, as shown in Fig. 1(a), to make them function as an energy transfer device. The feasibility of a contactless energy transfer using PCB windings was reported in [4], and the idea of adapting this contactless energy transfer scheme to battery charging circuits for portable electronics was presented in [5] along with preliminary results on such an application. Fig. 1(b) shows the configuration of the contactless battery charger proposed in [5] for application to cellular phones. The desk-top unit, i.e., the primary side of the charger, contains the primary PCB winding along with associated electronics, while the secondary side of the charger consists of the secondary PCB winding, a battery charging circuit, and lithium-ion battery. The inductive coupling between these two paralleled PCB windings, one on top of the desk-top unit and the other on the bottom of the battery pack, provides a contactless energy transfer. One apparent merit of the proposed charging method is that the charger does not noticeably increase the thickness, size, or weight of the application system, thereby making it adaptable to low-profile hand-held electronics.” Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at 140.
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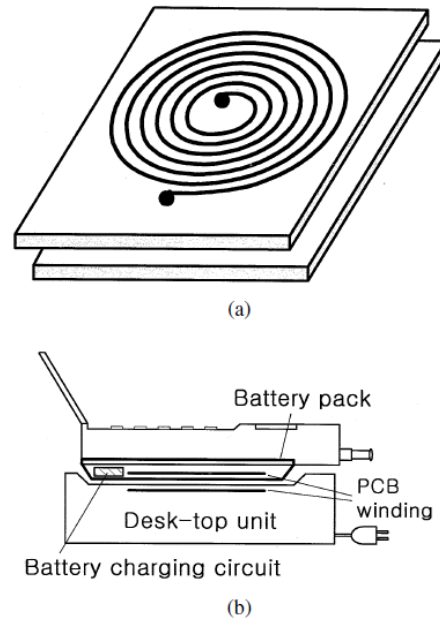


Fig. 1. Neighboring PCB windings and contactless charger for cellular phones. (a) Neighboring PCB windings. (b) Contactless charger developed for cellular phones.

Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Fig. 1.

“Fig. 3 shows a circuit model for the neighboring PCB windings. The circuit model is developed using the conventional method [11] that has been used to model magnetically coupled inductors. Referring to Fig. 3, the inductive parameter is referred to as the leakage inductance, while is called the magnetizing inductance, following the terminologies used to quantify the nonideal characteristics of conventional transformers.” Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at 142.

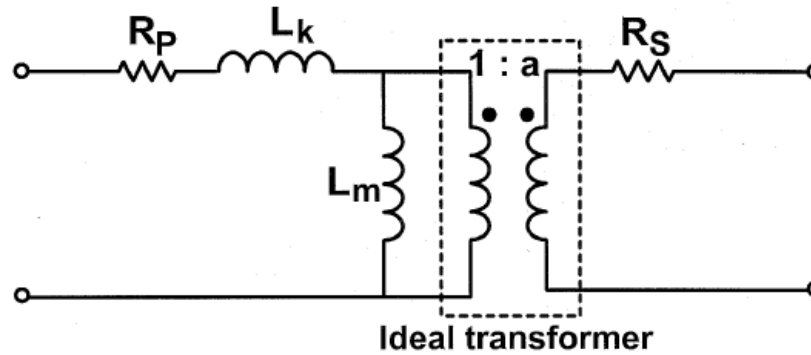
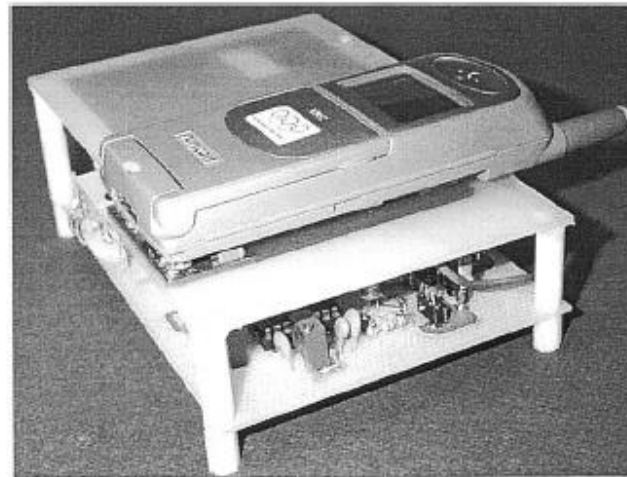
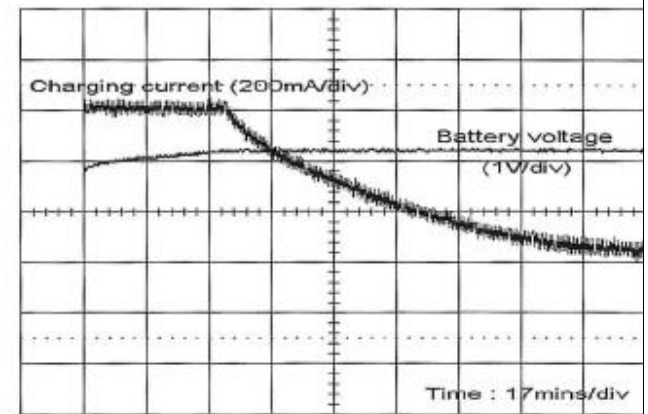


Fig. 3. Circuit model for neighboring PCB windings.

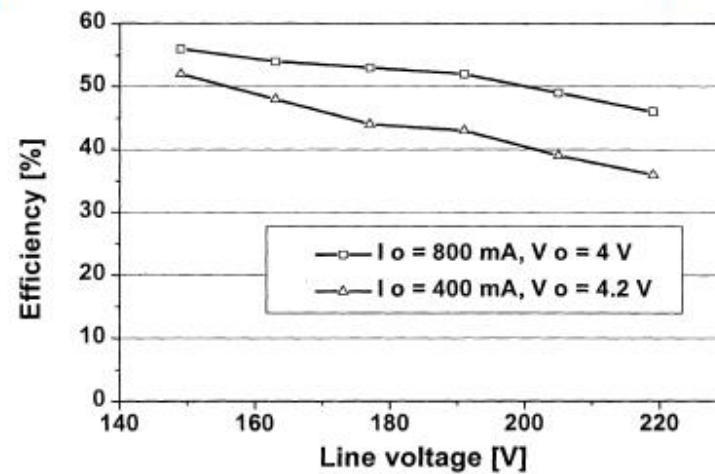
Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Fig. 3.



(a)



(b)



(c)

Fig. 9. Prototype charger and its performance. (a) Prototype charger in operation. (b) Charging profile. (c) Efficiency.

		Choi (Design and Implementation of Low-Profile Contactless battery Charger Using Planar Printed Circuit Board Windings as Energy Transfer Device) at Fig. 9. One of ordinary skill in the art would have been motivated to combine '392 Baarman with Choi because at the time of the alleged invention insufficient alignment of the secondary inductor with the primary inductor was a common problem with a well-known solution. In particular, common problems with maintaining the correct alignment of the secondary inductor with the primary inductor were known to persons of ordinary skill in the art, and using an alignment mechanism to maintain the correct alignment and improve the efficiency of the inductive transfer system was a well-known solution to achieve improved performance. One such known method being to provide an alignment mechanism configured to facilitate alignment between an inductive outlet and an inductive power receiver such that an inductive couple is formed between a primary inductive coil and a secondary inductive coil.
[1.e]	a driving circuit wired to said primary inductive coil,	'392 Baarman discloses a driving circuit wired to said primary inductive coil. For example: “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” '392 Baarman at [0011]. “The charger circuit 6 generally includes a primary coil 15, a frequency controller 80 for applying power to the primary coil at a desired frequency and a feedback detector 82 for receiving feedback from the secondary circuit 8.” '392 Baarman at [0032]. “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” '392 Baarman at [0035].

		“The output of the OR gate 38 is coupled to the switch 42. The switch 42 is controlled by the output of the OR gate 38 and is connected in series between the rectifier 32 and the resistor 44. The switch 42 could be any suitable switch such as a bipolar transistor, a field effect transistor, or an insulated gate bipolar transistor. The resistor 44 is connected in series between the switch 42 and ground.” ’392 Baarman at [0035]. “In operation, if the output of the over-voltage detector 36 or the output of the over-current detector 40 indicate an over-voltage or an over-current situation, then the output of the OR gate 38 turns on the switch 42. When the switch 42 is on, current from the rectifier 32 flows through the resistor 44 to ground.” ’392 Baarman at [0036].
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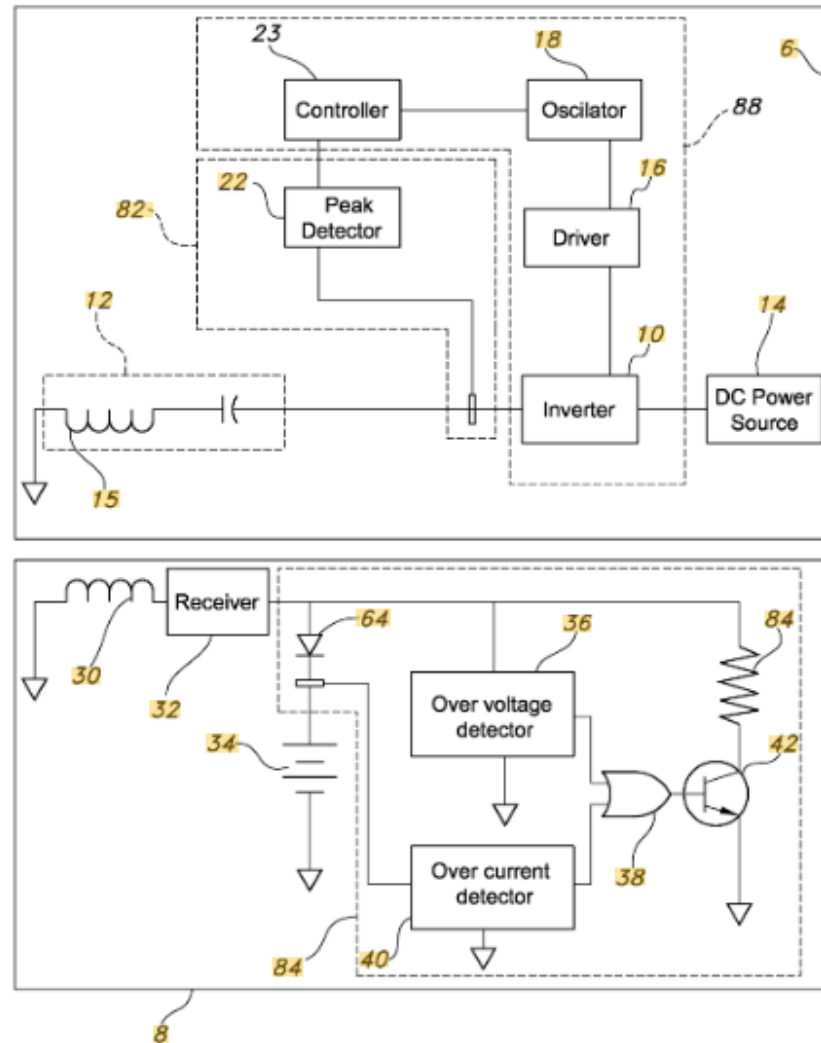


FIG. 2

Baarman at Fig. 2.

		To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
[1.f]	said driving circuit comprising a switching unit configured and operable to provide an oscillating driving voltage across said primary inductive coil such that a secondary voltage is induced in the secondary inductive coil;	'392 Baarman discloses said driving circuit comprising a switching unit configured and operable to provide an oscillating driving voltage across said primary inductive coil such that a secondary voltage is induced in the secondary inductive coil. For example: “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” '392 Baarman at [0011]. “The charger circuit 6 generally includes a primary coil 15, a frequency controller 80 for applying power to the primary coil at a desired frequency and a feedback detector 82 for receiving feedback from the secondary circuit 8.” '392 Baarman at [0032]. “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” '392 Baarman at [0035]. “The output of the OR gate 38 is coupled to the switch 42. The switch 42 is controlled by the output of the OR gate 38 and is connected in series between the rectifier 32 and the resistor 44. The switch 42 could be any suitable switch such as a bipolar transistor, a field effect transistor, or an insulated gate bipolar transistor. The resistor 44 is connected in series between the switch 42 and ground.” '392 Baarman at [0035]. “In operation, if the output of the over-voltage detector 36 or the output of the over-current detector 40 indicate an over-voltage or an over-current situation, then the output of the OR gate 38 turns on the switch 42. When

the switch 42 is on, current from the rectifier 32 flows through the resistor 44 to ground.” ’392 Baarman at [0036].

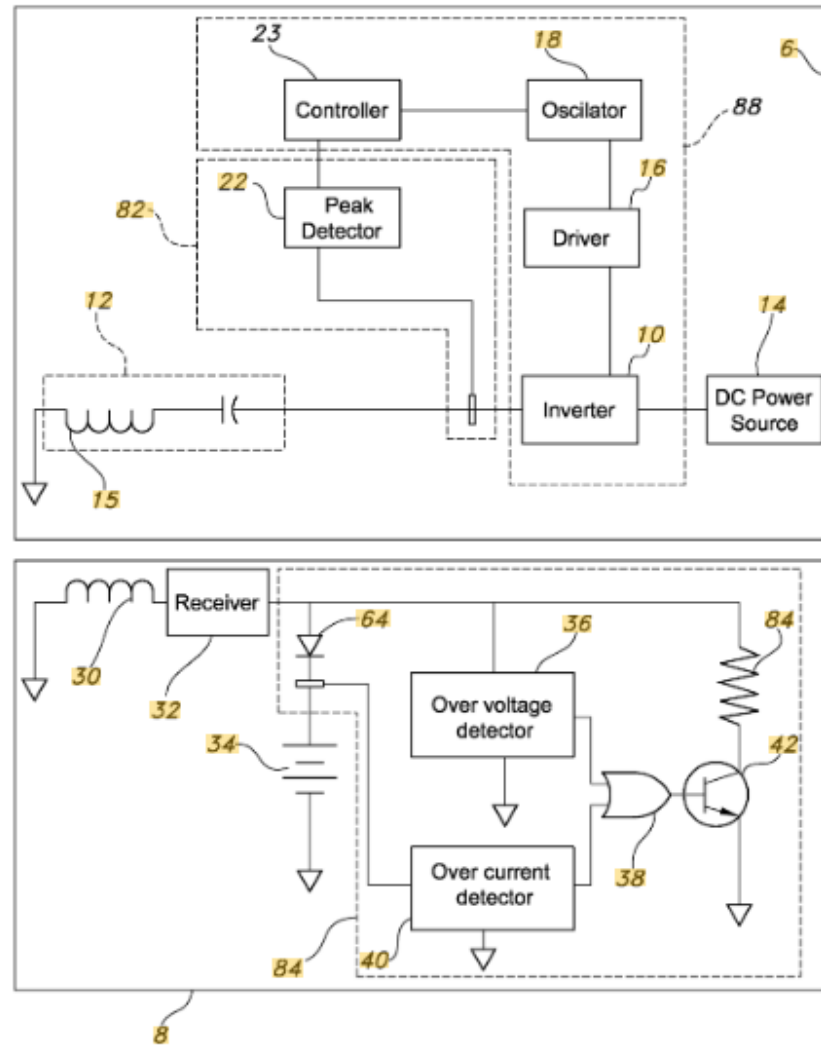


FIG. 2

		Baarman at Fig. 2. To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
[1.g]	wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.	'392 Baarman discloses the driving circuit being configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple. For example: “In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer.” '392 Baarman at [0015]. “Thus, a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred from the primary coil 15 to the secondary coil 30. As can be seen by the graph, it would be equally effective to use an operating frequency less than the resonant frequency. If so, then an increase in the operating frequency would lead to an increase in the power transfer, and vice-versa.” '392 Baarman at [0038].

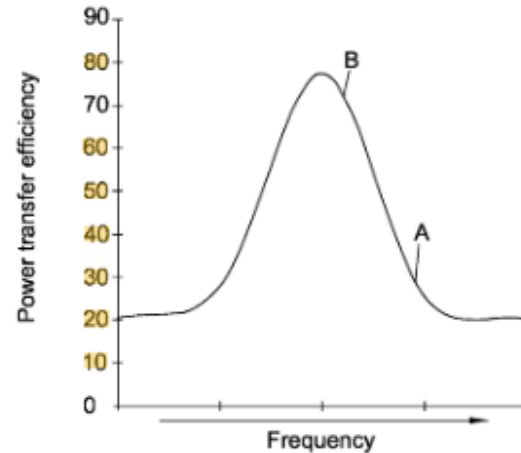


FIG. 3

'392 Baarman at Fig. 3.

“The controller 20 then determines whether a feedback signal, discussed previously, has been received. If not, then the frequency is decreased by ΔFREQ . Step 116. In this embodiment, a decrease in the frequency moves the system toward resonance, and therefore increases the power transfer from the charger circuit 6 to the battery 34.

ΔFREQ could be a constant, or it could be determined by obtaining the value from a lookup table indexed by the operating frequency of the inverter at the particular time ΔFREQ is used. The values selected for ΔFREQ may be frequency dependent and chosen so that if the operating frequency is reduced or increased by ΔFREQ , then the corresponding increase or decrease in current is the approximately the same for ΔFREQ s for all operating frequencies.” '392 Baarman at [0055]-[0056].

To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.

Claim 2		
[2.pre]	The inductive power outlet of claim 1 said inductive power outlet comprising a signal detector adapted to detect a first signal and a second signal, and said driver is configured to:	'392 Baarman discloses inductive power outlet comprising a signal detector adapted to detect a first signal and a second signal. For example: "In one embodiment, the feedback detector is a current sensor coupled to the primary tank circuit. In this embodiment, when the current is shunted through the feedback signaling resistor in the secondary, the current through the secondary coil increases, which varies the reflected impedance of the secondary circuit resulting in increased current through the primary coil. The increase in current through the primary coil is detected by the current sensor in the primary circuit, which could include a peak detector, thereby providing to the controller a feedback signal for detecting whether the battery is in an over-voltage or over-current state. In one embodiment, the frequency control mechanism makes appropriate adjustments to the frequency to correct the over-voltage or over-current state by reducing the power supplied to the secondary coil." '392 Baarman at [0014]. "In another aspect, the present invention also provides a method for operating an inductive charging system having a charger circuit with a primary coil and a secondary circuit with a secondary coil. The method generally includes the steps of detecting whether a battery is present in the secondary circuit and charging the battery by way of one or more charging cycles. The charging step generally includes the steps of: applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit. In this way, the frequency of the power applied to the primary coil is changed in order to optimize the charging for the battery. Several charging cycles may be necessary to fully charge the battery." '392 Baarman at [0016]. "In one embodiment, the detecting step further includes the steps of: applying a pulse of power to the primary coil at a predetermined probe frequency, sensing the reflected impedance, and determining whether a battery is present as a function of the sensed reflected impedance." '392 Baarman at [0022]. "The frequency controller 80 varies the frequency of the power applied to the primary coil 15 as a function of the feedback from the secondary circuit 8." '392 Baarman at [0032]. "In operation, the controller 20 uses signals from the peak detector 22 to assist in determining the frequency of operation for the oscillator 18, and thereby the frequency of the inverter 10." '392 Baarman at [0034].

		“As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” ’392 Baarman at [0035].
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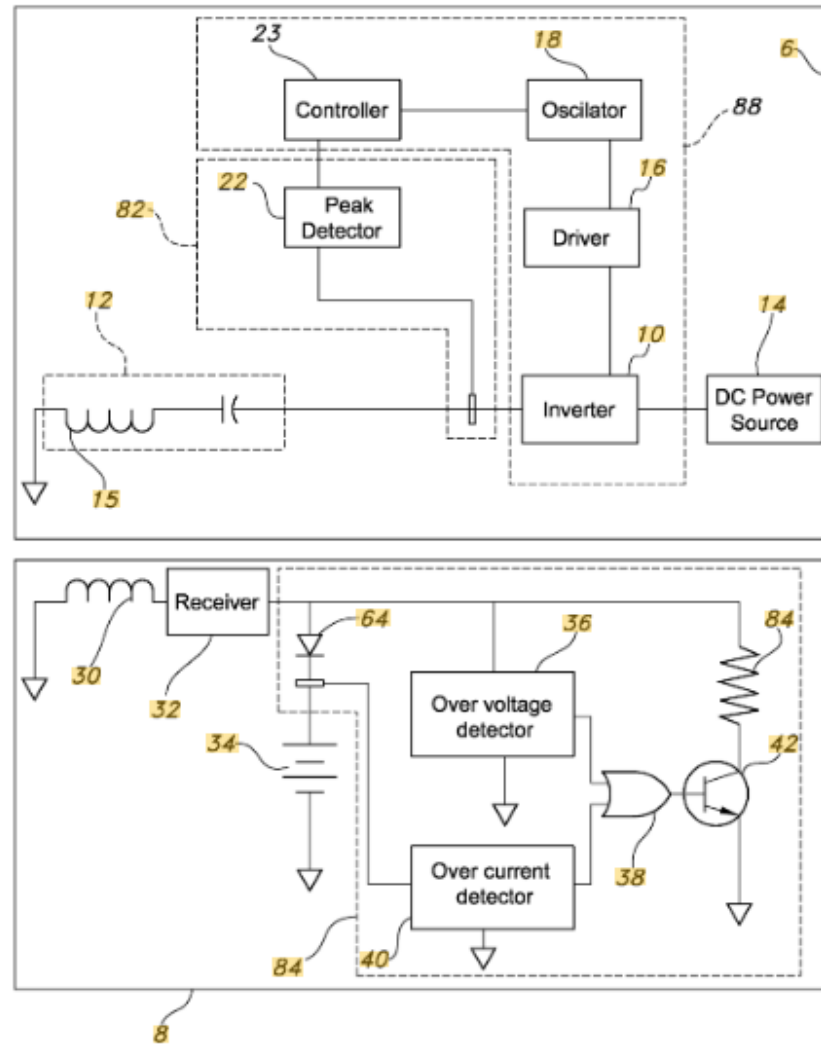
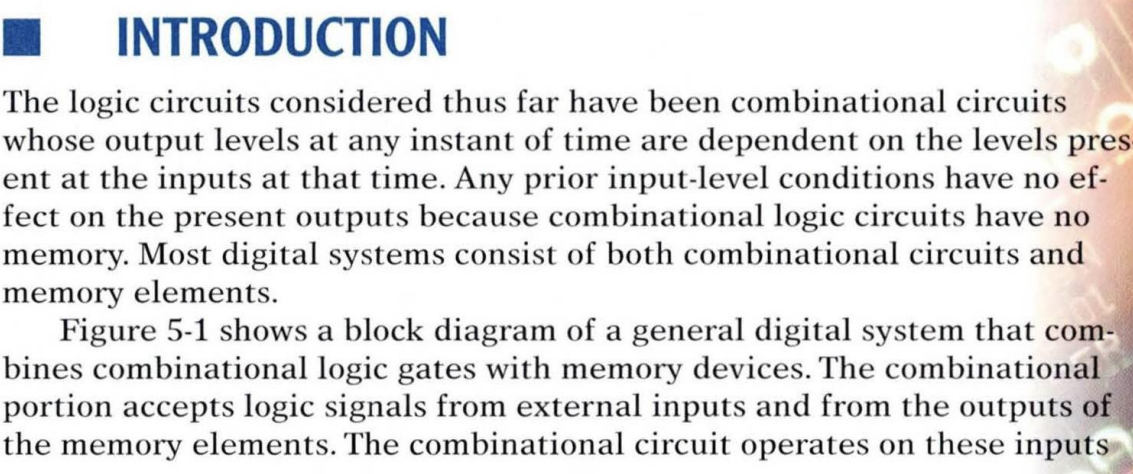
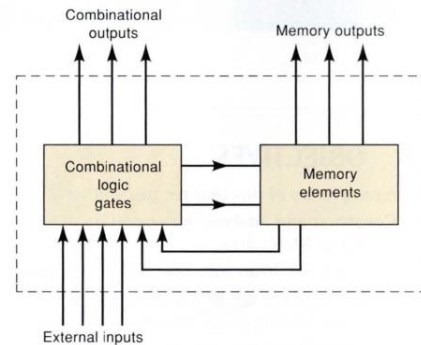


FIG. 2

Baarman at Fig. 2.

	To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, Tocci discloses inductive power outlet comprising a signal detector adapted to detect a first signal and a second signal: ■ INTRODUCTION The logic circuits considered thus far have been combinational circuits whose output levels at any instant of time are dependent on the levels present at the inputs at that time. Any prior input-level conditions have no effect on the present outputs because combinational logic circuits have no memory. Most digital systems consist of both combinational circuits and memory elements. Figure 5-1 shows a block diagram of a general digital system that combines combinational logic gates with memory devices. The combinational portion accepts logic signals from external inputs and from the outputs of the memory elements. The combinational circuit operates on these inputs 
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to produce various outputs, some of which are used to determine the binary values to be stored in the memory elements. The outputs of some of the memory elements, in turn, go to the inputs of logic gates in the combinational circuits. This process indicates that the external outputs of a digital system are functions of both its external inputs and the information stored in its memory elements.

The most important memory element is the **flip-flop**, which is made up of an assembly of logic gates. Even though a logic gate, by itself, has no storage capability, several can be connected together in ways that permit information to be stored. Several different gate arrangements are used to produce these flip-flops (abbreviated FF).

Figure 5-2(a) is the general type of symbol used for a flip-flop. It shows two outputs, labeled Q and $\bar{Q}$, that are the inverse of each other. $Q/\bar{Q}$ are the most common designations used for a FF's outputs. From time to time, we will use other designations such as $X/\bar{X}$ and $A/\bar{A}$ for convenience in identifying different FFs in a logic circuit.

The Q output is called the *normal* FF output, and $\bar{Q}$ is the *inverted* FF output. Whenever we refer to the state of a FF, we are referring to the state of its normal (Q) output; it is understood that its inverted output ($\bar{Q}$) is in the opposite state. For example, if we say that a FF is in the HIGH (1) state, we mean that $Q = 1$; if we say that a FF is in the LOW (0) state, we mean that $Q = 0$. Of course, the $\bar{Q}$ state will always be the inverse of Q .

The two possible operating states for a FF are summarized in Figure 5-2(b). Note that the HIGH or 1 state ($Q = 1/\bar{Q} = 0$) is also referred to as the **SET** state. Whenever the inputs to a FF cause it to go to the $Q = 1$ state, we call this *setting* the FF; the FF has been set. In a similar way, the LOW or

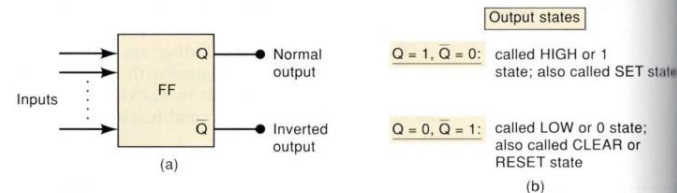


FIGURE 5-2 General flip-flop symbol and definition of its two possible output states.

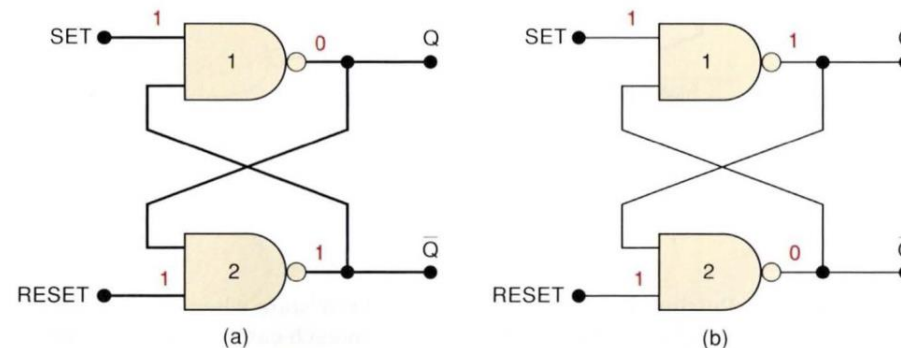
		0 state ($Q = 0/\bar{Q} = 1$) is also referred to as the CLEAR or RESET state. Whenever the inputs to a FF cause it to go to the $Q = 0$ state, we call this <i>clearing</i> or <i>resetting</i> the FF; the FF has been cleared (reset). As we shall see, many FFs will have a SET input and/or a CLEAR (RESET) input that is used to drive the FF into a specific output state. As the symbol in Figure 5-2(a) implies, a FF can have one or more inputs. These inputs are used to cause the FF to switch back and forth (“flip-flop”) between its possible output states. We will find out that most FF inputs need only to be momentarily activated (pulsed) in order to cause a change in the FF output state, and the output will remain in that new state even after the input pulse is over. This is the FF’s <i>memory</i> characteristic. The flip-flop is known by other names, including <i>latch</i> and <i>bistable multivibrator</i>. The term <i>latch</i> is used for certain types of flip-flops that we will describe. The term <i>bistable multivibrator</i> is the more technical name for a flip-flop, but it is too much of a mouthful to be used regularly.
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5-1 NAND GATE LATCH

The most basic FF circuit can be constructed from either two NAND gates or two NOR gates. The NAND gate version, called a **NAND gate latch** or simply a **latch**, is shown in Figure 5-3(a). The two NAND gates are cross-coupled so that the output of NAND-1 is connected to one of the inputs of NAND-2, and vice versa. The gate outputs, labeled Q and $\bar{Q}$, respectively, are the latch outputs. Under normal conditions, these outputs will always be the inverse of each other. There are two latch inputs: the SET input is the input that *sets* Q to the 1 state; the RESET input is the input that *resets* Q to the 0 state.

The SET and RESET inputs are both normally resting in the HIGH state, and one of them will be pulsed LOW whenever we want to change the latch outputs. We begin our analysis by showing that there are two equally likely output states when SET = RESET = 1. One possibility is shown in Figure 5-3(a), where we have $Q = 0$ and $\bar{Q} = 1$. With $\bar{Q} = 0$, the inputs to NAND-2 are 0 and 1, which produce $\bar{Q} = 1$. The 1 from $\bar{Q}$ causes NAND-1 to have a 1 at both inputs to produce a 0 output at Q . In effect, what we have is the LOW at the NAND-1 output producing a HIGH at the NAND-2 output, which, in turn, keeps the NAND-1 output LOW.

The second possibility is shown in Figure 5-3(b), where $Q = 1$ and $\bar{Q} = 0$. The HIGH from NAND-1 produces a LOW at the NAND-2 output, which, in turn, keeps the NAND-1 output HIGH. Thus, there are two possible output states when SET = RESET = 1; as we shall soon see, the one that actually exists will depend on what has occurred previously at the inputs.



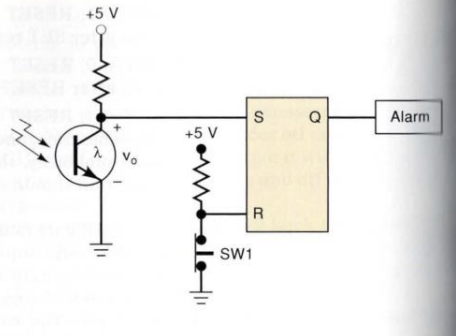
Tocci at 209-11.

EXAMPLE 5-4

Figure 5-12 shows a simple circuit that can be used to detect the interruption of a light beam. The light is focused on a phototransistor that is connected in the common-emitter configuration to operate as a switch. Assume that the latch has previously been cleared to the 0 state by momentarily opening switch SW1, and describe what happens if the light beam is momentarily interrupted.

CHAPTER 5/FLIP-FLOPS AND RELATED DEVICES

FIGURE 5-12
Example 5-4.



		Solution With light on the phototransistor, we can assume that it is fully conducting so that the resistance between the collector and the emitter is very small. Thus, v_0 will be close to 0 V. This places a LOW on the SET input of the latch so that SET = RESET = 0. When the light beam is interrupted, the phototransistor turns off, and its collector-emitter resistance becomes very high (i.e., essentially an open circuit). This causes v_0 to rise to approximately 5 V; this activates the SET input, which sets Q HIGH and turns on the alarm. Q will remain HIGH and the alarm will remain on even if v_0 returns to 0 V (i.e., the light beam was interrupted only momentarily) because SET and RESET will both be LOW, which will produce no change in Q. In this application, the latch's memory characteristic is used to convert a momentary occurrence (beam interruption) into a constant output. Tocci at 217-18.
[2.a]	increase said transmission frequency when said first signal is detected by the detector, and	'392 Baarman discloses increasing the transmission frequency when said first signal is detected by the detector. For example: "In one embodiment, the feedback detector is a current sensor coupled to the primary tank circuit. In this embodiment, when the current is shunted through the feedback signaling resistor in the secondary, the current through the secondary coil increases, which varies the reflected impedance of the secondary circuit resulting in increased current through the primary coil. The increase in current through the primary coil is detected by the current sensor in the primary circuit, which could include a peak detector, thereby providing to the controller a feedback signal for detecting whether the battery is in an over-voltage or over-current state. In one embodiment, the frequency control mechanism makes appropriate adjustments to the frequency to correct the over-voltage or over-current state by reducing the power supplied to the secondary coil." '392 Baarman at [0014]. "In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power

transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer.” ’392 Baarman at [0015]. “In the illustrated embodiment, the primary coil 15 and the secondary coil 30 are loosely coupled. Because the two are loosely coupled in this embodiment, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled. An exemplary power transfer curve for the coils 15, 30 is shown in FIG. 3. In this embodiment, the power transfer is highest when the inverter 10 is operating at resonance.” ’392 Baarman at [0038].

“Thus, a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred from the primary coil 15 to the secondary coil 30. As can be seen by the graph, it would be equally effective to use an operating frequency less than the resonant frequency. If so, then an increase in the operating frequency would lead to an increase in the power transfer, and vice-versa.” ’392 Baarman at [0038].

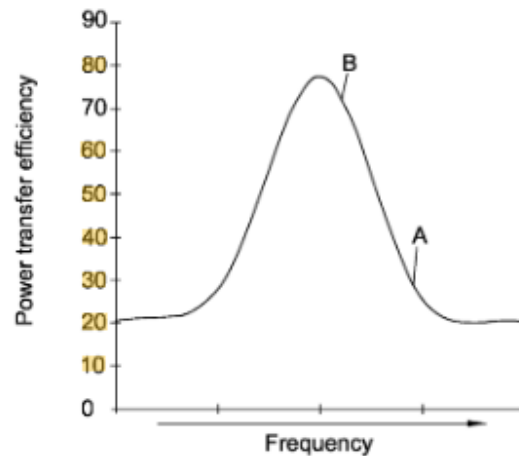


FIG. 3

’392 Baarman at Fig. 3.

	“The controller 20 then determines whether a feedback signal, discussed previously, has been received. If not, then the frequency is decreased by ΔFREQ. Step 116. In this embodiment, a decrease in the frequency moves the system toward resonance, and therefore increases the power transfer from the charger circuit 6 to the battery 34. ΔFREQ could be a constant, or it could be determined by obtaining the value from a lookup table indexed by the operating frequency of the inverter at the particular time ΔFREQ is used. The values selected for ΔFREQ may be frequency dependent and chosen so that if the operating frequency is reduced or increased by ΔFREQ, then the corresponding increase or decrease in current is the approximately the same for ΔFREQs for all operating frequencies.” ’392 Baarman at [0055]-[0056]. “If a feedback signal is detected, then the power transfer to the battery 34 should be reduced. The frequency is therefore increased by an amount equal to twice the value of ΔFREQ, which again could be obtained from a look-up table. Step 122. The frequency is compared with Max_FREQ. Step 124. Max_FREQ is a predetermined value indicating the maximum frequency for operating the inverter. If the frequency will be greater than a predetermined maximum frequency Max_FREQ, then the charger circuit 6 returns to the probing process 99. If not, the controller 20 waits (step 126) and then checks for a feedback signal. Step 128.” ’392 Baarman at [0059].
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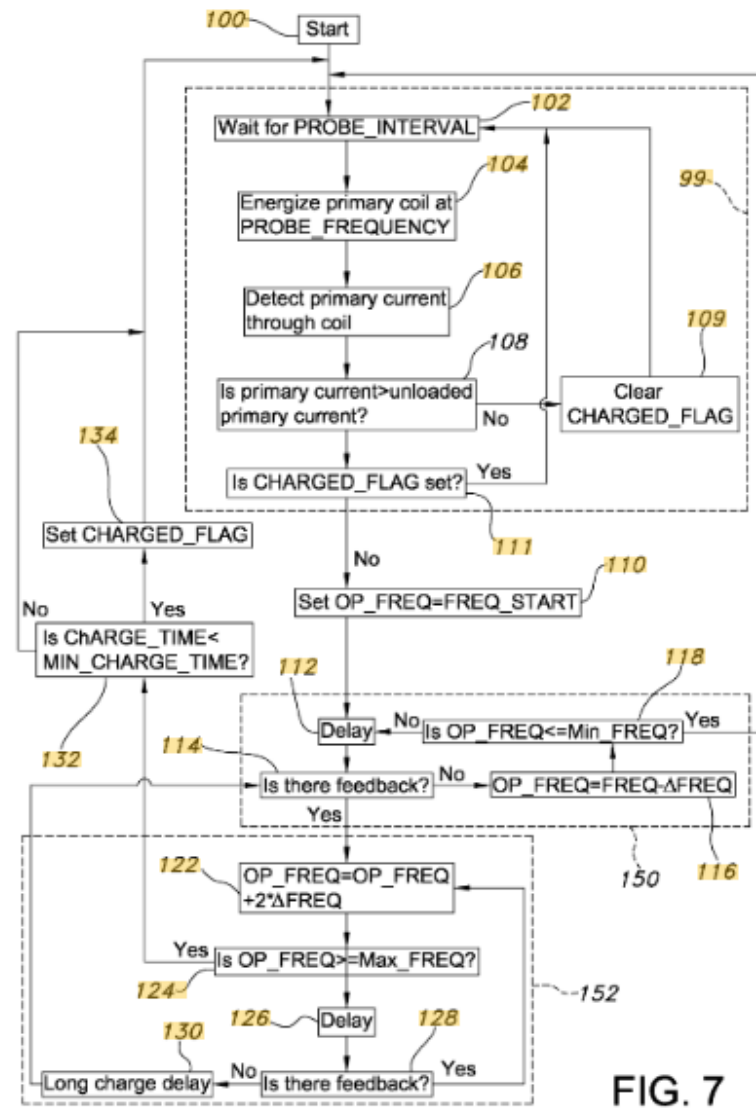
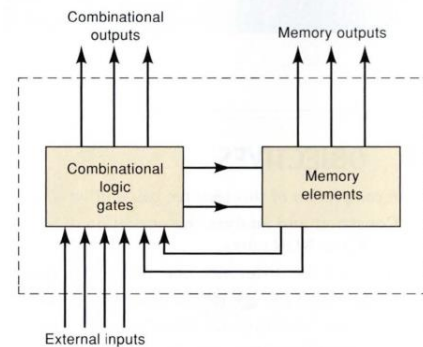


FIG. 7

'392 Baarman at Fig. 7.

	To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, Tocci discloses increasing the transmission frequency when said first signal is detected by the detector: ■ INTRODUCTION The logic circuits considered thus far have been combinational circuits whose output levels at any instant of time are dependent on the levels present at the inputs at that time. Any prior input-level conditions have no effect on the present outputs because combinational logic circuits have no memory. Most digital systems consist of both combinational circuits and memory elements. Figure 5-1 shows a block diagram of a general digital system that combines combinational logic gates with memory devices. The combinational portion accepts logic signals from external inputs and from the outputs of the memory elements. The combinational circuit operates on these inputs
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to produce various outputs, some of which are used to determine the binary values to be stored in the memory elements. The outputs of some of the memory elements, in turn, go to the inputs of logic gates in the combinational circuits. This process indicates that the external outputs of a digital system are functions of both its external inputs and the information stored in its memory elements.

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The two possible operating states for a FF are summarized in Figure 5-2(b). Note that the HIGH or 1 state ($Q = 1/\bar{Q} = 0$) is also referred to as the **SET** state. Whenever the inputs to a FF cause it to go to the $Q = 1$ state, we call this *setting* the FF; the FF has been set. In a similar way, the LOW or

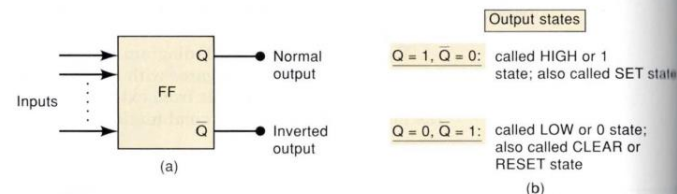


FIGURE 5-2 General flip-flop symbol and definition of its two possible output states.

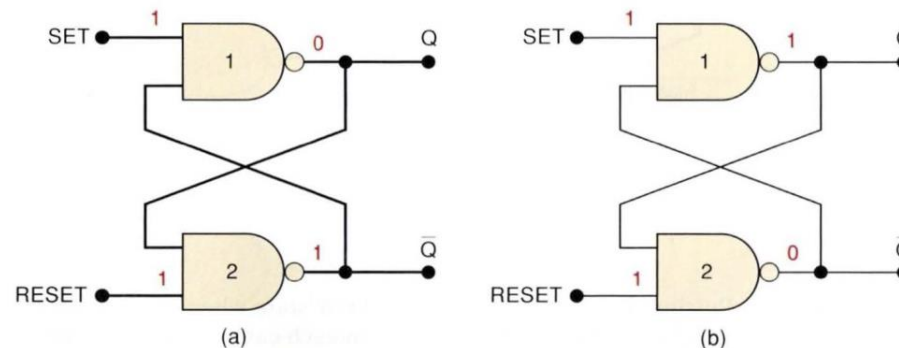
		0 state ($Q = 0/\overline{Q} = 1$) is also referred to as the CLEAR or RESET state. Whenever the inputs to a FF cause it to go to the $Q = 0$ state, we call this <i>clearing</i> or <i>resetting</i> the FF; the FF has been cleared (reset). As we shall see, many FFs will have a SET input and/or a CLEAR (RESET) input that is used to drive the FF into a specific output state. As the symbol in Figure 5-2(a) implies, a FF can have one or more inputs. These inputs are used to cause the FF to switch back and forth (“flip-flop”) between its possible output states. We will find out that most FF inputs need only to be momentarily activated (pulsed) in order to cause a change in the FF output state, and the output will remain in that new state even after the input pulse is over. This is the FF’s <i>memory</i> characteristic. The flip-flop is known by other names, including <i>latch</i> and <i>bistable multivibrator</i>. The term <i>latch</i> is used for certain types of flip-flops that we will describe. The term <i>bistable multivibrator</i> is the more technical name for a flip-flop, but it is too much of a mouthful to be used regularly.
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5-1 NAND GATE LATCH

The most basic FF circuit can be constructed from either two NAND gates or two NOR gates. The NAND gate version, called a **NAND gate latch** or simply a **latch**, is shown in Figure 5-3(a). The two NAND gates are cross-coupled so that the output of NAND-1 is connected to one of the inputs of NAND-2, and vice versa. The gate outputs, labeled Q and $\bar{Q}$, respectively, are the latch outputs. Under normal conditions, these outputs will always be the inverse of each other. There are two latch inputs: the SET input is the input that *sets* Q to the 1 state; the RESET input is the input that *resets* Q to the 0 state.

The SET and RESET inputs are both normally resting in the HIGH state, and one of them will be pulsed LOW whenever we want to change the latch outputs. We begin our analysis by showing that there are two equally likely output states when $\text{SET} = \text{RESET} = 1$. One possibility is shown in Figure 5-3(a), where we have $Q = 0$ and $\bar{Q} = 1$. With $Q = 0$, the inputs to NAND-2 are 0 and 1, which produce $\bar{Q} = 1$. The 1 from $\bar{Q}$ causes NAND-1 to have a 1 at both inputs to produce a 0 output at Q . In effect, what we have is the LOW at the NAND-1 output producing a HIGH at the NAND-2 output, which, in turn, keeps the NAND-1 output LOW.

The second possibility is shown in Figure 5-3(b), where $Q = 1$ and $\bar{Q} = 0$. The HIGH from NAND-1 produces a LOW at the NAND-2 output, which, in turn, keeps the NAND-1 output HIGH. Thus, there are two possible output states when $\text{SET} = \text{RESET} = 1$; as we shall soon see, the one that actually exists will depend on what has occurred previously at the inputs.



Setting the Latch (FF)

Now let's investigate what happens when the SET input is momentarily pulsed LOW while RESET is kept HIGH. Figure 5-4(a) shows what happens when $Q = 0$ prior to the occurrence of the pulse. As SET is pulsed LOW at time t_0 , Q will go HIGH, and this HIGH will force $\bar{Q}$ to go LOW so that NAND-1 now has two LOW inputs. Thus, when SET returns to the 1 state at t_1 , the NAND-1 output *remains* HIGH, which, in turn, keeps the NAND-2 output LOW.

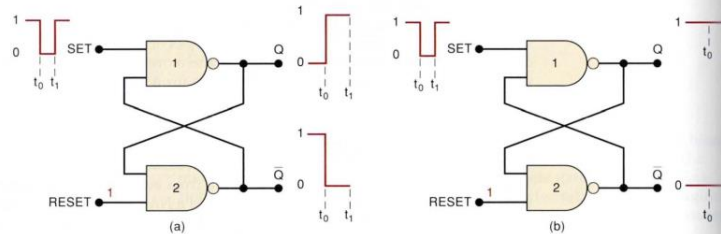


FIGURE 5-4 Pulsing the SET input to the 0 state when (a) $Q = 0$ prior to SET pulse; (b) $Q = 1$ prior to SET pulse. Note that, in both cases, Q ends up HIGH.

Figure 5-4(b) shows what happens when $Q = 1$ and $\bar{Q} = 0$ prior to the application of the SET pulse. Since $\bar{Q} = 0$ is already keeping the NAND-1 output HIGH, the LOW pulse at SET will not change anything. Thus, when SET returns HIGH, the latch outputs are still in the $Q = 1$, $\bar{Q} = 0$ state.

We can summarize Figure 5-4 by stating that a LOW pulse on the SET input will always cause the latch to end up in the $Q = 1$ state. This operation is called *setting* the latch or FF.

Resetting the Latch (FF)

Now let's consider what occurs when the RESET input is pulsed LOW while SET is kept HIGH. Figure 5-5(a) shows what happens when $Q = 0$ and $\bar{Q} = 1$

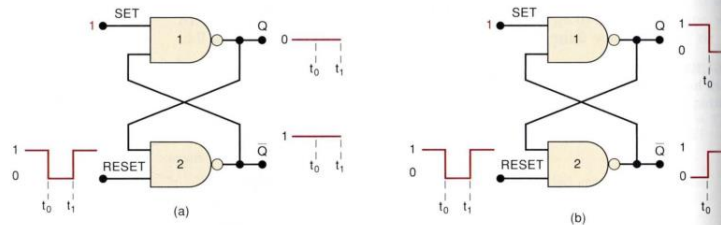


FIGURE 5-5 Pulsing the RESET input to the LOW state when (a) $Q = 0$ prior to RESET pulse; (b) $Q = 1$ prior to RESET pulse. In each case, Q ends up LOW.

SECTION 5-1/NAND GATE LATCH

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prior to the application of the pulse. Since $Q = 0$ is already keeping the NAND-2 output HIGH, the LOW pulse at RESET will not have any effect. When RESET returns HIGH, the latch outputs are still $Q = 0$ and $\bar{Q} = 1$.

Figure 5-5(b) shows the situation where $Q = 1$ prior to the occurrence of the RESET pulse. As RESET is pulsed LOW at t_0 , $\bar{Q}$ will go HIGH, and this HIGH forces Q to go LOW so that NAND-2 now has two LOW inputs. Thus, when RESET returns HIGH at t_1 , the NAND-2 output *remains* HIGH, which, in turn, keeps the NAND-1 output LOW.

Figure 5-5 can be summarized by stating that a LOW pulse on the RESET input will always cause the latch to end up in the $Q = 0$ state. This operation is called *clearing* or *resetting* the latch.

Simultaneous Setting and Resetting

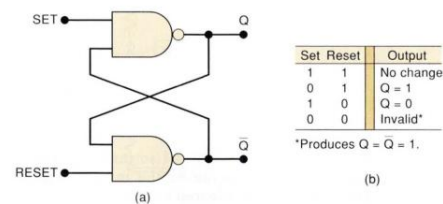
The last case to consider is the case where the SET and RESET inputs are simultaneously pulsed LOW. This will produce HIGH levels at both NAND outputs so that $Q = \bar{Q} = 1$. Clearly, this is an undesired condition because the two outputs are supposed to be inverses of each other. Furthermore, when the SET and RESET inputs return HIGH, the resulting output state will depend on which input returns HIGH first. Simultaneous transitions back to the 1 state will produce unpredictable results. For these reasons the SET = RESET = 0 condition is normally not used for the NAND latch.

Summary of NAND Latch

The operation described above can be conveniently placed in a function table (Figure 5-6) and is summarized as follows:

1. SET = RESET = 1. This condition is the normal resting state, and it has no effect on the output state. The Q and $\bar{Q}$ outputs will remain in whatever state they were in prior to this input condition.
2. SET = 0, RESET = 1. This will always cause the output to go to the $Q = 1$ state, where it will remain even after SET returns HIGH. This is called *setting* the latch.
3. SET = 1, RESET = 0. This will always produce the $Q = 0$ state, where the output will remain even after RESET returns HIGH. This is called *clearing* or *resetting* the latch.
4. SET = RESET = 0. This condition tries to set and clear the latch at the same time, and it produces $Q = \bar{Q} = 1$. If the inputs are returned to 1 simultaneously, the resulting state is unpredictable. This input condition should not be used.

FIGURE 5-6 (a) NAND latch; (b) function table.



		Tocci at 209-13.
[2.b]	decrease said transmission frequency when said second signal is detected by the detector.	'392 Baarman discloses decreasing transmission frequency when said second signal is detected by the detector. For example: "In one embodiment, the feedback detector is a current sensor coupled to the primary tank circuit. In this embodiment, when the current is shunted through the feedback signaling resistor in the secondary, the current through the secondary coil increases, which varies the reflected impedance of the secondary circuit resulting in increased current through the primary coil. The increase in current through the primary coil is detected by the current sensor in the primary circuit, which could include a peak detector, thereby providing to the controller a feedback signal for detecting whether the battery is in an over-voltage or over-current state. In one embodiment, the frequency control mechanism makes appropriate adjustments to the frequency to correct the over-voltage or over-current state by reducing the power supplied to the secondary coil." '392 Baarman at [0014]. "In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer." '392 Baarman at [0015]. "In the illustrated embodiment, the primary coil 15 and the secondary coil 30 are loosely coupled. Because the two are loosely coupled in this embodiment, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled. An exemplary power transfer curve for the coils 15, 30 is shown in FIG. 3. In this embodiment, the power transfer is highest when the inverter 10 is operating at resonance." '392 Baarman at [0038]. "Thus, a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred from the primary coil 15 to the secondary coil 30. As can be seen by the graph, it would be equally effective to use an operating frequency less than the resonant frequency. If so, then an increase in the operating frequency would lead to an increase in the power transfer, and vice-versa." '392 Baarman at [0038].

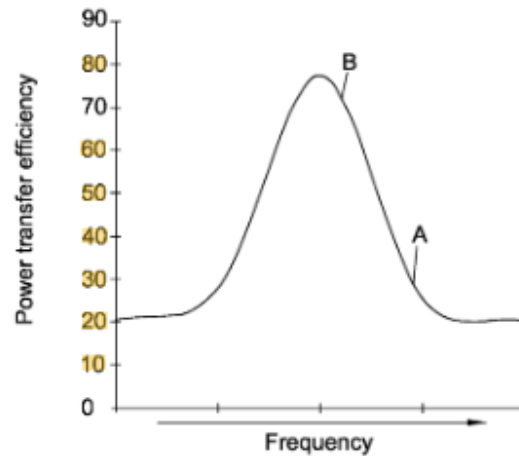


FIG. 3

'392 Baarman at Fig. 3.

"The controller 20 then determines whether a feedback signal, discussed previously, has been received. If not, then the frequency is decreased by $\Delta FREQ$. Step 116. In this embodiment, a decrease in the frequency moves the system toward resonance, and therefore increases the power transfer from the charger circuit 6 to the battery 34.

$\Delta FREQ$ could be a constant, or it could be determined by obtaining the value from a lookup table indexed by the operating frequency of the inverter at the particular time $\Delta FREQ$ is used. The values selected for $\Delta FREQ$ may be frequency dependent and chosen so that if the operating frequency is reduced or increased by $\Delta FREQ$, then the corresponding increase or decrease in current is the approximately the same for $\Delta FREQ$ s for all operating frequencies." '392 Baarman at [0055]-[0056].

"If a feedback signal is detected, then the power transfer to the battery 34 should be reduced. The frequency is therefore increased by an amount equal to twice the value of $\Delta FREQ$, which again could be obtained from a look-up table. Step 122. The frequency is compared with Max_FREQ . Step 124. Max_FREQ is a predetermined value indicating the maximum frequency for operating the inverter. If the frequency will be greater than a predetermined maximum frequency Max_FREQ , then the charger circuit 6 returns to the probing

		process 99. If not, the controller 20 waits (step 126) and then checks for a feedback signal. Step 128.” ’392 Baarman at [0059]. “If a feedback signal has been detected, then the inverter frequency is again decreased by twice the value of ΔFREQ. Step 122. The process then continues. On the other hand, if no feedback signal is detected, then the system waits while power at the then-current frequency is applied to the primary coil 15. Step 130. The long charge delay of step 130 is generally much larger than the delays of step 112 or step 126. The long charge delay allows a substantial amount power to be provided to the battery 34.” ’392 Baarman at [0060].
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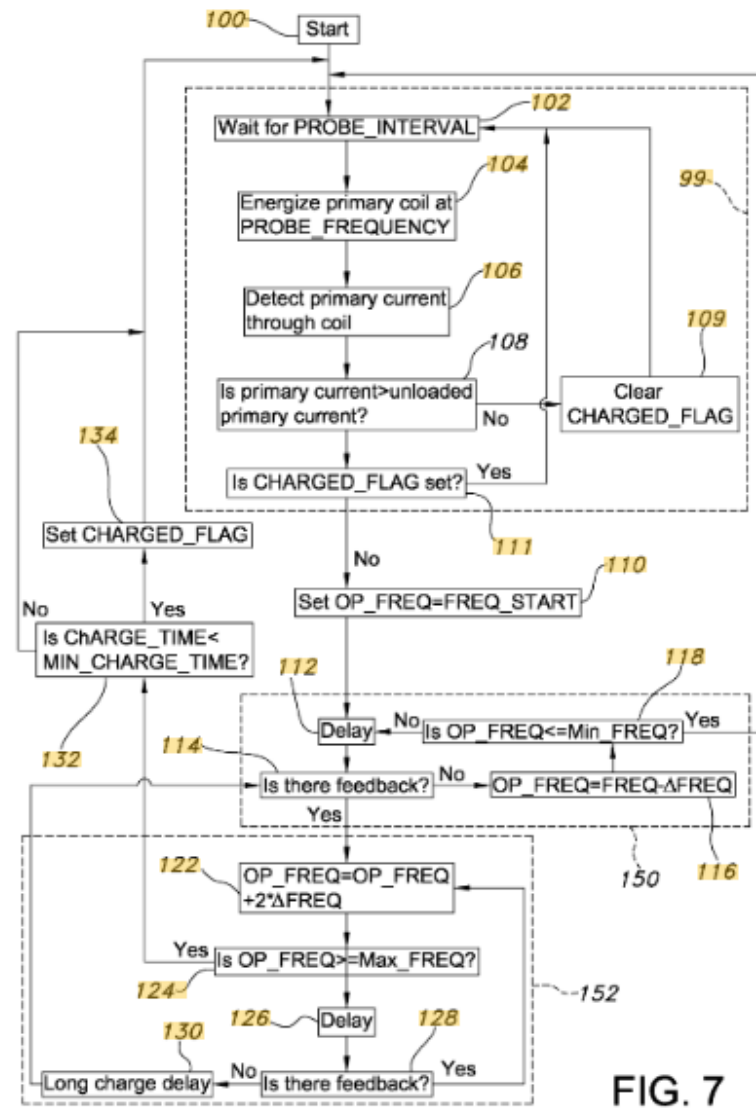
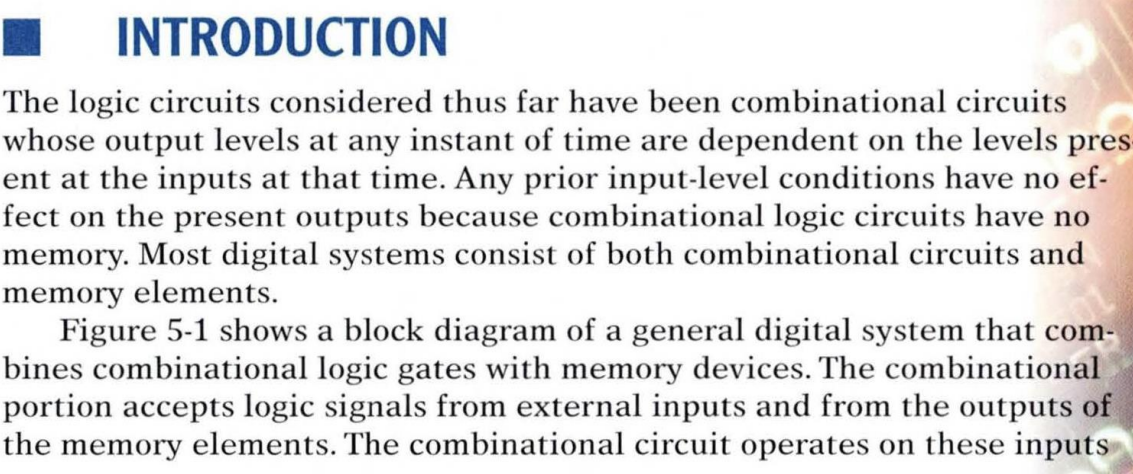
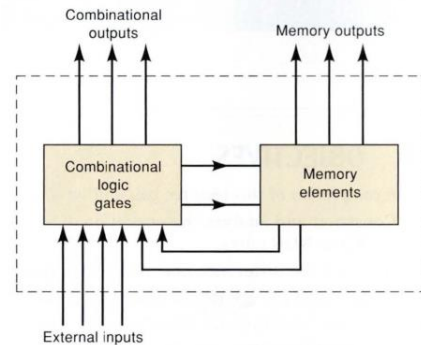


FIG. 7

'392 Baarman at Fig. 7.

	To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, Tocci discloses decreasing transmission frequency when said second signal is detected by the detector: ■ INTRODUCTION The logic circuits considered thus far have been combinational circuits whose output levels at any instant of time are dependent on the levels present at the inputs at that time. Any prior input-level conditions have no effect on the present outputs because combinational logic circuits have no memory. Most digital systems consist of both combinational circuits and memory elements. Figure 5-1 shows a block diagram of a general digital system that combines combinational logic gates with memory devices. The combinational portion accepts logic signals from external inputs and from the outputs of the memory elements. The combinational circuit operates on these inputs 
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to produce various outputs, some of which are used to determine the binary values to be stored in the memory elements. The outputs of some of the memory elements, in turn, go to the inputs of logic gates in the combinational circuits. This process indicates that the external outputs of a digital system are functions of both its external inputs and the information stored in its memory elements.

The most important memory element is the **flip-flop**, which is made up of an assembly of logic gates. Even though a logic gate, by itself, has no storage capability, several can be connected together in ways that permit information to be stored. Several different gate arrangements are used to produce these flip-flops (abbreviated FF).

Figure 5-2(a) is the general type of symbol used for a flip-flop. It shows two outputs, labeled Q and $\bar{Q}$, that are the inverse of each other. $Q/\bar{Q}$ are the most common designations used for a FF's outputs. From time to time, we will use other designations such as $X/\bar{X}$ and $A/\bar{A}$ for convenience in identifying different FFs in a logic circuit.

The Q output is called the *normal* FF output, and $\bar{Q}$ is the *inverted* FF output. Whenever we refer to the state of a FF, we are referring to the state of its normal (Q) output; it is understood that its inverted output ($\bar{Q}$) is in the opposite state. For example, if we say that a FF is in the HIGH (1) state, we mean that $Q = 1$; if we say that a FF is in the LOW (0) state, we mean that $Q = 0$. Of course, the $\bar{Q}$ state will always be the inverse of Q .

The two possible operating states for a FF are summarized in Figure 5-2(b). Note that the HIGH or 1 state ($Q = 1/\bar{Q} = 0$) is also referred to as the **SET** state. Whenever the inputs to a FF cause it to go to the $Q = 1$ state, we call this *setting* the FF; the FF has been set. In a similar way, the LOW or

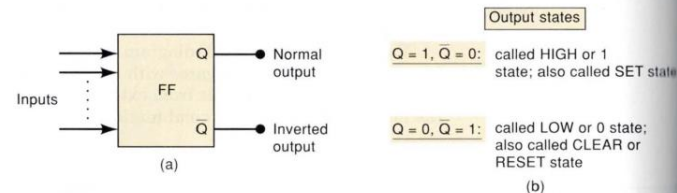


FIGURE 5-2 General flip-flop symbol and definition of its two possible output states.

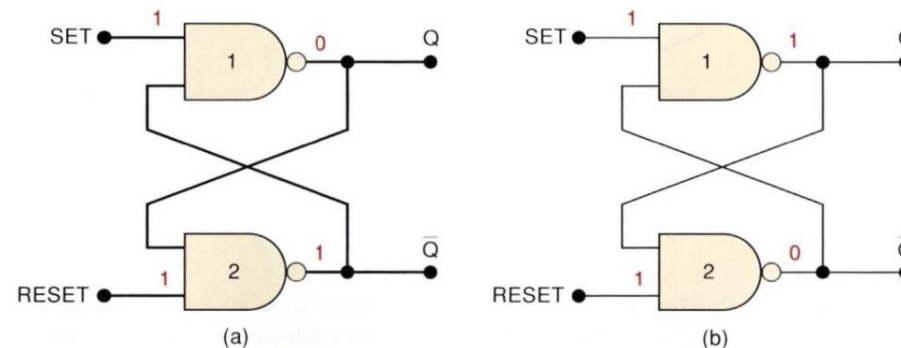
		0 state ($Q = 0/\overline{Q} = 1$) is also referred to as the CLEAR or RESET state. Whenever the inputs to a FF cause it to go to the $Q = 0$ state, we call this <i>clearing</i> or <i>resetting</i> the FF; the FF has been cleared (reset). As we shall see, many FFs will have a SET input and/or a CLEAR (RESET) input that is used to drive the FF into a specific output state. As the symbol in Figure 5-2(a) implies, a FF can have one or more inputs. These inputs are used to cause the FF to switch back and forth (“flip-flop”) between its possible output states. We will find out that most FF inputs need only to be momentarily activated (pulsed) in order to cause a change in the FF output state, and the output will remain in that new state even after the input pulse is over. This is the FF’s <i>memory</i> characteristic. The flip-flop is known by other names, including <i>latch</i> and <i>bistable multivibrator</i>. The term <i>latch</i> is used for certain types of flip-flops that we will describe. The term <i>bistable multivibrator</i> is the more technical name for a flip-flop, but it is too much of a mouthful to be used regularly.
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5-1 NAND GATE LATCH

The most basic FF circuit can be constructed from either two NAND gates or two NOR gates. The NAND gate version, called a **NAND gate latch** or simply a **latch**, is shown in Figure 5-3(a). The two NAND gates are cross-coupled so that the output of NAND-1 is connected to one of the inputs of NAND-2, and vice versa. The gate outputs, labeled Q and $\bar{Q}$, respectively, are the latch outputs. Under normal conditions, these outputs will always be the inverse of each other. There are two latch inputs: the SET input is the input that *sets* Q to the 1 state; the RESET input is the input that *resets* Q to the 0 state.

The SET and RESET inputs are both normally resting in the HIGH state, and one of them will be pulsed LOW whenever we want to change the latch outputs. We begin our analysis by showing that there are two equally likely output states when SET = RESET = 1. One possibility is shown in Figure 5-3(a), where we have $Q = 0$ and $\bar{Q} = 1$. With $\bar{Q} = 0$, the inputs to NAND-2 are 0 and 1, which produce $\bar{Q} = 1$. The 1 from $\bar{Q}$ causes NAND-1 to have a 1 at both inputs to produce a 0 output at Q . In effect, what we have is the LOW at the NAND-1 output producing a HIGH at the NAND-2 output, which, in turn, keeps the NAND-1 output LOW.

The second possibility is shown in Figure 5-3(b), where $Q = 1$ and $\bar{Q} = 0$. The HIGH from NAND-1 produces a LOW at the NAND-2 output, which, in turn, keeps the NAND-1 output HIGH. Thus, there are two possible output states when SET = RESET = 1; as we shall soon see, the one that actually exists will depend on what has occurred previously at the inputs.



Setting the Latch (FF)

Now let's investigate what happens when the SET input is momentarily pulsed LOW while RESET is kept HIGH. Figure 5-4(a) shows what happens when $Q = 0$ prior to the occurrence of the pulse. As SET is pulsed LOW at time t_0 , Q will go HIGH, and this HIGH will force $\bar{Q}$ to go LOW so that NAND-1 now has two LOW inputs. Thus, when SET returns to the 1 state at t_1 , the NAND-1 output *remains* HIGH, which, in turn, keeps the NAND-2 output LOW.

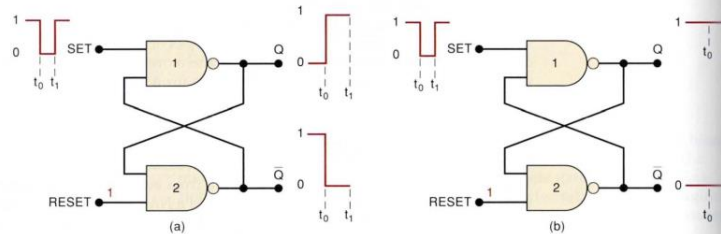


FIGURE 5-4 Pulsing the SET input to the 0 state when (a) $Q = 0$ prior to SET pulse; (b) $Q = 1$ prior to SET pulse. Note that, in both cases, Q ends up HIGH.

Figure 5-4(b) shows what happens when $Q = 1$ and $\bar{Q} = 0$ prior to the application of the SET pulse. Since $\bar{Q} = 0$ is already keeping the NAND-1 output HIGH, the LOW pulse at SET will not change anything. Thus, when SET returns HIGH, the latch outputs are still in the $Q = 1, \bar{Q} = 0$ state.

We can summarize Figure 5-4 by stating that a LOW pulse on the SET input will always cause the latch to end up in the $Q = 1$ state. This operation is called *setting* the latch or FF.

Resetting the Latch (FF)

Now let's consider what occurs when the RESET input is pulsed LOW while SET is kept HIGH. Figure 5-5(a) shows what happens when $Q = 0$ and $\bar{Q} = 1$

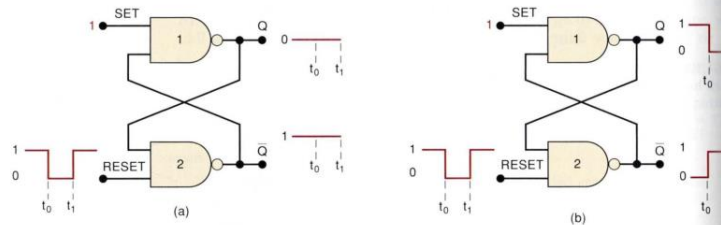


FIGURE 5-5 Pulsing the RESET input to the LOW state when (a) $Q = 0$ prior to RESET pulse; (b) $Q = 1$ prior to RESET pulse. In each case, Q ends up LOW.

SECTION 5-1/NAND GATE LATCH

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prior to the application of the pulse. Since $Q = 0$ is already keeping the NAND-2 output HIGH, the LOW pulse at RESET will not have any effect. When RESET returns HIGH, the latch outputs are still $Q = 0$ and $\bar{Q} = 1$.

Figure 5-5(b) shows the situation where $Q = 1$ prior to the occurrence of the RESET pulse. As RESET is pulsed LOW at t_0 , $\bar{Q}$ will go HIGH, and this HIGH forces Q to go LOW so that NAND-2 now has two LOW inputs. Thus, when RESET returns HIGH at t_1 , the NAND-2 output *remains* HIGH, which, in turn, keeps the NAND-1 output LOW.

Figure 5-5 can be summarized by stating that a LOW pulse on the RESET input will always cause the latch to end up in the $Q = 0$ state. This operation is called *clearing* or *resetting* the latch.

Simultaneous Setting and Resetting

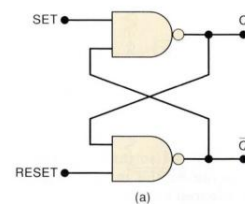
The last case to consider is the case where the SET and RESET inputs are simultaneously pulsed LOW. This will produce HIGH levels at both NAND outputs so that $Q = \bar{Q} = 1$. Clearly, this is an undesired condition because the two outputs are supposed to be inverses of each other. Furthermore, when the SET and RESET inputs return HIGH, the resulting output state will depend on which input returns HIGH first. Simultaneous transitions back to the 1 state will produce unpredictable results. For these reasons the SET = RESET = 0 condition is normally not used for the NAND latch.

Summary of NAND Latch

The operation described above can be conveniently placed in a function table (Figure 5-6) and is summarized as follows:

1. SET = RESET = 1. This condition is the normal resting state, and it has no effect on the output state. The Q and $\bar{Q}$ outputs will remain in whatever state they were in prior to this input condition.
2. SET = 0, RESET = 1. This will always cause the output to go to the $Q = 1$ state, where it will remain even after SET returns HIGH. This is called *setting* the latch.
3. SET = 1, RESET = 0. This will always produce the $Q = 0$ state, where the output will remain even after RESET returns HIGH. This is called *clearing* or *resetting* the latch.
4. SET = RESET = 0. This condition tries to set and clear the latch at the same time, and it produces $Q = \bar{Q} = 1$. If the inputs are returned to 1 simultaneously, the resulting state is unpredictable. This input condition should not be used.

FIGURE 5-6 (a) NAND latch; (b) function table.



Set	Reset	Output
1	1	No change
0	1	$Q = 1$
1	0	$Q = 0$
0	0	Invalid*

*Produces $Q = \bar{Q} = 1$.

(b)

		Tocci at 209-13.
Claim 3		
3.	The inductive power outlet of claim 1 said driver being configured to adjust said transmission frequency in response to feedback signals.	'392 Baarman discloses the driver being configured to adjust said transmission frequency in response to feedback signals. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at Abstract. “The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at [0011]. “In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer.” '392 Baarman at [0015]. “The secondary circuit 8 generally includes a secondary coil 30 for receiving inductive power from the charger circuit 6 and a feedback mechanism 84 for providing feedback to the charger circuit 6 indicative of the voltage or current in the secondary circuit 8.” '392 Baarman at [0032]. “The frequency controller 80 varies the frequency of the power applied to the primary coil 15 as a function of the feedback from the secondary circuit 8.” Baarman at [0032]. “In operation, the controller 20 uses signals from the peak detector 22 to assist in determining the frequency of operation for the oscillator 18, and thereby the frequency of the inverter 10.” '392 Baarman at [0034].

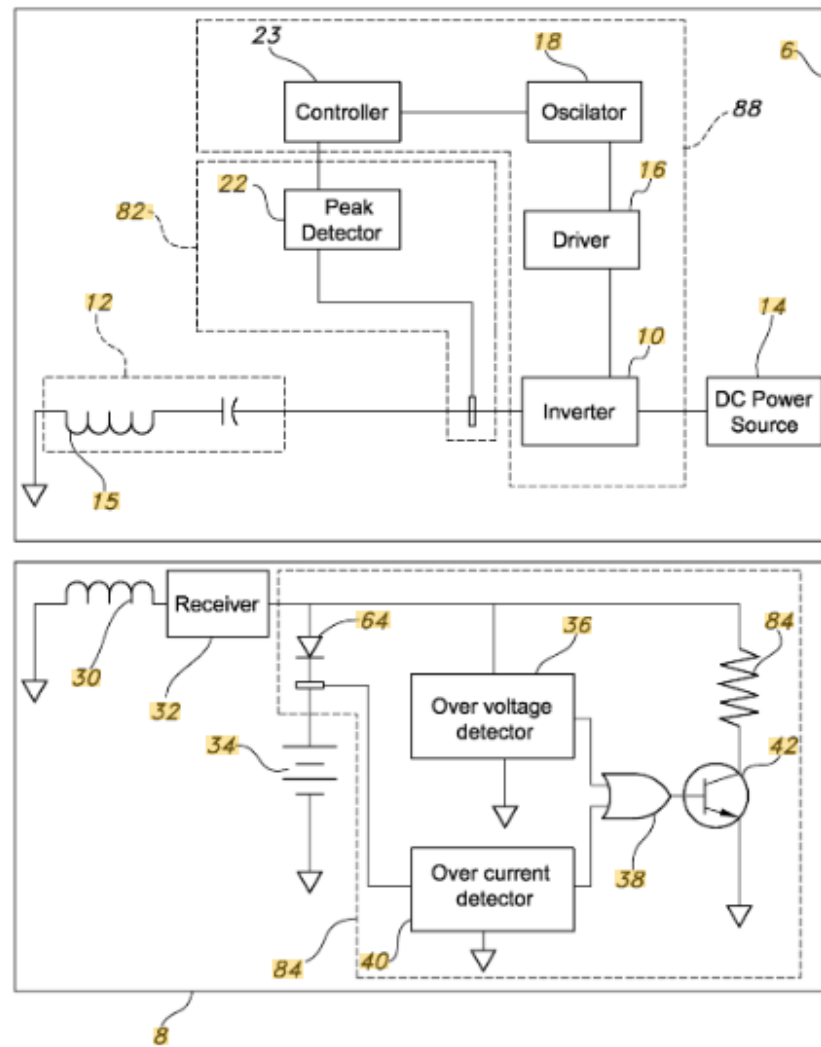


FIG. 2

Baarman at Fig. 2.

		“As stated, when the transistor 42 is turned on, increased current flows through the secondary coil 30, causing increased current flow through the primary coil 15. This increase in current is detected by the peak detector 22. The output of the peak detector caused by the increased current through the primary coil is shown in FIG. 6.” '392 Baarman at [0045].
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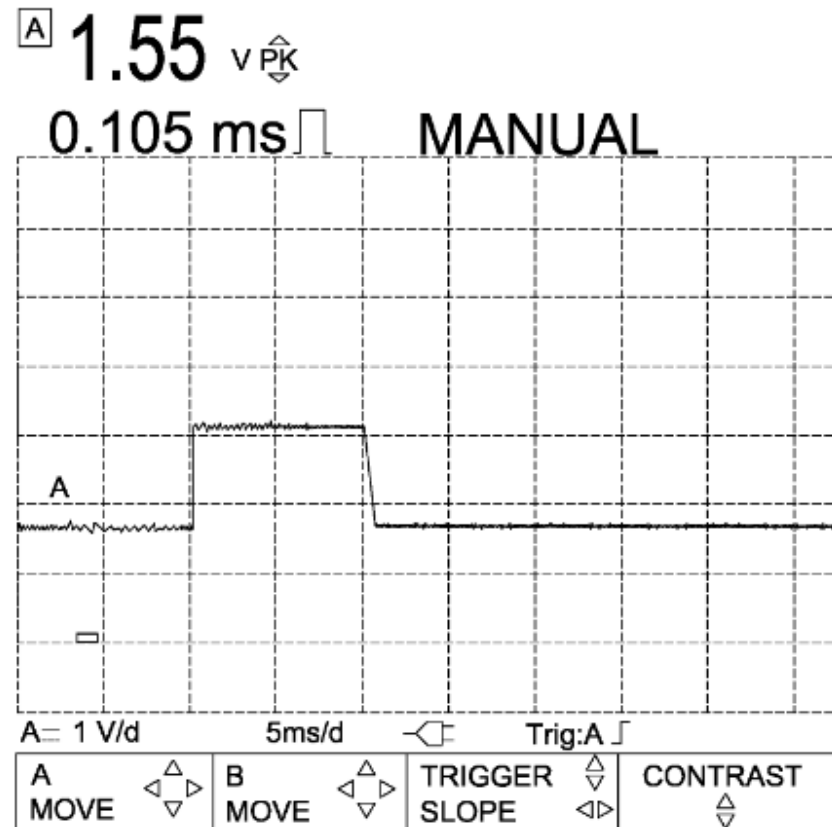
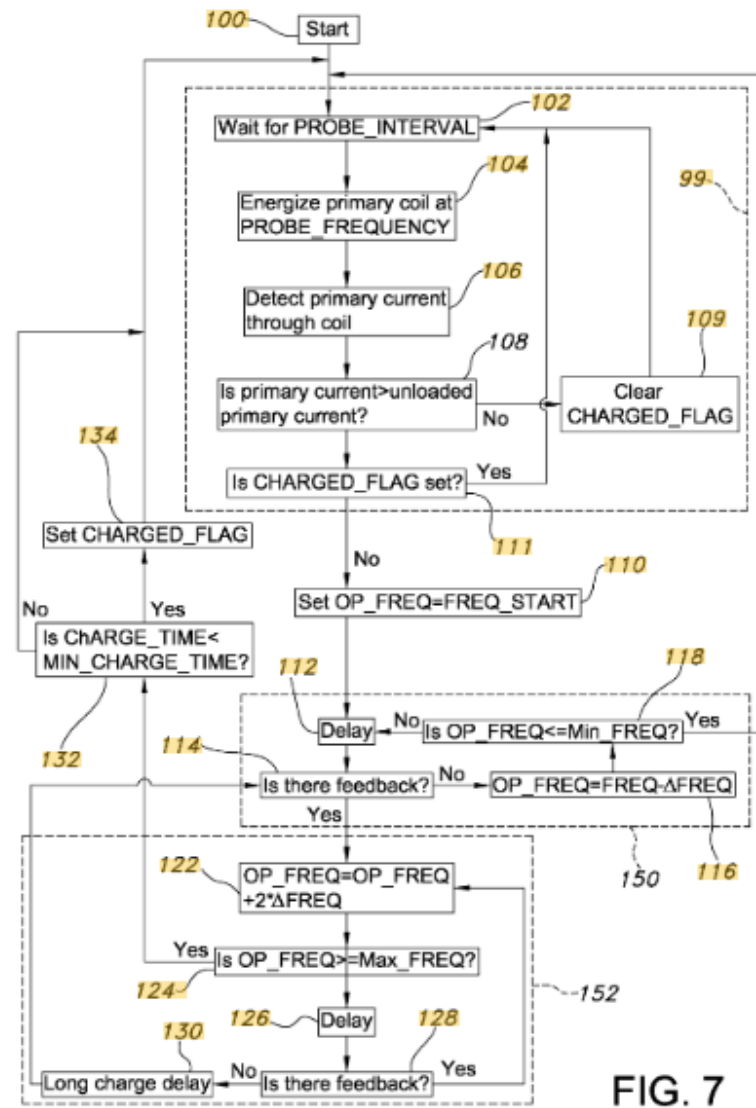


FIG. 6

'392 Baarman at Fig. 6.

		“If a feedback signal is detected, then the power transfer to the battery 34 should be reduced. The frequency is therefore increased by an amount equal to twice the value of $\Delta FREQ$, which again could be obtained from a look-up table. Step 122. The frequency is compared with Max_FREQ. Step 124. Max_FREQ is a predetermined value indicating the maximum frequency for operating the inverter. If the frequency will be greater than a predetermined maximum frequency Max_FREQ, then the charger circuit 6 returns to the probing process 99. If not, the controller 20 waits (step 126) and then checks for a feedback signal. Step 128.” ’392 Baarman at [0059].
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'392 Baarman at Fig. 7.

		To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
Claim 4		
4.	The inductive power outlet of claim 3 wherein said feedback signals carry data pertaining to the operational parameters of said electric load.	'392 Baarman discloses the said feedback signals carry data pertaining to the operational parameters of said electric load. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at Abstract. “The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at [0011]. “In one embodiment, the feedback mechanism includes a subcircuit for varying the reflected impedance of the secondary circuit. In this embodiment, the charger circuit may include a feedback detector for monitoring a characteristic of the power in the charger circuit that varies at least in part in response to changes in the reflected impedance of the secondary circuit. In this embodiment, the feedback detector may be coupled to the primary coil to allow the controller to monitor the current through the primary coil.” '392 Baarman at [0012]. “In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer.” '392 Baarman at [0015].

		“In another aspect, the present invention also provides a method for operating an inductive charging system having a charger circuit with a primary coil and a secondary circuit with a secondary coil. The method generally includes the steps of detecting whether a battery is present in the secondary circuit and charging the battery by way of one or more charging cycles. The charging step generally includes the steps of: applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit. In this way, the frequency of the power applied to the primary coil is changed in order to optimize the charging for the battery. Several charging cycles may be necessary to fully charge the battery.” ’392 Baarman at [0016]. “In one embodiment, the detecting step further includes the steps of: applying a pulse of power to the primary coil at a predetermined probe frequency, sensing the reflected impedance, and determining whether a battery is present as a function of the sensed reflected impedance.” ’392 Baarman at [0022]. “The frequency controller 80 varies the frequency of the power applied to the primary coil 15 as a function of the feedback from the secondary circuit 8.” Baarman at [0032]. “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” ’392 Baarman at [0035]. “As stated, when the transistor 42 is turned on, increased current flows through the secondary coil 30, causing increased current flow through the primary coil 15. This increase in current is detected by the peak detector 22. The output of the peak detector caused by the increased current through the primary coil is shown in FIG. 6.” ’392 Baarman at [0045].
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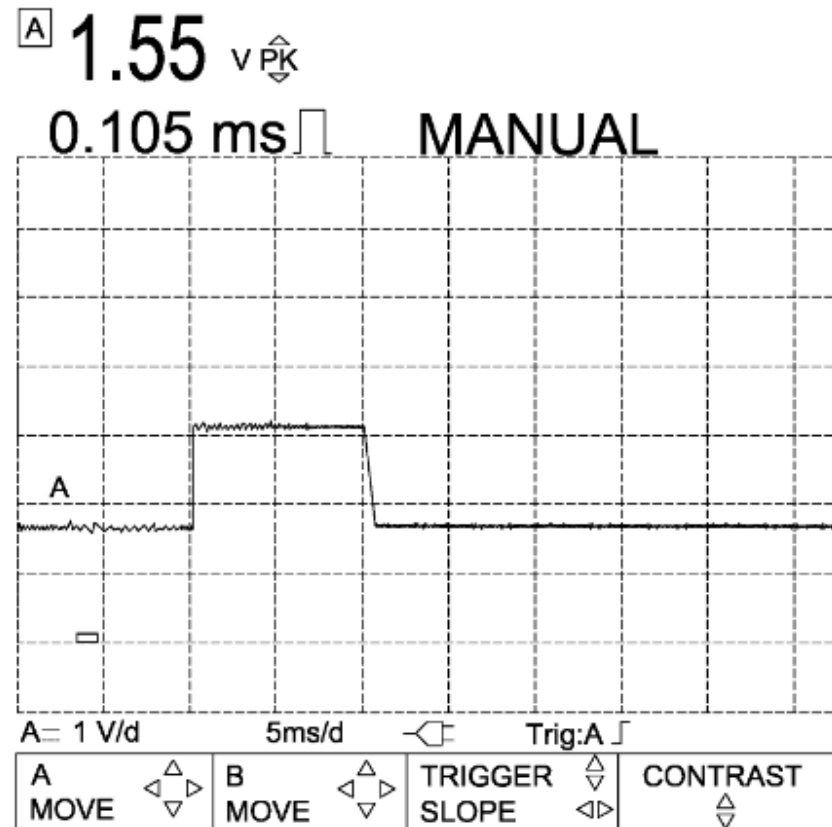


FIG. 6

'392 Baarman at Fig. 6.

	To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, '169 Purdy discloses the said feedback signals carry data pertaining to the operational parameters of said electric load: “In view of the foregoing background, it is therefore an object of the present invention to provide a battery charger that may be used with numerous types of portable devices and associated batteries, and yet which may account for differences between the charging parameters thereof.” '69 Purdy at [0007]. “[0013] More specifically, the controller may enter the learning mode upon receiving a learning mode signal from the portable device. For example, if a portable device of an unknown device type, or which has an unknown battery type, is connected to the charger connector, the controller may provide an error signal to the portable device based thereon. The portable device may then provide the learning mode signal to the controller and communicate the appropriate charging parameter(s) thereto once the controller enters the learning mode. As such, the newly learned charging parameter(s) may advantageously be stored in the memory and used upon future connections of the device and/or battery type to the battery charger. [0014] Additionally, the charger connector may also carry communications signals between the controller and a host device (e.g., a computer) connected thereto. More particularly, the communications signals may relate to at least one charging parameter. That is, the controller may advantageously learn charging parameters from the host device as well the portable device. Furthermore, in some embodiments the charger connector may also carry communications signals between the portable device and the host device. Thus, the battery charger may provide a docking station between the portable device and the host device. This arrangement may be particularly advantageous for portable devices such as personal digital assistants (PDAs) which not only have portable batteries, but which frequently are also used to synchronize calendar, contact, email, and other data with a computer. [0015] The controller may also monitor the charging circuit to detect a charging error during charging of the rechargeable battery. By way of example, such charging errors may include over or undervoltage conditions, over or undercurrent conditions, excessive temperatures, exceeding a maximum charging time, etc. The battery
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		charger may also include an indicator connected to the controller for providing an error indication upon detecting the charging error. For example, the error indicator could be an LED or LCD display. Also the charger connector may be a universal serial bus (USB) connector, for example.” ’169 Purdy at [0013] – [0015]. “Even if a device or battery type is unknown to the controller 27, it may advantageously learn or download the appropriate charging parameters for the device/battery. This allows the charger 23 to be used with future generations or models of devices/batteries that are not available when the battery charger 23 is manufactured, for example. [0045] More specifically, the controller 27 may enter a learning mode for learning the new device/battery parameters upon receiving a learning mode signal from the portable device 21, at Block 44. For example, the portable device 21 may store its own charging parameters and, responsive to receiving an unknown device error signal from the controller 27, send a designated learning mode signal that the battery charger 23 will recognize as such. The charging parameters for the rechargeable battery 22 may be stored in its identification circuit, for example. [0046] Once the controller 27 enters the learning mode, the microprocessor 30 of the portable device 21 then communicates the appropriate charging parameters to the controller, which it then stores in the memory 32, at Block 45. The newly learned charging parameters are then available for use in charging the device and/or battery type, and these device types will be recognized by the controller 27 thereafter. If a learning mode signal is not received, the battery charger 23 will stop the charging process (Block 52).” ’169 Purdy at [0044]-[0046]. “In addition, the controller 27 may also monitor the charging circuit 26 to detect a charging error during charging of the battery 22, at Block 50. By way of example, such charging errors may include over or undervoltage conditions, over or undercurrent conditions, excessive temperatures, etc. Upon detecting such an error, the controller 27 may provide an error indication via the indicator 33 (and/or an indicator of the portable device 21) upon detecting a charging error. The controller 27 may also take corrective action responsive to the error condition, such as limiting the charging voltage or current, or terminating charging, as illustratively shown at Block 52. If no such error is detected, then charging continues until a predetermined event occurs, such as a maximum charging time or charge level being reached, at Block 53. [0052] In accordance with another advantageous aspect of the invention, the charger connector 24 may also carry communications signals between the controller 27 and the host device. For example, the controller 27 may
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communicate with the host device over the same differential signal lines D+, D– connected to the charger connector 24. In particular, the communications signals may relate to one or more charging parameters. That is, the controller 27 may download charging parameters for unknown device/battery types from the host device instead of, or in addition to, downloading charging parameters from portable devices themselves,

[0053]

Of course, this configuration also allows the charger connector 24 to carry communications signals between the portable device 21 and the host device. In other words, the battery charger 23 may thus be used as a docking station for allowing the portable device 21 to communicate with the host device while it is being charged. This arrangement may be particularly advantageous for portable devices such as PDAs. This is because PDAs not only have portable batteries which typically require regular re-charging, but they also typically need to synchronize calendar, contact, email, and other data with a computer, as will be appreciated by those of skill in the art.” ’169 Purdy at [0051]-[0053].

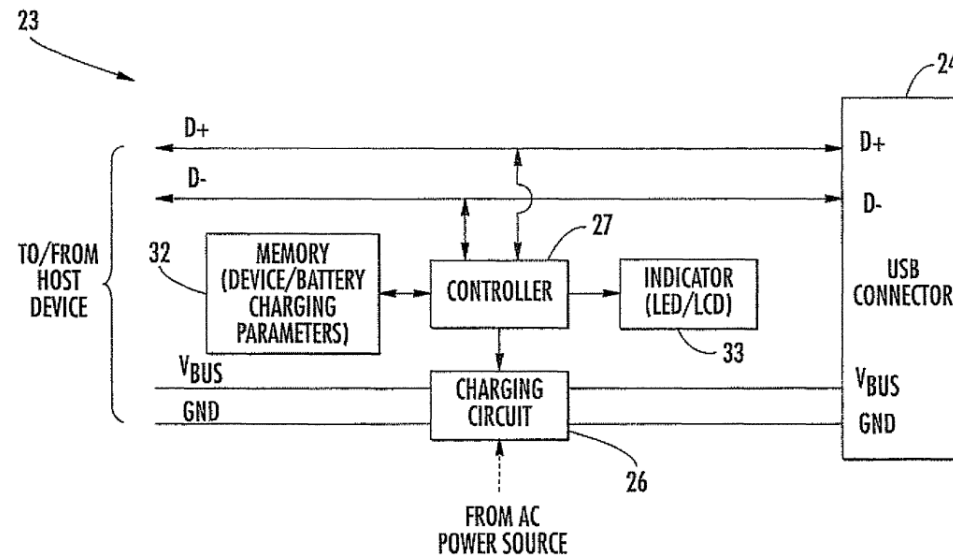


FIG. 2

’169 Purdy at Figure 2.

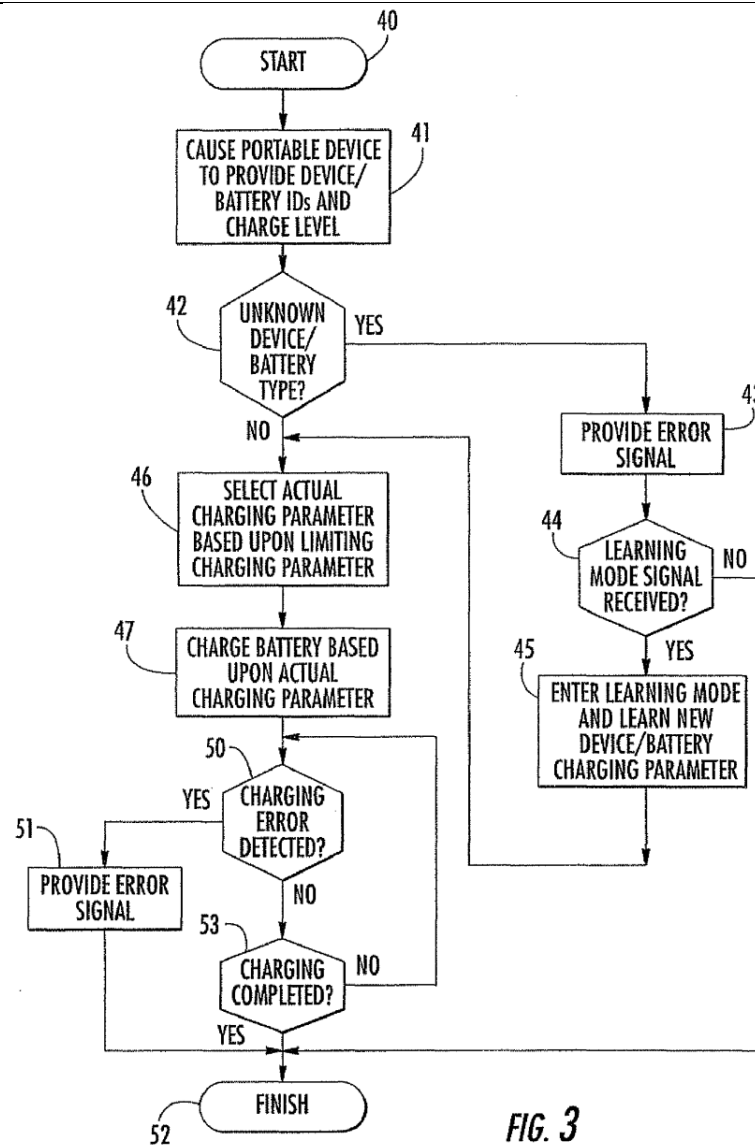
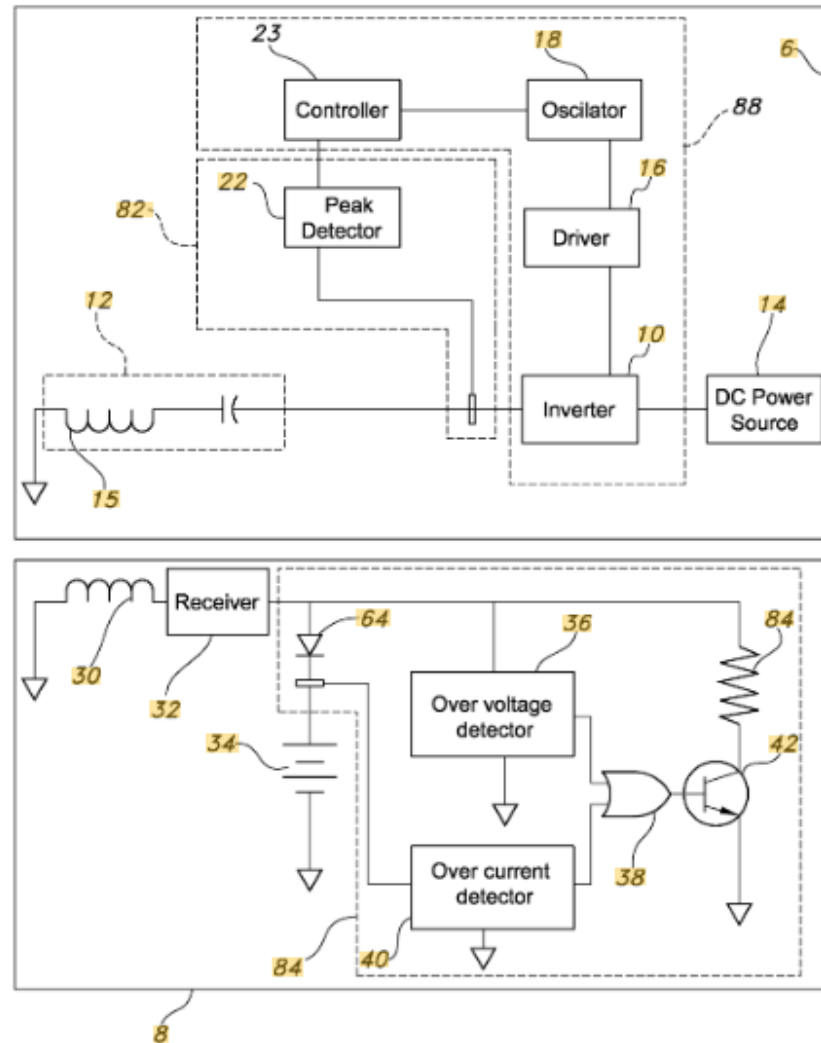


FIG. 3

'169 Purdy at Figure 3.

Claim 5		
5	The inductive power outlet of claim 4 wherein said operational parameters are selected from the group consisting of: required operating voltage for said electric load; required operating current for said electric load; required operating temperature for said electric load; required operating	'392 Baarman discloses operational parameters. For example: “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” '392 Baarman at [0035]. “The output of the OR gate 38 is coupled to the switch 42. The switch 42 is controlled by the output of the OR gate 38 and is connected in series between the rectifier 32 and the resistor 44. The switch 42 could be any suitable switch such as a bipolar transistor, a field effect transistor, or an insulated gate bipolar transistor. The resistor 44 is connected in series between the switch 42 and ground.” '392 Baarman at [0035]. “In operation, if the output of the over-voltage detector 36 or the output of the over-current detector 40 indicate an over-voltage or an over-current situation, then the output of the OR gate 38 turns on the switch 42. When the switch 42 is on, current from the rectifier 32 flows through the resistor 44 to ground.” '392 Baarman at [0036].

power for
said electric
load;
measured
operating
voltage for
said electric
load;
measured
operating
current for
said electric
load;
measured
operating
temperature
for said
electric
load;
measured
operating
power for
said electric
load;
power
delivered to
said
primary
inductive
coil;
power
received by
said



Baarman at Fig. 2.

	secondary inductive coil, and a user identification code.	To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, '169 Purdy discloses operational parameters: “The controller may also monitor the charging circuit to detect a charging error during charging of the rechargeable battery. By way of example, such charging errors may include over or undervoltage conditions, over or undercurrent conditions, excessive temperatures, exceeding a maximum charging time, etc. The battery charger may also include an indicator connected to the controller for providing an error indication upon detecting the charging error. For example, the error indicator could be an LED or LCD display. Also the charger connector may be a universal serial bus (USB) connector, for example.” '169 Purdy at [0015]. “Different portable device types will typically have one or more different portable device charging parameters, and different battery types may similarly have one or more different battery charging parameters. Table 1 provides exemplary charging parameters for two different types of USB compatible PDAs, while Table 2 provides exemplary charging parameters for two different types of PDA batteries.
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TABLE 1

Exemplary Device Charging Parameters

Device Charging Parameter	Device Type #1	Device Type #2
Overvoltage limit (V)	6.0	5.25
Undervoltage limit (V)	4.0	4.8
Overcurrent limit (mA)	800	400
Constant current (mA)	750	350
Battery full (mA)	40	20
Battery full (V)	4.15	4.22

[0037]

TABLE 2

Exemplary Battery Charging Parameters

Battery Charging Parameter	Battery Type #1	Battery Type #2
Max. Charge time (Hours)	4.0	8.0
Battery Capacity (mAh)	1000	2000

'169 Purdy at [0036] – [0037].

“Moreover, even if a charger detects the appropriate voltage level for charging a particular battery, as with the prior art discussed above, a particular battery may support voltage or current levels inside the acceptable ranges for device type #1, but outside those for device type #2, for example. Thus, while the same battery type may

		fit in both device types and have a suitable operating voltage for both, charging the battery at or near its maximum charge limits could exceed the acceptable range for device type #2, as will be appreciated by those skilled in the art. Of course, the opposite is also true, namely that a given portable device could support charging parameters that could damage a particular battery type.” ’169 Purdy at [0040].
Claim 6		
6.	The inductive power outlet of claim 2 wherein said detector is selected from the list comprising optical detectors, radio receivers, audio detectors and voltage peak detectors.	’392 Baarman discloses the detector being selected from the list comprising optical detectors, radio receivers, audio detectors and voltage peak detectors. For example: “In one embodiment, the feedback detector is a current sensor coupled to the primary tank circuit. In this embodiment, when the current is shunted through the feedback signaling resistor in the secondary, the current through the secondary coil increases, which varies the reflected impedance of the secondary circuit resulting in increased current through the primary coil. The increase in current through the primary coil is detected by the current sensor in the primary circuit, which could include a peak detector, thereby providing to the controller a feedback signal for detecting whether the battery is in an over-voltage or over-current state. In one embodiment, the frequency control mechanism makes appropriate adjustments to the frequency to correct the over-voltage or over-current state by reducing the power supplied to the secondary coil.” ’392 Baarman at [0014]. “In another aspect, the present invention also provides a method for operating an inductive charging system having a charger circuit with a primary coil and a secondary circuit with a secondary coil. The method generally includes the steps of detecting whether a battery is present in the secondary circuit and charging the battery by way of one or more charging cycles. The charging step generally includes the steps of: applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit. In this way, the frequency of the power applied to the primary coil is changed in order to optimize the charging for the battery. Several charging cycles may be necessary to fully charge the battery.” ’392 Baarman at [0016]. “In one embodiment, the detecting step further includes the steps of: applying a pulse of power to the primary coil at a predetermined probe frequency, sensing the reflected impedance, and determining whether a battery is present as a function of the sensed reflected impedance.” ’392 Baarman at [0022]. “The present invention provides a simple and effective inductive charging circuit that permits nonlinear charging profiles to be implemented in an inductive system with a small number of components. The over-

		current and over-voltage detectors not only provide feedback used to drive the frequency of the charging power, but also protect the battery from potential harmful power conditions.” Baarman at [0023]. “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” ’392 Baarman at [0035]. “A blocking diode 64 prevents the battery 34 from discharging when the secondary coil 30 is not receiving power or when the feedback mechanism is signaling an over-voltage or over-current condition.” ’392 Baarman at [0040].
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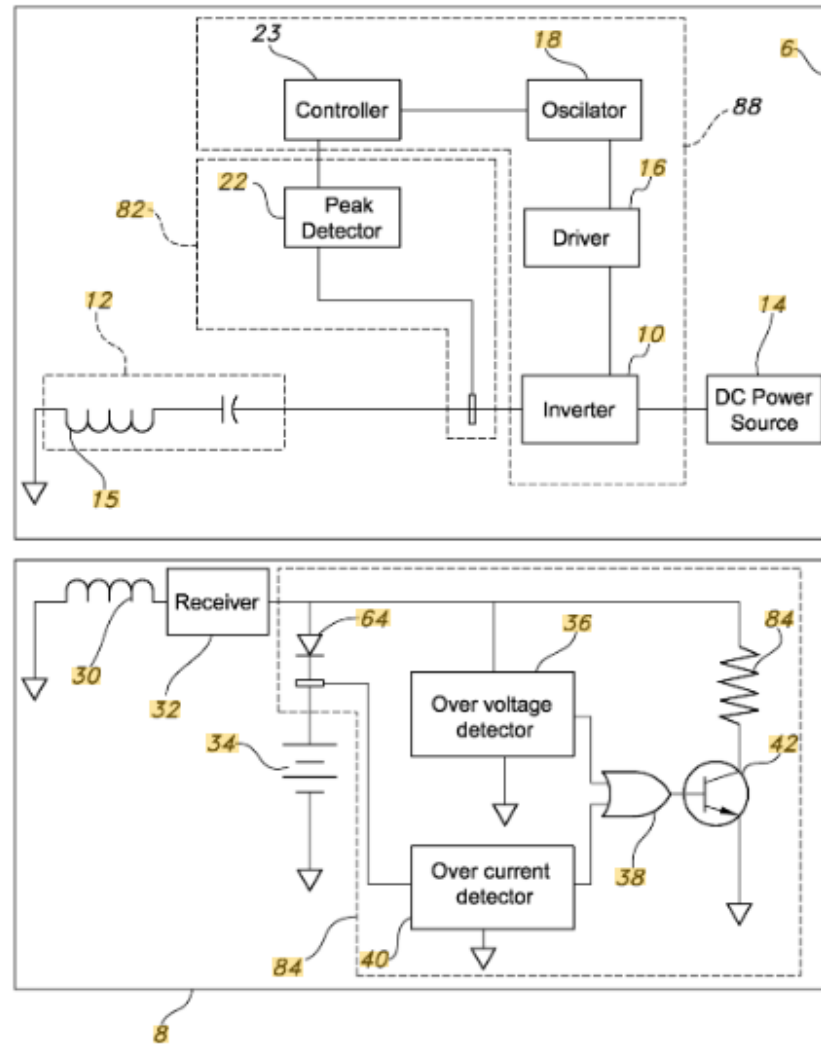


FIG. 2

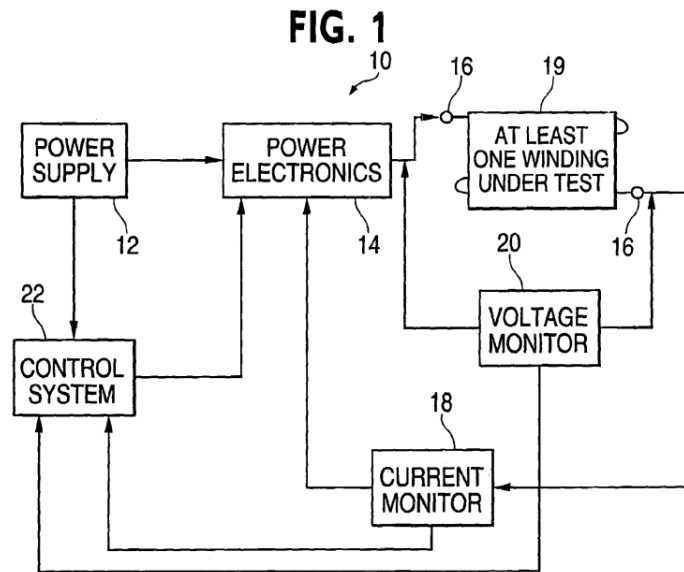
Baarman at Fig. 2.

		To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
Claim 7		
7.	The inductive power outlet of claim 1 wherein said driver further comprises a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil.	'392 Baarman discloses the driver further comprising a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil. For example: “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery.” '392 Baarman at [0011]. “In one embodiment, the feedback mechanism includes a subcircuit for varying the reflected impedance of the secondary circuit. In this embodiment, the charger circuit may include a feedback detector for monitoring a characteristic of the power in the charger circuit that varies at least in part in response to changes in the reflected impedance of the secondary circuit. In this embodiment, the feedback detector may be coupled to the primary coil to allow the controller to monitor the current through the primary coil.” '392 Baarman at [0012]. “In one embodiment, the feedback detector is a current sensor coupled to the primary tank circuit. In this embodiment, when the current is shunted through the feedback signaling resistor in the secondary, the current through the secondary coil increases, which varies the reflected impedance of the secondary circuit resulting in increased current through the primary coil. The increase in current through the primary coil is detected by the current sensor in the primary circuit, which could include a peak detector, thereby providing to the controller a feedback signal for detecting whether the battery is in an over-voltage or over-current state. In one embodiment, the frequency control mechanism makes appropriate adjustments to the frequency to correct the over-voltage or over-current state by reducing the power supplied to the secondary coil.” '392 Baarman at [0014]. “The frequency controller 80 varies the frequency of the power applied to the primary coil 15 as a function of the feedback from the secondary circuit 8.” Baarman at [0032]. “As shown, the feedback mechanism of this embodiment generally includes an over-voltage detector 36, an over-current detector 40, an OR gate 38, a switch 42, and a resistor 44. The output of an over-voltage detector 36 indicates whether the voltage across the battery 34 is above a predetermined level. Similarly, the output of

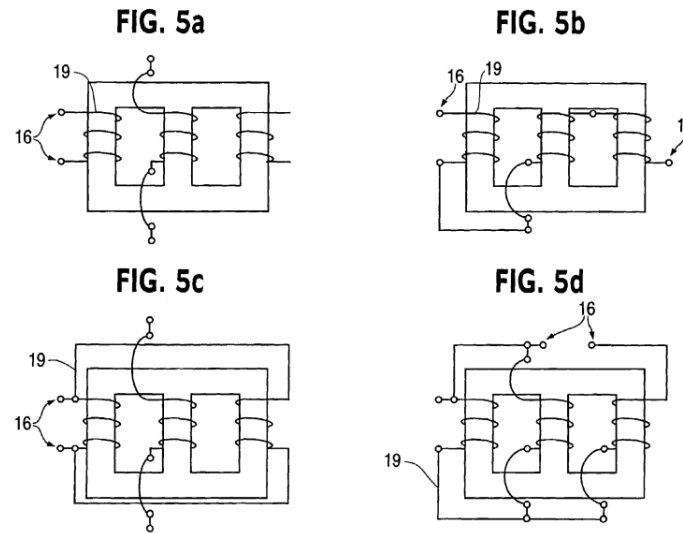
		an over-current detector 40 indicates whether the current to the battery 34 is above a predetermined amount. The output of the current detector 40 as well as the output of the voltage detector 36 are coupled to the inputs of an OR gate 38. The OR gate 38 could be a discrete circuit, or it could be a connection between the outputs of the detectors.” ’392 Baarman at [0035]. “The controller 20 continuously samples the output of the peak detector 22. When a sudden increase is detected, an internal flag referred to as FB_flag is set. When a decrease is detected, FB_flag is cleared. However, a copy of FB_flag referred to hereinafter as FB_latch is also set. FB_latch is not cleared when a decrease is detected. It can only be cleared by the controller 20. FB_latch therefore can be checked periodically by controller 20 to determine whether an over-voltage condition or an over-current condition occurred during a given period of time. Thus, the system provides a feedback mechanism to the controller.” ’392 Baarman at [0046]. To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. For example, ’078 Frank discloses the driver further comprising a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil. “The method is based on connecting the at least one winding to the source of electrical energy; increasing driving power from the source of electrical energy applied to the at least one winding until current in the at least one winding provided from the source of electrical energy reaches a predetermined level which is below a core saturation current level of the transformer whose at least one winding is having its resistance measured or a current limit of the source of electrical energy; controlling the power from the source of electrical energy applied to the at least one winding to maintain the predetermined current flowing through the at least one winding over a desired time period sufficient to cause a $L \, di/dt$ contribution to the voltage drop across the at least one winding to decrease below a threshold level; and calculating the resistance of the at least one winding from the measured current flowing through the at least one winding and the voltage drop across the at least one winding.” ’078 Frank at 3:6-22. “The method of transformer winding resistance measurements in accordance to the present invention is based on the active control of the voltage $V(t)$ in the Equation (1) to maintain a predetermined current flowing through the at least one winding over a desired period of time sufficient to cause a $L \, di/dt$ contribution to the
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		voltage drop across the at least one winding to decrease below a threshold level. The power source in accordance to the present invention is shown in a block diagram in FIG. 1. A first embodiment of a transformer winding resistance measuring device 10 shown in FIG. 1 is powered by a power supply 12 which, when attached to an external source of electrical energy (not illustrated), provides electrical power to the components of the device. A controllable power electronics module 14 provides a desired test current signal with the maximum current substantially lower than the core saturation current to the connecting terminals 16 of the winding resistance measuring configuration 19 comprising at least one winding as for example illustrated in FIGS. 5 a–d. A current monitor 18 measures the current flowing in the winding resistance measuring configuration as for example without limitation illustrated in FIGS. 5 a–d during the testing, and a voltage monitor 20 that measures the voltage drop over the winding resistance measuring configuration 14. A control system 22 controls the controllable power module to generate the test current signal according to predetermined values, user input and measured currents and voltage drop values, calculates, stores, and communicates measured resistances, and provides interfacing with the device users. The power electronic module 14 can be designed as a controllable voltage source providing an increase of the driving voltage during the ramping of the current flowing through the at least one winding such as but not limited to the configuration of FIGS. 5 a–d. When the current approaches the desired predetermined test current value, the driving voltage is modified by a feedback loop or otherwise in order to stabilize the current flowing through the at least one winding, and achieve the $di/dt \approx 0$ condition. Equivalently, the power electronic module 14 can be designed as a controllable current source that directly controls the current inserted in the at least one winding through the connecting terminals 16, both during the current ramp-up to the desired test current value and during a measurement phase when the substantially constant measurement current with $di/dt \approx 0$ is maintained at which time the resistance of the at least one winding is calculated from the voltage and current measured by the current and voltage monitors 18 and 20. The voltage source and the current source designs are functionally equivalent. The inspection of the equation (1) directly implies that the increase of the voltage $V(t)$ must result in the positive di/dt and the increase in the current $i(t)$. Once the condition $di/dt \approx 0$ is achieved, the voltage and current are linearly related and the control of either one of the two values causally results in the control of the other. The control system 22 continuously receives and stores the time-dependent values of the current flowing in the resistance measuring configuration measured by the current monitor 18 and the time-dependent values of the voltage drop as measured by the voltage monitor 20.” ’078 Frank at 5:50-6:42.
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	“The method of operation of the transformer winding resistance measuring device 10 shown in FIG. 1 is presented in the flowchart form in FIG. 2. The flowchart illustrates a feedback loop controlled algorithm.” ’078 Frank at 7:18-21. “The current i flowing throw the winding measuring configuration 19 and the voltage drop v over the winding measuring configuration is sampled during the measurement as represented by step 39.” ’078 Frank at 7:44-47. “The active current control feature of the apparatus of the invention that keeps $di(\infty)/dt \approx 0$ also means that the magnetic relationship between different transformer windings does not influence resistance measurements. Any individual transformer winding (primary, secondary, tertiary, diagnostic etc.) can comprise a winding resistance measuring configuration, as shown without limitation in the FIG. 5 a, and can be measured independently. Also any set of windings can be connected in series (FIG. 5 b), parallel (FIG. 5 c), or a parallel-series winding resistance measuring configuration (FIG. 5 d) and the equivalent resistance may be measured without regard of any other winding not connected in the winding resistance measuring configuration. The equivalent resistance measurement of a series winding resistance measuring configuration of (FIG. 5 b) is frequently used in the transformer diagnostic art for detection of the potential damages of winding conductors. The parallel winding resistance measuring configuration (FIG. 5 c) can be used for detection of the insulation failure between windings, while the parallel-series winding resistance measuring configuration (FIG. 5 d) can be beneficial for diagnostics of multiphase transformers.” ’078 Frank at 8:52-9:6.
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'078 Frank at Figure 1.



'078 Frank at Figure 5.

"1. A method for measuring resistance of at least one winding of a transformer utilizing a test current with a maximum test current less than either a core saturation current of a transformer whose at least one winding is having its resistance measured or a current limit of a source of electrical energy used for measuring of the resistance comprising:

selecting at least one transformer winding for measurement of winding resistance of the at least one winding;
 connecting the at least one winding to the source of electrical energy;
 increasing driving power from the source of electrical energy applied to the at least one winding until current in the at least one winding provided from the source of electrical energy reaches a predetermined level which is below a core saturation current level of the transformer whose at least one winding is having its resistance measured or a current limit of the power source of electrical energy;

		controlling the power from the source of electrical energy applied to the at least one winding to maintain the predetermined current flowing through the at least one winding over a time period sufficient to cause a $L \frac{di}{dt}$ contribution to a voltage drop across the at least one winding to decrease below a threshold level; and calculating the resistance of the at least one winding from a measured current flowing through the at least one winding and a voltage drop across the at least one winding which are measured after the time period.” ’078 Frank at Claim 1. “7. The method of claim 1 wherein the power of the source of the electrical energy is controlled to maintain the predetermined current flowing in the at least one winding over the time period is achieved automatically using a feedback loop.” ’078 Frank at Claim 7. “12. The method of claim 7 wherein the feedback loop uses a measured voltage drop over the at least one winding as the input control parameter of a control of the power source of electrical energy.” ’078 Frank at Claim 12.
Claim 9		
9.	The inductive power outlet of claim 1 comprising a power converter selected from the group comprising: a transformer, a DC-to-DC	’392 Baarman discloses power converter selected from the group comprising: a transformer, a DC-to-DC converter, an AC-to-DC converter, an AC-to-AC converter, a flyback transformer, a flyback converter, a full-bridge converter, a half-bridge converter and a forward converter. For example: “In one embodiment, the charger circuit includes an inverter and a tank circuit. In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit. It would be equally possible to arrange the system such that an increase in the inverter frequency would move the power applied to the primary coil closer to resonance and thereby increase power transfer while a decrease in inverter frequency would move the power applied to the primary coil farther from the resonant frequency of the tank circuit and thereby decrease the power transfer.” ’392 Baarman at [0015]. “In the illustrated embodiment, the frequency controller 80 includes a controller 20, an oscillator 18, a driver 16 and an inverter 10. In this embodiment, these components collectively drive a tank circuit 12. More specifically, the inverter 10 provides AC (alternating current) power to the tank circuit 12 from a source of DC (direct current) power 14.” ’392 Baarman at [0033].

converter, an AC-to- DC converter, an AC-to- AC converter, a flyback transformer , a flyback converter, a full-bridge converter, a half-bridge converter and a forward converter.	“A rectifier 32 produces a DC current from the AC current supplied by secondary coil 30. A capacitor 62 is charged to provide a DC power source for charging the battery 34.” ’392 Baarman at [0040].
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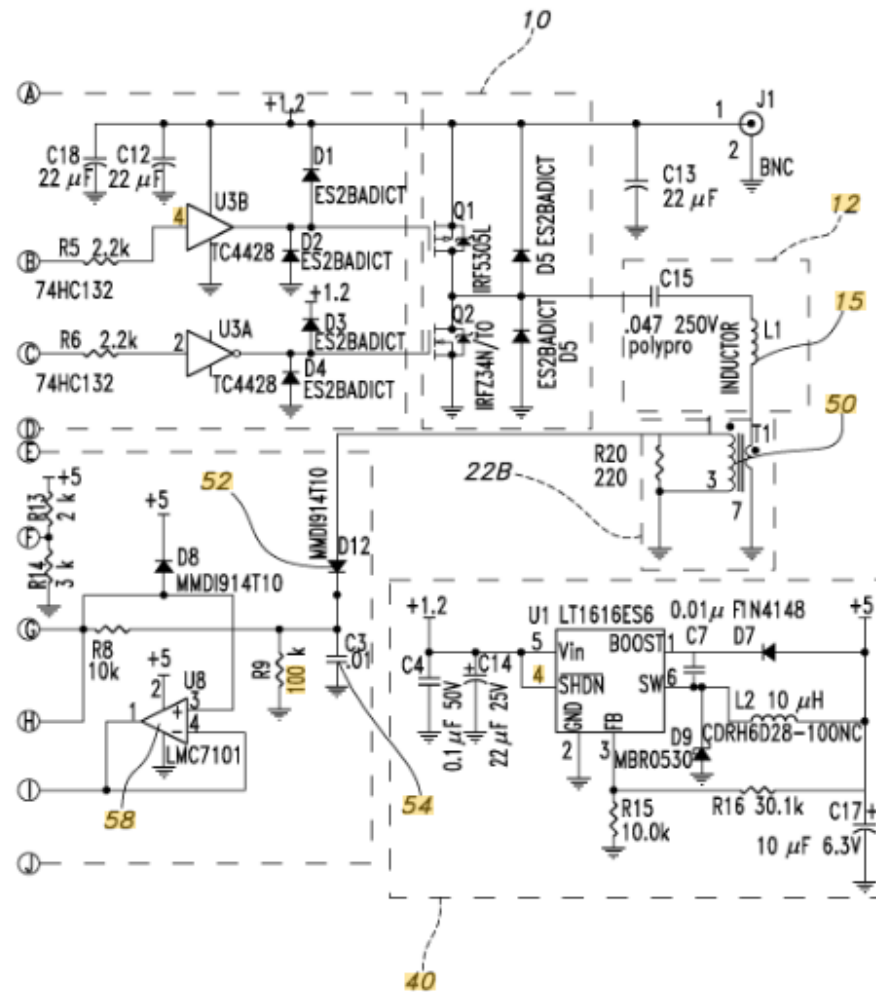


FIG. 4B

'392 Baarman at Fig. 4B.

		To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.
Claim 10		
10.	The inductive power outlet of claim 1 incorporated into at least one application selected from a group consisting of: inductive chargers, inductive power adaptors, power tools, kitchen appliances, bathroom appliances, computers, media players, office	'392 Baarman discloses at least one application selected from a group consisting of: inductive chargers, inductive power adaptors, power tools, kitchen appliances, bathroom appliances, computers, media players, office equipment, implanted devices, pace makers, trackers and RFID tags. For example: “An inductive charging system for recharging a battery. The system includes a charger circuit and a secondary circuit. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at Abstract. “An inductive charging system in accordance with an embodiment of the present invention in shown in FIG. 2. The inductive charging system 4 is configured to inductively charge a battery having a nonlinear charging profile, such as a Li-Ion battery.” '392 Baarman at [0032]. To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.

	equipment, implanted devices, pace makers, trackers and RFID tags.	
Claim 11		
11.	The inductive power outlet of claim 1 wherein said alignment mechanism comprises a first magnetic element configured to engage a second magnetic element associated with the power receiver.	'392 Baarman discloses an alignment mechanism. For example: “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” '392 Baarman at [0011]. To the extent '392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions. In particular, it was well known by those with skill in the art before the time of the '696 patent to include a magnetic alignment mechanism. For example, '979 McEachern discloses a magnetic alignment mechanism: “An improved charger, known in the art, eliminates any electrical connection between the hand-held device and the AC outlet. Instead, the required recharging power is coupled magnetically between the recharger and the hand-held device. The charger contains the primary of a transformer, and the hand-held device contains the secondary of a trans former. The primary and the secondary of the transformer are mechanically separable. When the two are placed in proper orientation and close proximity, a varying magnetic field is electrically induced in the primary of the transformer, and is then coupled to the secondary of the

		transformer. The secondary coil of the transformer is used to generate charging current for the rechargeable batteries. This approach allows the hand-held device to be completely sealed, and provides no electrical connection between an AC outlet and the hand-held device.” ’979 McEachern at 1:41-57.
Claim 14		
14.	The inductive power outlet of claim 1 wherein said alignment mechanism comprises a tactile indication.	’392 Baarman discloses alignment mechanism. For example: “An inductive system for recharging a battery, such as a Li-Ion battery, having a unique charging cycle generally includes a charger circuit having a primary coil for inductively supplying charging power and a secondary circuit for inductively receiving the charging power and applying that power to a battery. The secondary circuit includes a feedback mechanism to provide feedback to the charger circuit through the inductive coupling of the primary coil and the secondary coil. The charger circuit includes a frequency control mechanism for controlling the frequency of the power applied to the primary coil at least partly in response to the feedback from the feedback mechanism.” ’392 Baarman at [0011]. To the extent ’392 Baarman does not disclose any elements of this claim limitation, it would have been obvious to a person having ordinary skill in the art to combine, with the teachings of the Prior Art, those elements, as known to them or as disclosed by other prior art identified in the invalidity contentions.