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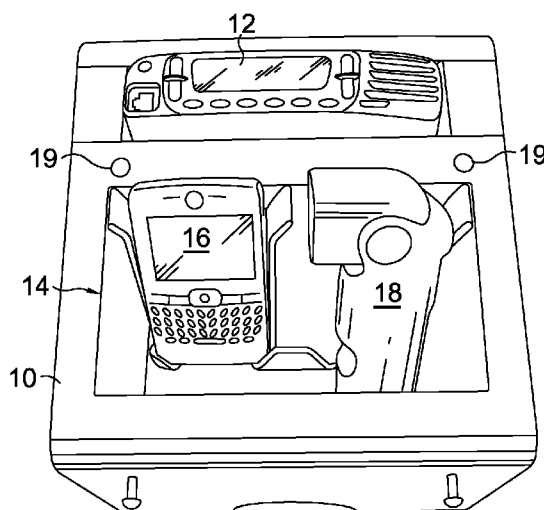
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- with information concerning request for restoration of the right of priority in respect of one or more priority claims (*Rules 26bis.3 and 48.2(b)(vii)*)

(54) Title: INDUCTIVELY COUPLED CONSOLES



**FIG. 1.**

(57) Abstract: Inductively coupled consoles and vehicle consoles with integrated primary coils, and apparatuses for charging, supporting, and securing portable computers with integrated primary coils are provided. Power is inductively coupled from a primary coil to a device containing a secondary coil, such as a PDA, cellular phone, rechargeable flashlight, remote control, power tool, or laptop computer. Primary coils may be integrated into consoles to charge devices containing secondary coils placed in the consoles. Primary coils may similarly be integrated into vehicle consoles. Inductively coupled consoles may be configured to receive and hold devices containing secondary coils. Primary coils may also be integrated into an apparatus for charging, supporting, and securing a portable computer. Integrated primary coils may provide varying amounts of power.



## INDUCTIVELY COUPLED CONSOLES

### BACKGROUND OF THE INVENTION

One of the problems associated with many of the electronic devices so common in today's world is the necessity for the cords and cables associated with the various electronic devices. Rechargeable cordless devices are a common alternative. These devices still require charging and the associated cords and cables to accommodate this charging.

Technology has been developed to address these limitations by providing an inductively coupled power circuit. This circuit dynamically seeks resonance and optimizes power transfer from a primary coil to a secondary device with a secondary coil. This power transfer can occur under multiple, varying load conditions. By using this circuit, the primary supply circuit adapts its operation to match the needs of the secondary devices being supplied with power. The circuit also allows the primary supply circuit to supply power to multiple secondary devices simultaneously.

### SUMMARY OF THE INVENTION

Intelligent, inductively coupled power circuits have been developed to transfer power from a source to a device without the need for a wired connection. Primary coils inductively couple power to secondary coils integrated into devices such as laptop computers, PDAs, cell phones, and power tools. Embodiments of the present invention incorporate this inductive coupling technology into consoles and apparatuses for charging, supporting, and securing portable computers.

In one embodiment, primary coils are integrated into a console. Primary coils of low, medium, and high power can be integrated into the console in any position, number, and combination. The inductively coupled console may be installed in furniture seating.

In another embodiment, primary coils are integrated into a vehicle console. Primary coils of low, medium, and high power can be integrated into the vehicle console in any position, number, and combination. The vehicle console may be configured to receive and hold devices containing secondary coils, such as a PDA, cell phone, and rechargeable

flashlight. The vehicle console could be installed between seats, in the front dashboard control unit, or elsewhere in a vehicle.

In yet another embodiment, an apparatus for charging, supporting, and securing a portable computer is provided. One or more primary coils are integrated into one or more surfaces. Primary coils of low, medium, and high power can be integrated into the surface in any position, number, and combination. The apparatus includes means of securing the portable computer to the surface and means of attaching the surface to the interior of a vehicle.

This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

#### BRIEF DESCRIPTION OF THE DRAWING

The present invention is described in detail below with reference to the attached drawing figures, wherein:

FIG. 1 is a perspective view of an inductively coupled vehicle console;

FIG. 2 is a perspective view of an inductively coupled console installed in seating furniture;

FIG. 3 is a perspective view of a laptop computer and an apparatus for securing and inductively charging the laptop computer;

FIG. 4 is a perspective view of the apparatus for securing and inductively charging a laptop computer shown in FIG. 3; and

FIG. 5 is an exploded perspective view of the laptop computer and apparatus for securing and inductively charging the laptop computer of FIG. 3.

#### DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the present invention are described with specificity herein to meet statutory requirements. However, the description itself is not intended to limit the scope

of this patent. Rather, the inventor has contemplated that the claimed subject matter might also be embodied in other ways.

As noted in the background section, technology has been developed that provides an intelligent, inductively coupled power circuit. This circuit dynamically seeks resonance and optimizes power transfer from a primary coil to a secondary coil in a secondary device. The circuit allows the primary coil to determine and provide the power needs of the secondary device. By using this circuit, the primary supply circuit adapts its operation to match the needs of the secondary devices being supplied with power. The circuit also allows the primary supply circuit to supply power to multiple secondary devices simultaneously. Examples of the circuit and the operation of the circuit are contained in the following U.S. Patents, all of which are hereby incorporated by reference: 6,436,299; 6,673,250; 6,731,071; 6,806,649; 6,812,645; 6,831,417; 6,917,163; 6,975,198; 7,116,200; 7,118,240; 7,126,450; and 7,132,918.

Inductively coupled power circuits may be used to power and recharge cordless devices, including cell phones, PDAs, flashlights, laptop computers, and power tools. Each cordless device could have a secondary coil. The primary coil required to create the inductively coupled power circuit could be integrated into a console, vehicle console, or apparatus for securing, supporting, and charging a portable computer. An inductively coupled console could be configured to receive and hold devices containing secondary coils. Alternatively, embodiments of an inductively coupled console may include a substantially flat surface with integrated primary coils that is integrated into furniture seating. Consoles may generally be installed near any type of seating or in an office or room environment. In a vehicle, an inductively coupled console may be installed between seats, as a center console in the front dashboard control unit, or anywhere else in the vehicle.

Primary coils may be low, medium, or high power. Low power primary coils provide up to about approximately 20 watts of power. Medium power primary coils provide between about approximately 20 and 100 watts of power. High power primary coils provide greater than about approximately 100 watts of power. Any number and combination of primary coils may be integrated into an inductively coupled console or surface of an apparatus for charging, securing, and supporting a portable computer.

FIG. 1 illustrates a center console 10 for a vehicle and is preferably located in the front seat between the driver's side and the passenger's side of the vehicle. Console 10 is typically provided with dedicated communications device 12, which could be a radio, CB,

navigation device, cassette player, or compact disc player. Below communications device 12 is holding area 14 for devices containing secondary coils, such as a cell phone or PDA 16 and flashlight 18. Other devices could of course be housed within holding area 14, limited only by the physical dimensions of holding area 14 and the devices housed.

5           With continued reference to FIG. 1, holding area 14 has one or more primary coils installed behind, beneath, above, or below that inductively couple power to secondary coils contained in devices. Console 10 is provided with small indicator lights 19 that illuminate when a device is receiving power inductively coupled from a primary coil. In embodiments with multiple primary coils installed, all of the multiple primary coils may be controlled by a  
10           single control circuit. Holding area 14 can be completely sealed due to the inductive nature of the power circuit, and so can alternatively be used as a general purpose holding area or cup holder when not in use as a charging area.

          With continued reference to FIG. 1, console 10 is configured to receive and hold PDA 16 and flashlight 18. This could be accomplished by a friction fit, strap restraints,  
15           buckles, compartments, clips, or other means of securing devices in holding area 14. For embodiments installed in a vehicle, this will ensure devices remain in place during transit. Additionally, in embodiments of a vehicle console, the primary coils may draw power from the battery of the vehicle.

          FIG. 2 illustrates theater-style seating 20 with a primary coil installed in center  
20           console 22. The individual seats in theater-style seating 20 tilt slightly toward center console 22. A person seated in theater-style seating 20 can charge a cell phone, PDA, or other handheld electronic device by placing the device on the top surface of center console 22. Additionally, remote control 24 can be charged through the primary coil such that an individual seated and using the remote control will not be inconvenienced by remote control  
25           batteries running out of power. Although FIG. 2 provides an embodiment in which an inductively coupled console is installed in theater seating, an inductively coupled console could also be installed in other seating furniture, including, but not limited to, recliner chairs, couches, sofas, loveseats, and office chairs. In embodiments with multiple primary coils installed, all of the multiple primary coils may be controlled by a single control circuit.

30           To facilitate proper placement, an outline of each charging area, along with logos, pictures, or other indicia, is preferably provided on the console surface. The outline may be illuminated, for example with LEDs. An indicator light may be located in the console surface for each primary coil location. More specifically, an indicator light may be embedded below

the console surface and covered with a material that allows the light to pass through, such as Plexiglas. The indicator light may turn on when a device containing a secondary coil is placed over a respective primary coil and is charging.

An inductively coupled console installed in seating furniture could contain one or more depressions or compartments in which devices containing secondary coils rest or are secured, rather than a substantially flat surface on which devices rest. Such depressions or compartments could be concealed by an armrest or center armrest. For example, an armrest of a chair could open via a hinge or other mechanism to reveal an inductively coupled console that may have compartments for devices containing secondary coils.

Referring again to FIG. 2, power may be provided to console 22 through a battery or a power cord plugged into an electrical outlet. Console 22 provides the user the capability to power or recharge any number of devices equipped with the proper secondary coils. Power is provided by the primary coil or coils under the console surface in an unobtrusive fashion. Also, it should be understood that any number of recharging zones could be provided, with corresponding primaries coils located beneath them. It should be also be understood that the rechargeable devices shown are merely exemplary, and that a virtually unlimited number and variety of devices equipped with a proper secondary coil could be charged by the primary coils located in console 22.

FIGS. 3-5 illustrate a portable computer mount 32. Computer mount 22 may be attached to any structure, including, but not limited to, a vehicle, interior or exterior building wall, desk, podium, or table. Preferably, the computer mount is attached to the interior of a vehicle. FIG. 3 illustrates laptop computer 30 being held within computer mount 32. For simplicity, computer mount 32 is not shown attached to a structure. It should be understood that mount 32 is normally found within the interior of a vehicle, such as in a police car, to provide the driver access to laptop 30. Mount 32 may be positioned such that the driver is able to see and use laptop 30 while seated in the driver's seat. Mount 32 is a universal mount that allows for different sizes and shapes of laptops.

FIG. 4 provides a more detailed view of the base 34 of mount 32, and is more fully described in U.S. Patent 7,032,872, the disclosure of which is hereby incorporated by reference. Base 34 provides a reliable computer mount which can secure a laptop computer in place within a vehicle. Base 34 also provides a number of different adjustment features to accommodate a variety of laptops. Base 34 also has locking and releasing features that allow the laptop to be easily removed. As best seen in FIG. 5, primary coil charging surface 36 is

coupled to base 34. The primary coil is located to correspond to the battery location of the laptop, and provides power to the secondary coil in the laptop. The mount base 34 and surface 36 provide a charging station and universal mount for laptop 30. The primary coil could also be embedded in base 34 rather than integrated into charging surface 36.

5 Additional primary coils could also be integrated into surface 36 or base 34. These additional primary coils could be configured to charge PDAs, cell phones, or other electronic devices that could also be secured to mount 32 along with laptop 30. In embodiments with multiple primary coils installed, all of the multiple primary coils may be controlled by a single control circuit.

10 It should be appreciated that other means for securing and supporting a portable computer, such as different mounts or a friction fit are contemplated. Means for attaching a laptop and mount to a vehicle or other structure are also contemplated. Such means include mounting brackets and support arms, which could be bolted, screwed, or otherwise attached to the vehicle or structure.

15 Referring again to FIG. 5, preferably the charging area for the primary coil intended to charge laptop 30 would be outlined, along with logos, pictures or other indicia, on surface 36. The outline may be illuminated, for example with LEDs. An indicator light may be located in the console surface for each primary coil location. More specifically, an indicator light may be embedded below the console surface and covered with a material that

20 allows the light to pass through, such as Plexiglas. The indicator light may turn on when a computer containing a secondary coil is placed over a respective primary coil and is charging. Similar indicators could be present for other devices containing secondary coils, such as PDAs or cell phones, that receive power inductively coupled from additional primary coils integrated into surface 36.

25 If an apparatus for charging, securing, and supporting a portable computer is installed in a vehicle, the primary coils may be powered through the vehicle's battery or engine. If an apparatus is installed on or in a structure with access to an electrical outlet, for example an office building lobby wall or podium, the apparatus may be powered through a battery or a power cord plugged into an electrical outlet.

30 The present invention has been described in relation to particular embodiments, which are intended in all respects to be illustrative rather than restrictive. Alternative embodiments will become apparent to those of ordinary skill in the art to which the present invention pertains without departing from its scope.

From the foregoing, it will be seen that this invention is one well adapted to attain all the ends and objects set forth above, together with other advantages which are obvious and inherent to the system and method. It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of the claims.

5



## CLAIMS

What is claimed is:

1. An inductively coupled console, comprising: a console; and one or  
5 more primary coils integrated into the console, wherein each primary coil is connected to a power source, and wherein each primary coil is capable of inductively coupling power to a device containing a secondary coil.
2. The inductively coupled console of claim 1, further comprising  
10 indicators that show the charging area for each primary coil.
3. The inductively coupled console of claim 1, wherein the one or more primary coils is a combination of primary coils selected from the group consisting of low power primary coil, medium power primary coil, and high power primary coil.  
15
4. The inductively coupled console of claim 1, wherein the console is installed in seating furniture.
5. The inductively coupled console of claim 4, wherein the console is  
20 configured to charge one or more remote controls.
6. The inductively coupled console of claim 1, wherein the console is configured to receive and hold one or more devices containing secondary coils.
7. The inductively coupled console of claim 1, wherein a plurality of  
25 primary coils are integrated into the console, and wherein the plurality of primary coils are controlled by a single circuit.

8. An inductively coupled vehicle console, comprising: a vehicle console capable of storing one or more devices containing one or more secondary coils; and one or more primary coils integrated into the vehicle console, wherein each primary coil is connected to a power source, and wherein each primary coil is capable of inductively powering a device containing a secondary coil.

9. The inductively coupled vehicle console of claim 8, further comprising indicators that show the charging area for each primary coil.

10. The inductively coupled vehicle console of claim 8, wherein the one or more primary coils is a combination of primary coils selected from the group consisting of low power primary coil, medium power primary coil, and high power primary coil.

11. The inductively coupled vehicle console of claim 8, wherein the console is installed between seats in a vehicle.

12. The inductively coupled vehicle console of claim 8, wherein the console is installed in the front control unit of a vehicle.

13. The inductively coupled vehicle console of claim 8, wherein the console is configured to receive and hold one or more devices containing secondary coils.

14. The inductively coupled vehicle console of claim 8, further comprising means for securing devices containing secondary coils in the console.

15. The inductively coupled vehicle console of claim 8, wherein a plurality of primary coils are integrated into the vehicle console, and wherein the plurality of primary coils are controlled by a single circuit.

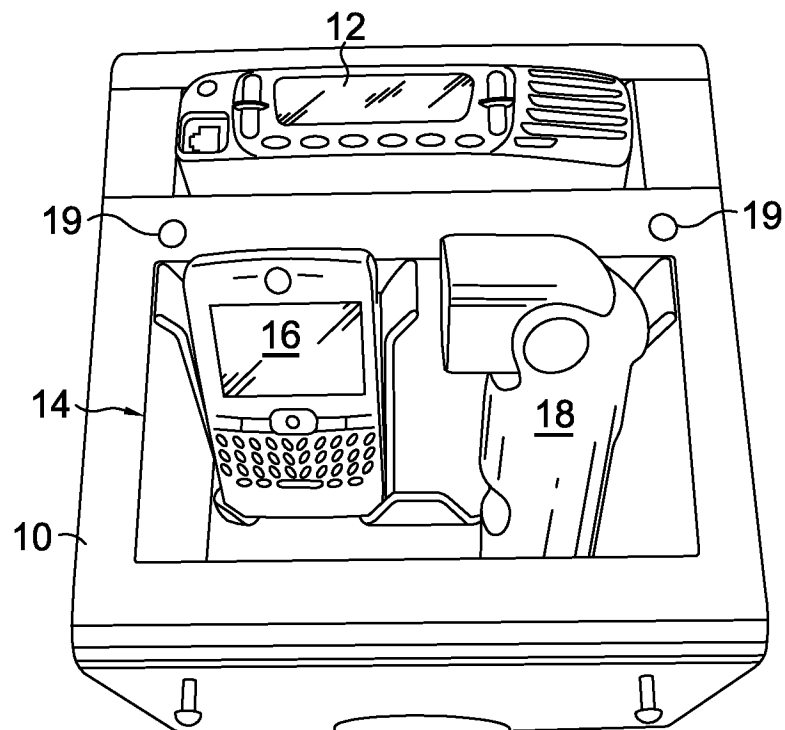
16. An apparatus for charging, securing, and supporting a portable computer, comprising: one or more surfaces capable of supporting a portable computer; one or more primary coils integrated into the surfaces, wherein each primary coil is connected to a power source, and wherein each primary coil is capable of inductively coupling power to a portable computer containing a secondary coil; means for securing the portable computer to the one or more surfaces; and means for attaching the one or more surfaces to a structure.

17. The apparatus of claim 16, wherein the structure is a vehicle.

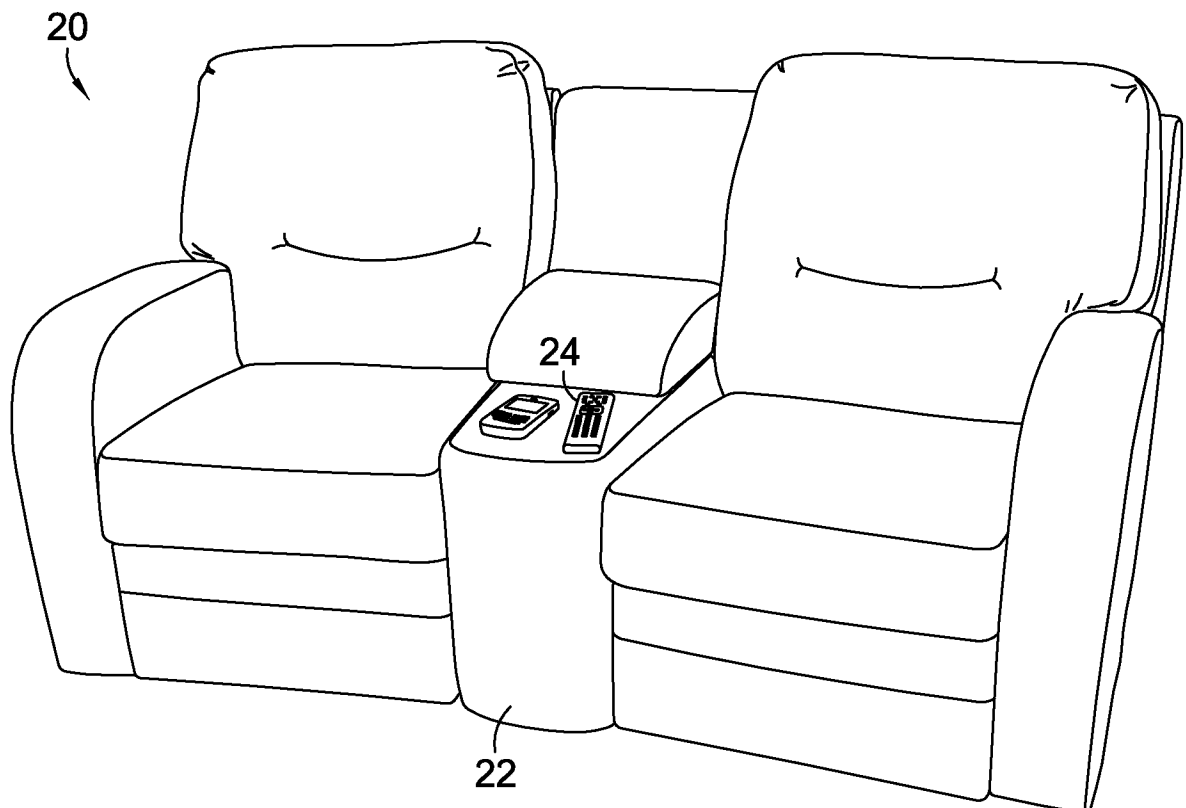
18. The apparatus of claim 17, wherein the apparatus is configured such that the computer may be used by a person seated in the driver's seat of the vehicle.

19. The apparatus of claim 16, further comprising one or more additional primary coils integrated into the surfaces, wherein the additional primary coils are configured to charge secondary-coil-containing devices other than portable computers.

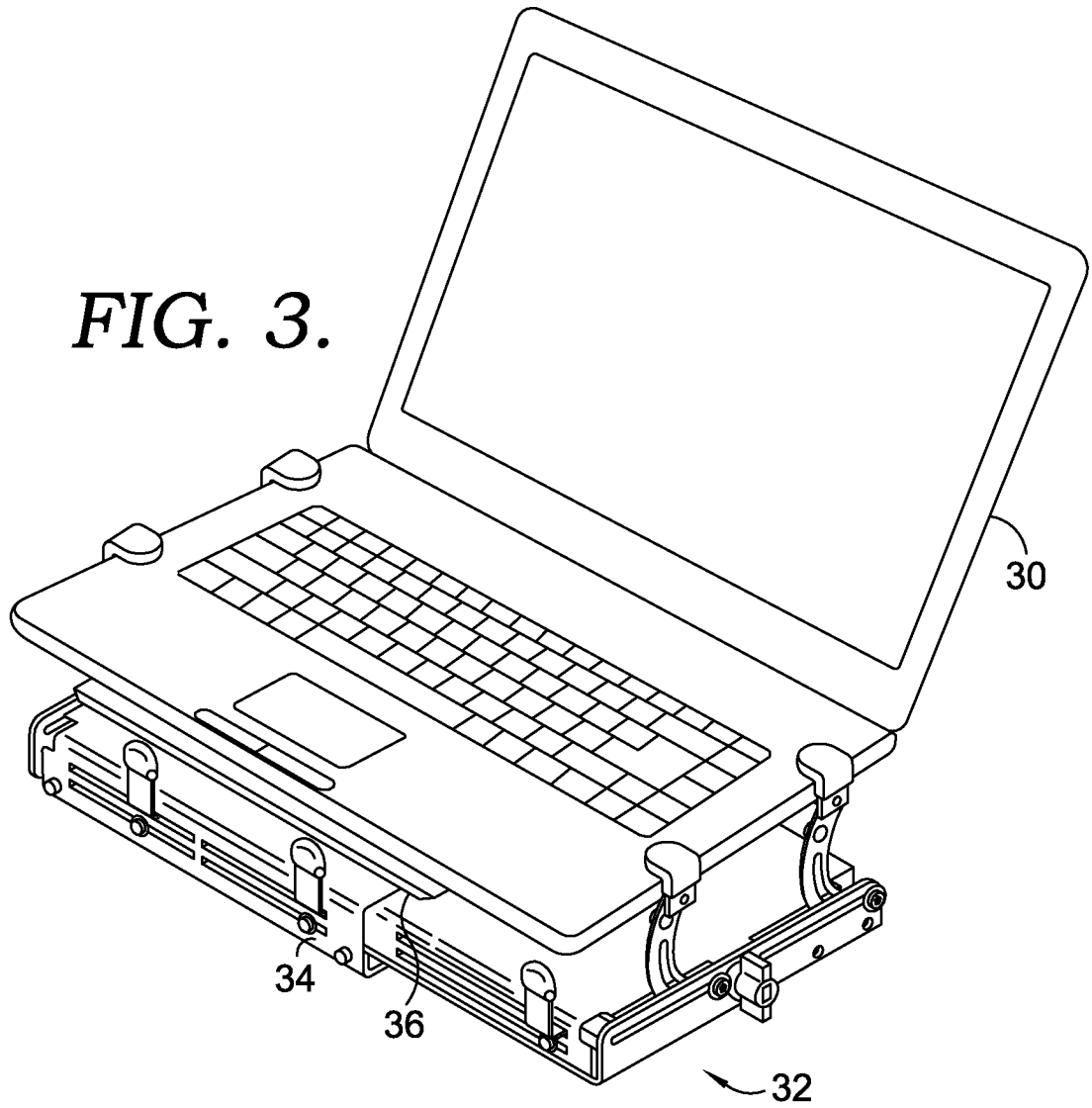
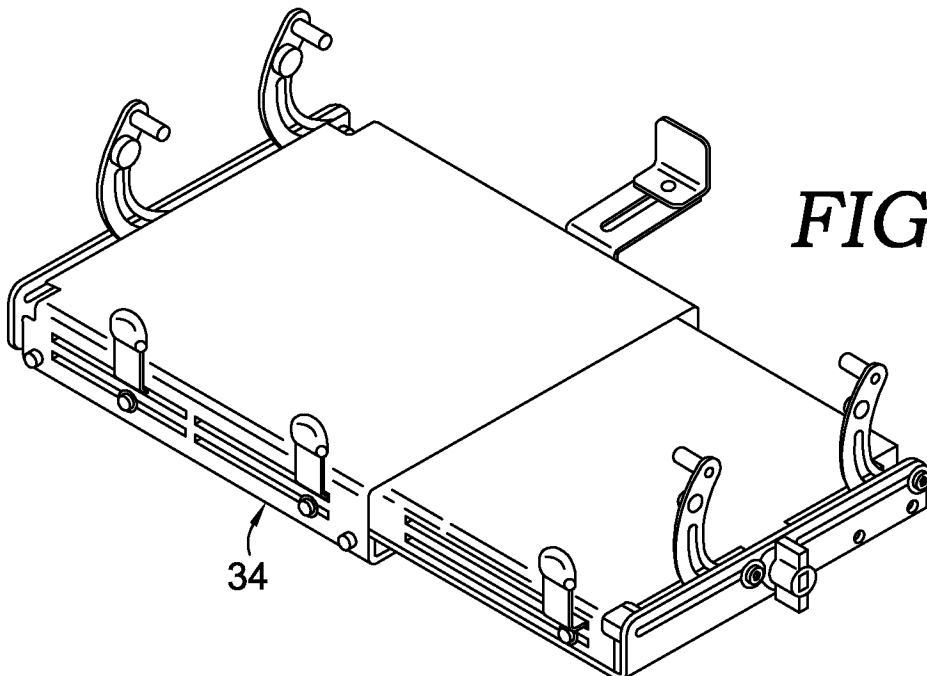
20. The apparatus of claim 16, wherein a plurality of primary coils are integrated into the one or more surfaces, and wherein the plurality of primary coils are controlled by a single circuit.

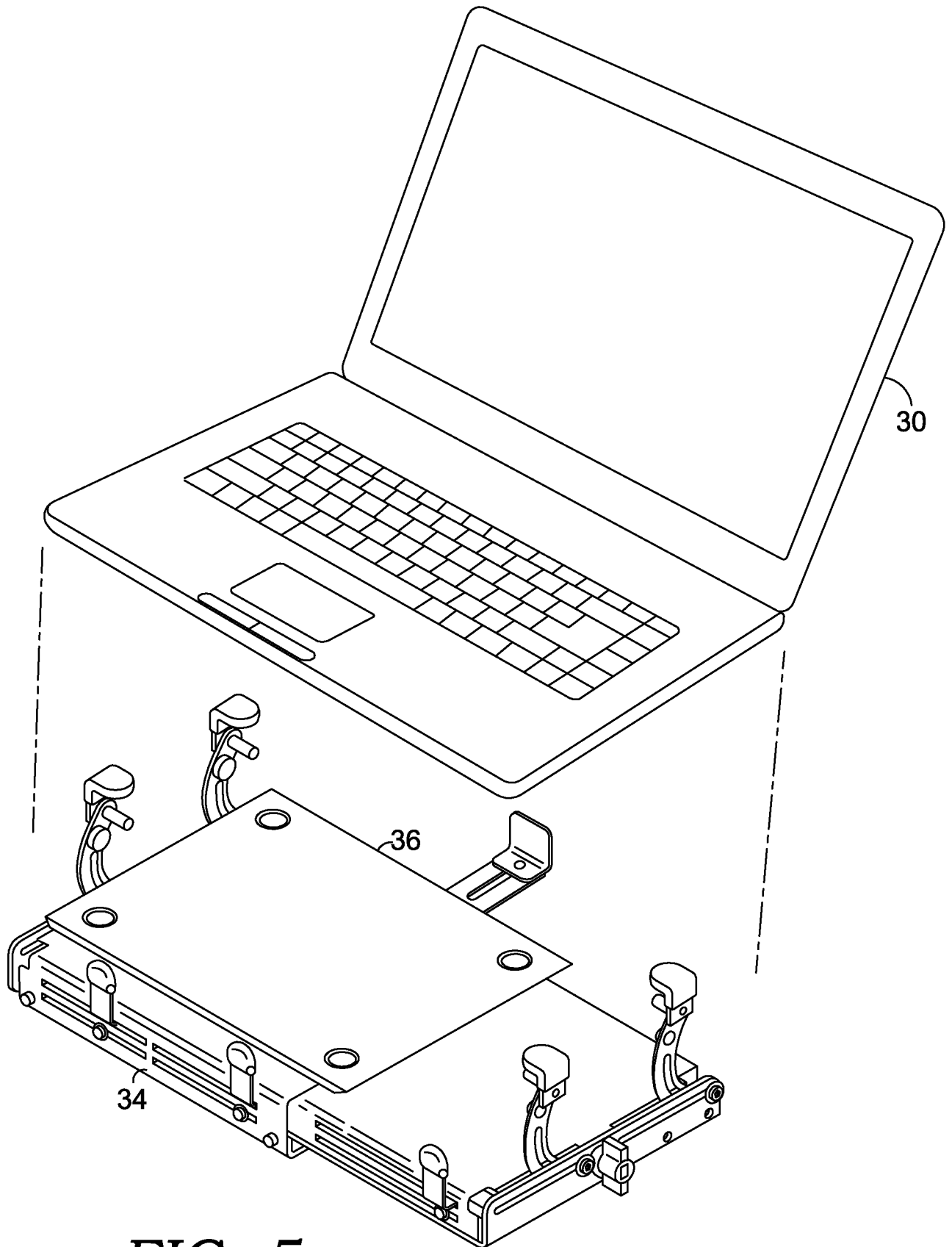


**FIG. 1.**



**FIG. 2.**

*FIG. 3.**FIG. 4.*



**FIG. 5.**

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 09/41508

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H02J 7/00 (2009.01)

USPC - 320/108

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC- 320/108

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC- 320/108, 137 (keyword limited - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST (PGPB,USPT,EPAB,JPAB); Google Scholar

Search Terms: inductive, power or charge, station or pad or surface, coil, circuit, console, vehicle, remote control, low or medium or high power, indicator, seat or furniture, between, secure, computer or laptop

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2005/0007067 A1 (BAARMAN et al.) 13 January 2005 (13.01.2005), entire document, especially; para [0005], [0022]-[0026], [0031], [0033]	1, 4-6, 8, 12-14 ----- 2, 3, 7, 9-11, 15-20
Y	US 2007/0182367 A1 (PARTOVI) 09 August 2007 (09.08.2007), entire document, especially; [0043]-[0044], [0067], [0130], [0163]	2, 3, 7, 9-11, 15-20

☐ Further documents are listed in the continuation of Box C.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

07 JUL 2009

Name and mailing address of the ISA/US

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