

H02J

CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY

Definition statement

This place covers:

- ac and/or dc supplying systems
- ac and/or dc distribution networks
- circuit arrangements for battery supplies, including charging or control thereof, or co-ordinated supply from two or more sources of any kind
- circuit arrangement providing remote indication and control of a network switch
- systems for supplying or distributing electric power by electromagnetic waves

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation	G01T 1/175
Electric power supply circuits specially adapted for use in electronic time-pieces with no moving parts	G04G 19/00
For digital computers	G06F 1/26
For discharge tubes	H01J 37/248

Informative references

Attention is drawn to the following places, which may be of interest for search:

Vessels networks	B63J
Aircraft networks	B64D
Power supplies for movable barriers, electric doors, electric sunshades	E06B
Circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus	H02M
Control of a single motor or generator, of the types covered by subclass H02N	H02N
Interrelated control of several motors, control of a prime-mover/generator combination	H02P
Control of high-frequency power	H03L
Additional use of power line or power network for transmission of information	H04B

Special rules of classification

Claimed devices, systems, and methods always have to be classified. If there is additional information disclosed, then indexing codes for the additional information must be allocated.

If a breakdown indexing code of the subclass [H02J](#) (only for additional information) is given, it must always be accompanied by a main trunk symbol under [H02J](#), for invention or additional information.

For example, if a document gets the breakdown indexing code [H02J 2003/001](#) only, the document will not be automatically retrieved when checking the documents having the main trunk symbol [H02J 3/00](#) as additional information. On practice, the document will not be considered part of the [H02J 3/00](#) collection.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Wireless energy transfer	non-conductive energy transfer, even if conductors can be used for implementing the separated sending and receiving units
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H02J 1/00

Circuit arrangements for dc mains or dc distribution networks

References

Limiting references

This place does not cover:

Power supplies for vehicle components	B60R 16/00
Power supplies for memories	G05G
Power supplies for computers	G06F 1/00
Fuel cells	H01M 8/00
Load protection by tripping of the load for dc systems	H02H
Details for dc/dc converters	H02M 3/00
Power supplies for dc lamps	H05B 37/00

Special rules of classification

The following Indexing Codes are to be used for classifying additional information:

H02J 2001/002	dc supply with intermediated ac distribution
H02J 2001/008	dc supply with at least two different dc voltage levels (e.g: 14V and 42V in certain vehicles)
H02J 2001/004	use of fuel cells for ac or dc power generation (e. g. for UPS, load balancing, economic power management...)
H02J 2001/006	Provisions for temporary connection of dc sources of essentially the same voltage, e.g. jumpstart cables, etc.

H02J 1/02

Arrangements for reducing harmonics or ripples

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

In converters	H02M 1/14
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H02J 1/10

Parallel operation of dc sources

Definition statement

This place covers:

Circuit arrangements, systems and methods for the parallel connection of DC sources. Parallel operation must be interpreted as the operational characteristics allowing that the parallel-connected sources supply the load, for instance, how to share the load among the different sources, or how to sequentially switch different power sources on.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Involving batteries	H02J 7/34
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H02J 1/102

{being switching converters ([H02J 1/108](#), [H02J 1/12](#) take precedence)}

Definition statement

This place covers:

Parallel operation of DC sources, where the sources are switched mode power supplies (SMPS), i.e. power electronic converters with a DC output.

References

Limiting references

This place does not cover:

Parallel operation of dc sources using diodes blocking reverse current flow	H02J 1/108
Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier	H02J 1/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Conversion of dc power input into dc power output without intermediate conversion into ac by static converters using semiconductor devices as final control devices for a single load	H02M 3/158
Single converters with a plurality of output stages connected in parallel	H02M 3/285

H02J 1/108

{using diodes blocking reverse current flow ([H02J 1/12](#) takes precedence)}

References

Limiting references

This place does not cover:

Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier	H02J 1/12
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H02J 1/14

Balancing the load in a network

Definition statement

This place covers:

Balancing the load in a DC distribution network, either by avoiding overloading one section of the network, or by load shedding

Relationships with other classification places

Group [H02J 1/14](#), in practice, relates for load shedding. Load balancing by buffering is classified in group [H02J 7/34](#).

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

By batteries	H02J 7/34
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H02J 3/00

Circuit arrangements for ac mains or ac distribution networks

Definition statement

This place covers:

- Arrangements for selectively connecting the load to one among a plurality of power lines or power sources
- Arrangements for reducing harmonics or ripples
- Arrangements using a single network for simultaneous distribution of power at different frequencies; using a single network for simultaneous distribution of ac power and of dc power
- Arrangements for connecting networks of the same frequency but supplied from different sources
- Constant-current supply systems
- Arrangements for adjusting, eliminating, or compensating reactive power in networks
- Arrangements for preventing or reducing oscillations of power in networks
- Arrangements for eliminating or reducing asymmetry in polyphase networks
- Arrangements for balancing of the load in a network by storage of energy
- Arrangements for transfer of electric power between networks of substantially different frequency

- Arrangements for transfer of electric power between ac networks via a high-tension dc link
- Arrangements for parallelly feeding a single network by two or more generators, converters or transformers

References

Limiting references

This place does not cover:

Wind turbines	F03D 9/00
Computer systems for trading	G06Q 30/00
Systems, methods for trading (electricity/gas/water)	G06Q 50/06
Details of switches for load protection	H01H
Photovoltaic panel	H01L 31/00
Mechanical details of connectors	H01R
Electromechanical details	H02B
Load protection by tripping of the load for ac systems	H02H
Harmonic reduction application for converters	H02M 1/12
Details of converters for reactive power compensation and ac power generation from dc sources	H02M 7/48
Details of converters for hvdc	H02M 7/7575
Preventing/reducing oscillation with a single generator	H02P 9/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

When searching in H0J3/00T see also computer systems for trading	G06Q 30/00
H02J 3/38 : Parallel connections of dc/ac converters	H02M 7/493
When searching in H0J3/36	H02M 7/7575

Special rules of classification

The Indexing Code [H02J 3/32](#) and/or [H02J 3/008](#) is assigned for covering the idea of using parked electric vehicle batteries for feeding the network during peak times and/or selling energy.

The following Indexing Codes are to be used for classifying additional information:

H02J 2003/003	methods and systems for forecasting future load demands
H02J 2003/001	methods to deal with contingencies in the widest meaning
H02J 2003/002	compensation of flicker introduced by nonlinear loads
H02J 2003/007	planning, simulating, CAD, modelling, reliability checks, etc.
H02J 2003/143	household appliances management
H02J 2003/146	switching loads on and off in function of energy prices
H02J 2003/365	means for the reduction or elimination of harmonics or oscillations in high voltage dc link (hvdc)
H02J 2003/388	Disconnection of a local power supply from the network

H02J 3/005

{Arrangements for selectively connecting the load to one among a plurality of power lines or power sources (for providing uninterruptable power supply [H02J 9/00](#))}

References

Limiting references

This place does not cover:

Arrangements for providing uninterruptable power supply	H02J 9/00
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H02J 3/01

Arrangements for reducing harmonics or ripples

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

In converters	H02M 1/12
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H02J 3/06

Controlling transfer of power between connected networks; Controlling sharing of load between connected networks

References

Limiting references

This place does not cover:

Controlling transfer of power, sharing load between a generator and the connected network	H02J 3/38
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H02J 3/18

Arrangements for adjusting, eliminating or compensating reactive power in networks (for adjustment of voltage [H02J 3/16](#))

References

Limiting references

This place does not cover:

For adjustment of voltage	H02J 3/16
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Use of Petersen coils	H02H 9/08
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H02J 3/1842

{wherein at least one reactive element is actively controlled by a bridge converter, e.g. active filters}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

if the bridge combines both series and shunt compensators	H02J 3/1814
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H02J 3/24

Arrangements for preventing or reducing oscillations of power in networks (by control effected upon a single generator [H02P 9/00](#))

Definition statement

This place covers:

Circuit arrangements, devices and methods for preventing, avoiding or correcting oscillations of voltage, current or power in an AC power network

References

Limiting references

This place does not cover:

Control effected upon a single generator	H02P 9/00
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H02J 3/34

Arrangements for transfer of electric power between networks of substantially different frequency

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Frequency converters	H02M 5/00
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H02J 3/38

Arrangements for parallelly feeding a single network by two or more generators, converters or transformers

References

Limiting references

This place does not cover:

Parallel connections of dc/ac converters not for feeding a network, but a local load	H02M 7/493
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H02J 4/00

Circuit arrangements for mains or distribution networks not specified as ac or dc

Definition statement

This place covers:

Circuit arrangements for mains or distribution networks containing both ac and dc (for instance, for planes) or for (rarely) networks whose nature (AC or DC) is not specified

H02J 5/00

Circuit arrangements for transfer of electric power between ac networks and dc networks ([H02J 3/36](#) takes precedence)

Definition statement

This place covers:

Circuit arrangements, systems and methods for supplying a DC load from an AC power source. Only general purpose circuits (not application-oriented/driven) are classified here.

References

Limiting references

This place does not cover:

Circuit arrangements for dc mains or dc distribution networks	H02J 1/00
Arrangements for balancing of the load in a network by storage of energy using batteries with converting means	H02J 3/32
Arrangements for transfer of electric power between ac networks via a high-tension dc link	H02J 3/36
Arrangements for parallelly feeding a single network by two or more generators, converters or transformers	H02J 3/38
Details for sending and receiving coils	H01F
Ac/dc or dc/ac converters	H02M 7/00

Special rules of classification

A system used for feeding an ac distribution network from the output of dc power source like fuel cells, solar panels belongs to [H02J 3/38](#) and not to [H02J 5/00](#), even if a dc to ac transfer is involved.

H02J 5/005

{with inductive power transfer (for charging [H02J 7/025](#))}

Definition statement

This place covers:

Circuit arrangements for transfer of electric power between ac networks and dc networks by inductive transfer, i.e. the sending coil being part of the source and the receiving coil being part of the load and coupling is in the near field region.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transmission involving transformers	H02J 3/00
Transmission by means of electromagnetic waves, e.g. microwave, RF, and far-field inductive coupling. In practice, long distance wireless transmission	H02J 50/00
Near-field transmission systems, e.g. inductive loop type	H04B 5/00

Special rules of classification

[H02J 5/005](#) should be allocated even, if the power source is not ac mains or if it is not better specified. For example, if the power source is a fuel cell, [H02J 5/005](#) has to be allocated, and additionally [H02J 2001/004](#)

With regard to wireless power transfer vs wireless battery charging; any document with relevant technical features about near-field inductive power transfer, should come here. If it is involved in battery charging, then double classification under [H02J 7/025](#) must be considered.

H02J 7/00

Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries

Definition statement

This place covers:

Circuit arrangements for charging batteries. Rarely, general-purpose discharging, battery management, e.g. sequentially discharging batteries, or load-supplying, e.g. when they are not too concerned by the characteristics of the load.

References

Limiting references

This place does not cover:

Charging electric/hybrid vehicles	B60L , B60K
Electrical circuits for vehicles	B60R
Vehicle starting circuits	F02D
Testing of batteries	G01R36/00
Batteries mechanical, chemical details	H01M
Mechanical details of battery charger alternators	H02K
Details of converter	H02M
Perpetuum mobile	H02N
Control of alternators	H02P 9/00
Details of telephone stands	H04M

Informative references

Attention is drawn to the following places, which may be of interest for search:

For over-discharge protection	H02H 7/18
Near-field transmission systems, e.g. inductive loop type	H04B 5/00

Special rules of classification

If the document deals with the controlled charging of a capacitor, e.g. a supercapacitor, it is mandatory to assign a combination of the Indexing Code [H02J 7/345](#) and CPC group symbols, which would apply, if the capacitor was replaced with a battery.

The following Indexing Codes are to be used for classifying additional information:

H02J 2001/002	Circuits in which a system component (battery, battery charger...) checks compatibility with another component (power source...)
H02J 2007/0067	managing load supply from one or more batteries, e.g.: discharge current reduction at low state of charge, sequential battery discharge in plural battery systems
H02J 2007/0095	means for power supply of control circuit
H02J 2007/0096	charger exchanges data with telephone or electronic device whose internal battery are being charged
H02J 2007/0098	data exchange between smart battery and charger
H02J 2007/0037	overcharge protection
H02J 2007/0039	overcurrent protection
H02J 2007/004	overdischarge protection
H02J 2007/0049	detection of fully charged condition
H02J 2007/005	remaining charge detection
H02J 2007/0059	characterised by the converter
H02J 2007/006	charge provided using dc bus or data bus of computer
H02J 2007/0062	charge provided using USB port connectors
H02J 2007/0095	means for power supply of control circuit
H02J 2007/0096	charger exchanges data with telephone or electronic device whose internal battery are being charged
H02J 2007/0098	data exchange between smart battery and charger
H02J 2007/143	multiple generators

H02J 7/0027

{Stations for charging mobile units, e.g. of electric vehicles, of mobile telephones ([H02J 7/0021](#), [H02J 7/0026](#) take precedence)}

Definition statement

This place covers:

Battery charging characterized by a physical or electrical arrangement allowing the simultaneous charge of a plurality, i.e. two or more, of mobile units, e.g. mobile phones, machine-tools or electric/hybrid vehicles.

References

Limiting references

This place does not cover:

Monitoring or indicating circuits	H02J 7/0021
Safety or protection circuits, e.g. overcharge/discharge disconnection	H02J 7/0026
Details of stations for charging electric vehicles, e.g. vehicle recognition or identification, billing or payment, charging columns for electric vehicles, automatic adjustment of relative position, vehicle to grid (V2G) arrangements.	B60L 53/00

H02J 7/0077

{the charge cycle being terminated in response to electric parameters
([H02J 7/0093](#) takes precedence)}

Definition statement

This place covers:

- Controlling charge in response to current
- Controlling charge in response to voltage
- Controlling charge in response to both current and voltage

References

Limiting references

This place does not cover:

Regulation of charging current or voltage with introduction of pulses during the charging process	H02J 7/0093
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Synonyms and Keywords

In the definition [H02J 7/0077](#) and subgroups the word "terminated" has to be interpreted as "controlled"

H02J 7/025

{using non-contact coupling, e.g. inductive, capacitive}

Definition statement

This place covers:

Non-contact coupling, i.e. the sending coil or the first capacitor plate being part of the supplying source and the receiving coil or the second capacitor plate being part of the energy receiving circuit and coupling is in the near field region.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Near-field transmission systems, e.g. inductive loop type	H04B 5/00
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Special rules of classification

The classification symbol [H02J 7/025](#) should be given even if the charging source is not ac mains or if it is unspecified. For example, if the charging source is a photovoltaic cell, classification is made in [H02J 7/35](#) and additionally in [H02J 7/025](#). Features regarding wireless power transfer itself are classified under [H02J 50/00](#).

H02J 7/34

Parallel operation in networks using both storage and other dc sources, e.g. providing buffering ([H02J 7/14](#) takes precedence)

Definition statement

This place covers:

Battery charging where power comes from one or more different DC power sources, e.g. charging from solar arrays. It may further involve the supply of a load and the resulting modes of operation (battery charging, battery supplying the load).

References

Limiting references

This place does not cover:

Arrangements for balancing of the load in an AC network by storing energy using batteries with converting means	H02J 3/32
Circuit arrangements for charging batteries from dynamo-electric generators driven at varying speed	H02J 7/14

H02J 9/00

Circuit arrangements for emergency or stand-by power supply, e.g. for emergency lighting

Definition statement

This place covers:

Power sources acting when the main source fails, i.e. uninterruptible (on-line and off-line) power supplies [UPS] and back-up power supplies

Power supplies able to operate in a "standby" mode (low power or sleep modes).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

With provision for charging standby battery	H02J 7/00
UPS for computers	G06F 1/00
UPS for communication stations	H04M
Details of lamp	H05B 37/00

Special rules of classification

The following Indexing Codes are to be used for classifying additional information:

H02J 2009/007	power saving operation when no load is present
H02J 2009/063	common neutral
H02J 2009/067	using a single transformer with multiple primaries (one for each ac energy source) and a secondary for the loads
H02J 2009/068	electronic means for switching from one power supply to another, avoiding parallel connection

H02J 9/02

in which an auxiliary distribution system and its associated lamps are brought into service

Definition statement

This place covers:

Emergency light systems integrated typically by a back-up power source, a set of lamps and a dedicated auxiliary distribution system powering the lamps from the back-up power source

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

A lamp not being an emergency lamp, but a lamp which is normally fed by the mains and during contingency by a battery, even if no dc/ac converters are not involved	H02J 9/065
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H02J 9/061

{characterised by the use of electronic means ([H02J 9/062](#) and [H02J 9/065](#) take precedence)}

Definition statement

This place covers:

Emergency, back-up or standby power supplies integrating power electronic converters for the different power conversions within the units: e.g. rectifiers, battery chargers, voltage regulators. Since [H02J 9/062](#) and [H02J 9/065](#) take precedence, in practice, this code covers UPS with a DC output

References

Limiting references

This place does not cover:

Electronic means consisting of non rotating dc/ac converter, e.g. UPS with an AC output	H02J 9/062
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H02J 11/00

Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed or converted

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Emergency or standby arrangements	H02J 9/00
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H02J 13/00

Circuit arrangements for providing remote indication of network conditions, e.g. an instantaneous record of the open or closed condition of each circuitbreaker in the network; Circuit arrangements for providing remote control of switching means in a power distribution network, e.g. switching in and out of current consumers by using a pulse code signal carried by the network {(circuits for indication of single switches [H01H 9/167](#); circuits specially adapted for remote switching of lighting via the power line [H05B 37/0263](#))}

Definition statement

This place covers:

[H02J 13/00](#) covers operation-related documents, i.e. there must be at least switching on/off or generator or load (or information of such an event) or any other similar action (i.e. sending settings of an inverter connecting a photovoltaic array to the power network).

It also covers specific monitoring of power networks (tailored to such application).

Concerning smart grids, documents where the relevant features concern electrical engineering and not ICT technologies, are classified here.

References

Limiting references

This place does not cover:

Electricity meters involved (in particular smart meters)	G01D 4/00
Measuring of electrical variables)	G01R
Power strips with locally controlled on/off capability for computers	G06F 1/266
Remote operation of appliances	G08C
Details of switches	H01H
Circuits for indication of single switches	H01H 9/167
Power strips with locally controlled on/off capability	H01R 13/66
Telemetry	H04Q 9/00
Remote switching of lightings	H05B 37/00
Circuits specially adapted for remote switching of lighting via the power line	H05B 37/0263

Informative references

Attention is drawn to the following places, which may be of interest for search:

Monitoring	G05B 15/02
Programmed control systems	G05B 19/00
Computer aided design (CAD), simulation, modelling	G06F 17/00
Computing for organisational, economical, commercial, marketing purposes	G06Q
Measured data transmission systems	G08C
Communication using power lines (PLC, power line carrier)	H04B 3/00
Details of data switching networks	H04L 12/2803

H02J 15/00

Systems for storing electric energy (mechanical systems therefor [F01](#) - [F04](#); in chemical form [H01M](#))

Definition statement

This place covers:

Energy storage systems having either relevant power management issues, or having (or be ready/able for) an interaction with the (AC or DC) power network (but with focus on the storage system). The subject-matter stays normally at system level (there are other CPC technical fields dealing with the specific storage technologies). Under this approach, the group has two subdivisions according to two different technologies:

- Systems for storing electric energy in the form of hydraulic energy
- Systems for storing electric energy in the form of pneumatic energy

References**Limiting references**

This place does not cover:

Conjoint control of energy storage in vehicles	B60W 10/00
Details of mechanical systems	F01 - F04
Details of accumulators for supplying fluids under pressure	F15B 1/04
Thermal storage - cold	F24F 5/00
Thermal storage - heaters	F24H 7/00
Thermal storage - heat	F28D 20/00
Capacitors	H01G
Batteries mechanical, chemical details	H01M
Fly-wheel generators	H02K 7/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for balancing of the load in an AC network by storage of energy	H02J 3/28
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H02J 17/00

Systems for supplying or distributing electric power by electromagnetic waves

References

Limiting references

This place does not cover:

Near-field transmission systems	H04B 5/00
Antennas, e.g. rectennas, i.e. antennas for power transfer	H04Q

H02J 50/00

Circuit arrangements or systems for wireless supply or distribution of electric power

Definition statement

This place covers:

Functional and operational aspects of systems for the wireless supply or distribution of electric power, regardless of the type of wireless power transmission used.

Circuit arrangements for the wireless supply or distribution of electric power.

In this main group, wireless supply or distribution of electric power involves both of the following steps:

- (1) conversion of electrical energy from a power source for transfer by wireless transmission;
- (2) reception of the wirelessly transmitted energy and re-conversion into electrical energy for distribution or delivery to an electrical load.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

WPT	Wireless Power Transfer
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In patent documents, the following words/expressions are often used as synonyms:

wireless power transmission, wireless energy transmission, wireless power transfer, contactless power transfer, cordless power transfer.

H02J 50/05

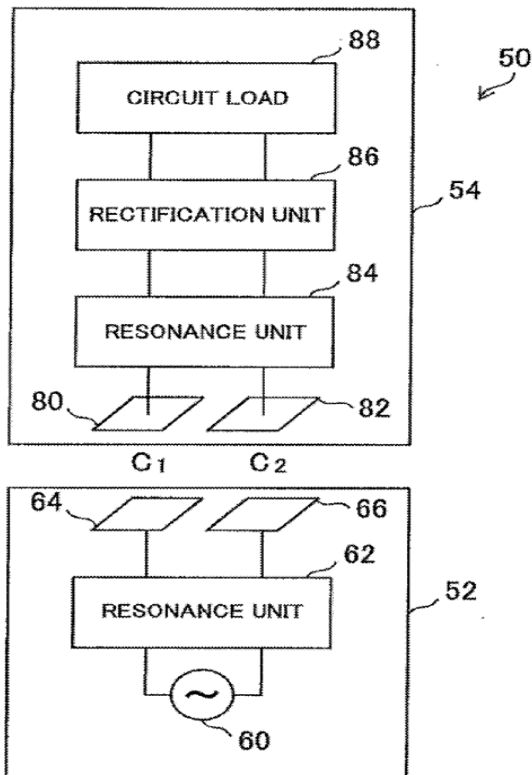
using capacitive coupling

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using capacitive coupling between the plates of at least two capacitive elements, the plates being located in separate units involved in contactless power transmission.

The figure below is an illustrative example which falls within the scope of this subgroup. In the figure, the pairs of plates 64 and 80, and 66 and 82 create two capacitive elements C1 and C2 through which power is transferred from a power transmitter 52 to a power receiver 54.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Capacitors; Capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices of the electrolytic type	H01G
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H02J 50/10

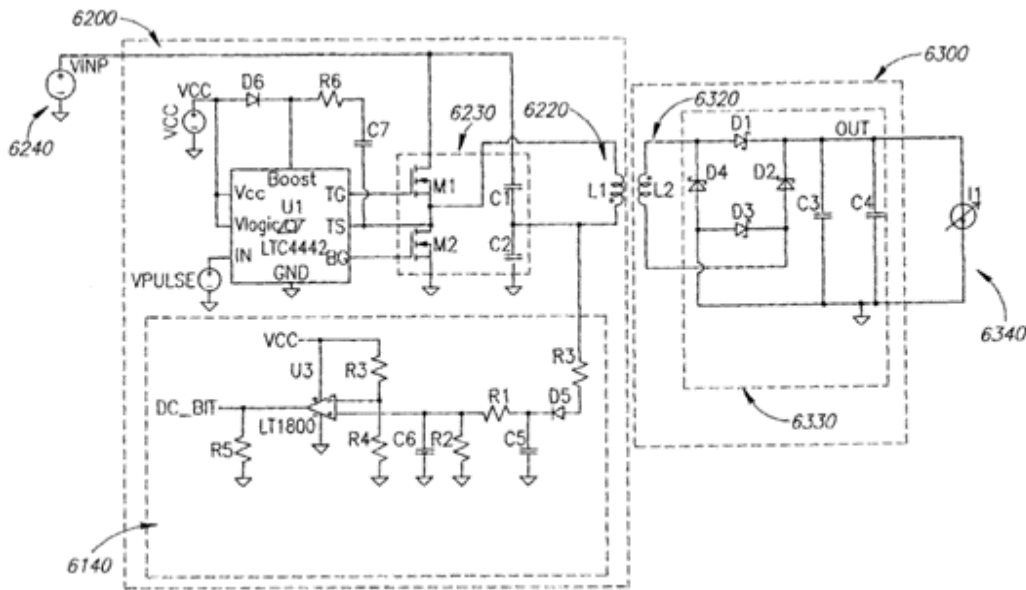
using inductive coupling

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using inductive coupling, i.e. electromagnetic interaction between two or more inductive coils, at least one coil being located in a unit separate from the others, the units being involved in contactless power transmission.

The figure below is an illustrative example which falls within the scope of this subgroup.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnets; inductances; transformers	H01F
Adaptations of transformers or inductances for inductive coupling	H01F 38/14
Conversion of dc power input into dc power output	H02M 3/00
Conversion of ac power input into ac power output	H02M 5/00
Conversion of ac power input into dc power output; conversion of dc power input into ac power output	H02M 7/00
Induction heating	H05B 6/02

H02J 50/12

of the resonant type

Definition statement

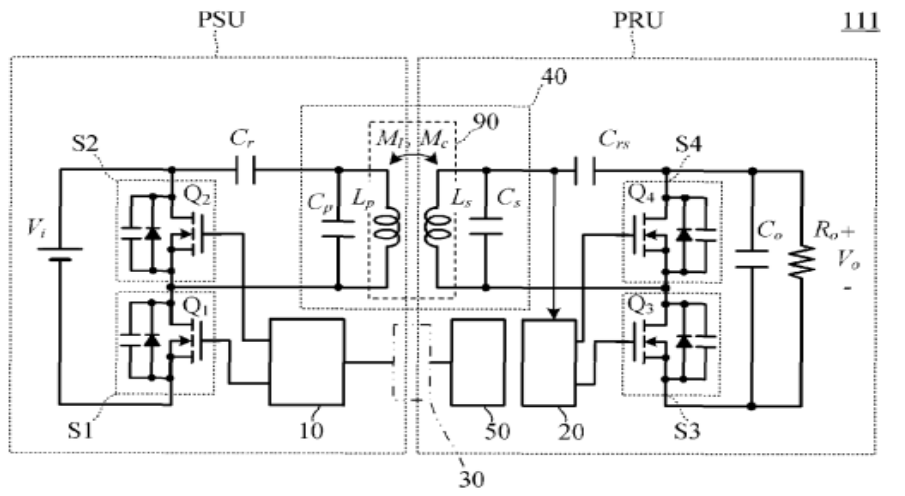
This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using inductive coupling of the resonant type, i.e. in which at least one coil forms part of a resonant circuit.

In the illustrative example, resonant circuits Cr-Cp-Lp and Crs-Cs-Ls constitute a resonant circuit 40 which has a specific resonant frequency f_r at which the total impedance of the resonant circuit 40 is

minimized so that transmission efficiency of electric power between the power emitter circuit in PSU and power receiver circuit in PRU is increased.

FIG. 1



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnets; inductances; transformers	H01F
Converters	H02M
Resonant circuits, resonators	H03H
Tuning resonant circuits	H03J

H02J 50/15

using ultrasonic waves

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Non-electric signal transmission systems using acoustic waves	G08C 23/02
Transmission systems employing ultrasonic waves	H04B 11/00

H02J 50/20

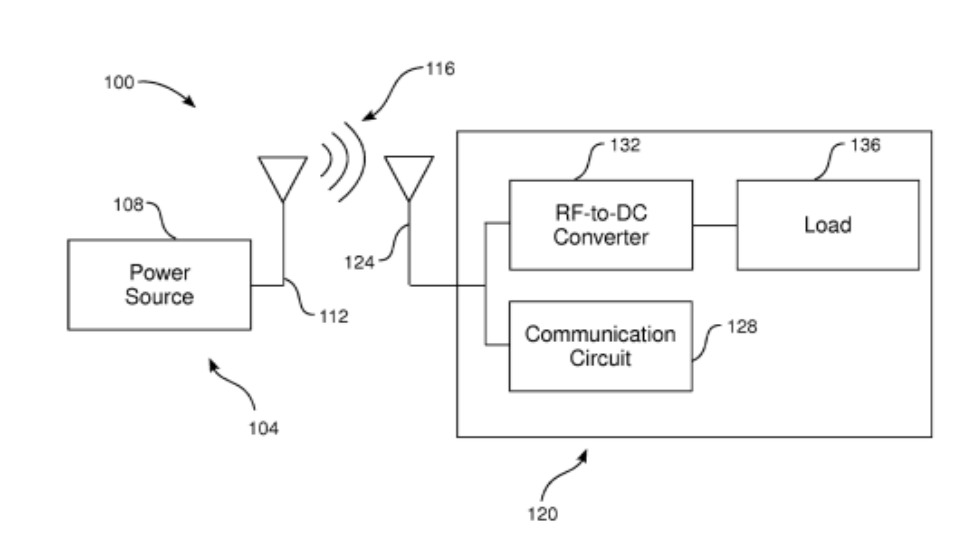
using microwaves or radio frequency waves

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using microwaves or radio frequency waves.

The figure below exemplifies the subject-matter to be classified in this subgroup. Power generated in power source 108 is converted into radiofrequency and transmitted by antenna 112 in transmitter 104 to antenna 124 in receiver 120, and used to power load 136.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Radiofrequency identification	G06K
Aerials	H01Q
Radio transmission systems	H04B 7/00

H02J 50/23

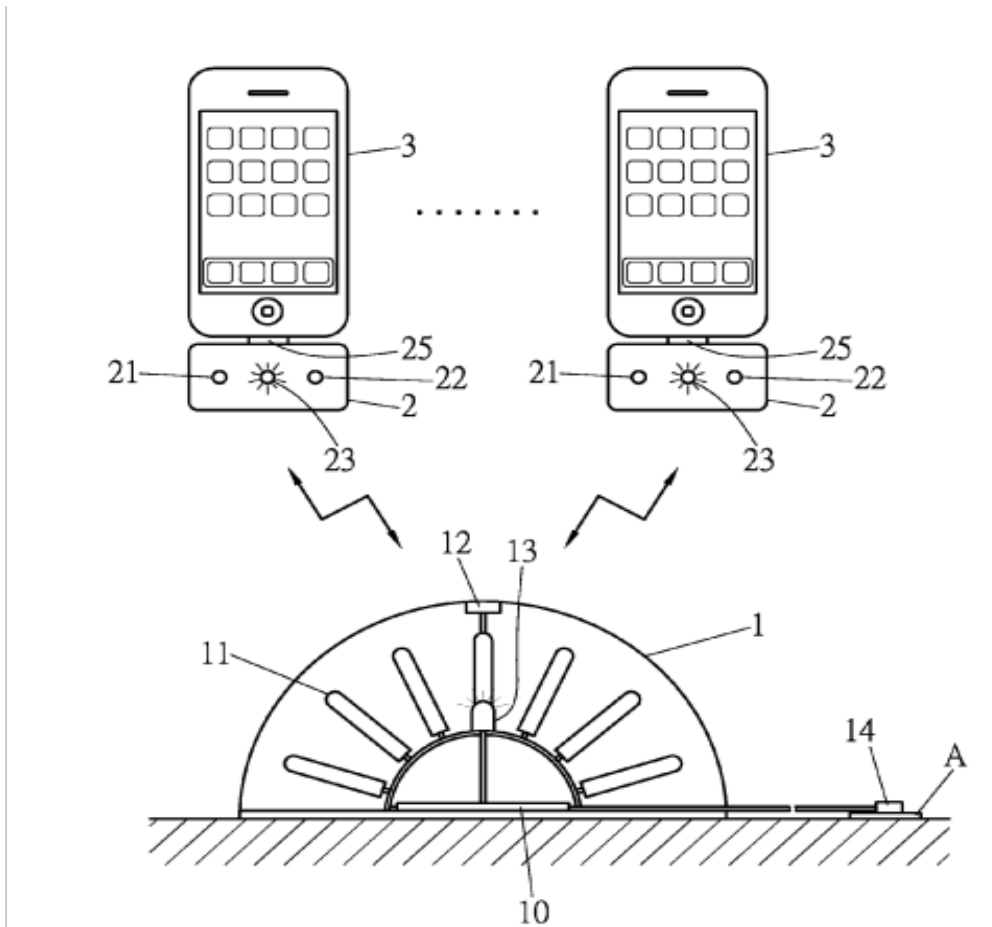
characterised by the type of transmitting antennas, e.g. directional array antennas or Yagi antennas

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using microwaves or radio frequency waves, characterised by the type of transmitting antennas, e.g. directional array antennas or Yagi antennas

The figure below is an illustrative example relevant for this subgroup. The directional antenna 11 of the transmitting station 1 sends power to the receiver 21 of the charging device 2.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Types of antennas, structural details or features of antennas, special arrangements of antennas	H01Q
Radio transmission systems	H04B 7/00

H02J 50/27

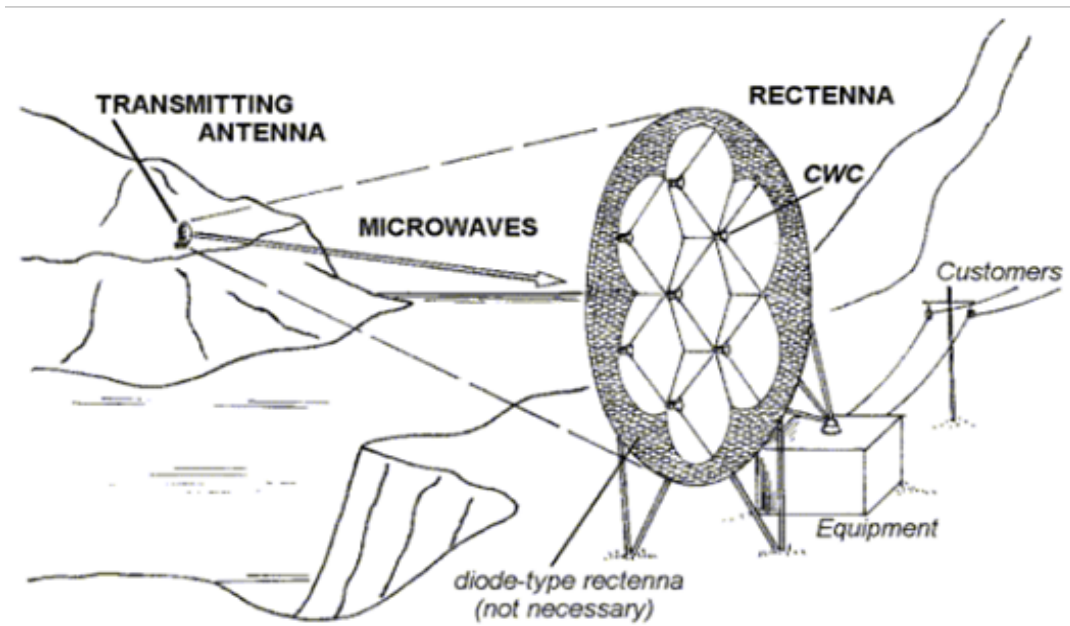
characterised by the type of receiving antennas, e.g. rectennas

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using microwaves or radio frequency waves characterised by the type of receiving antennas, e.g. rectennas.

The figure below is an illustrative example relevant for this subgroup.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Types of antennas, structural details or features of antennas, special arrangements of antennas	H01Q
Radio transmission systems	H04B 7/00

H02J 50/30

using light, e.g. lasers

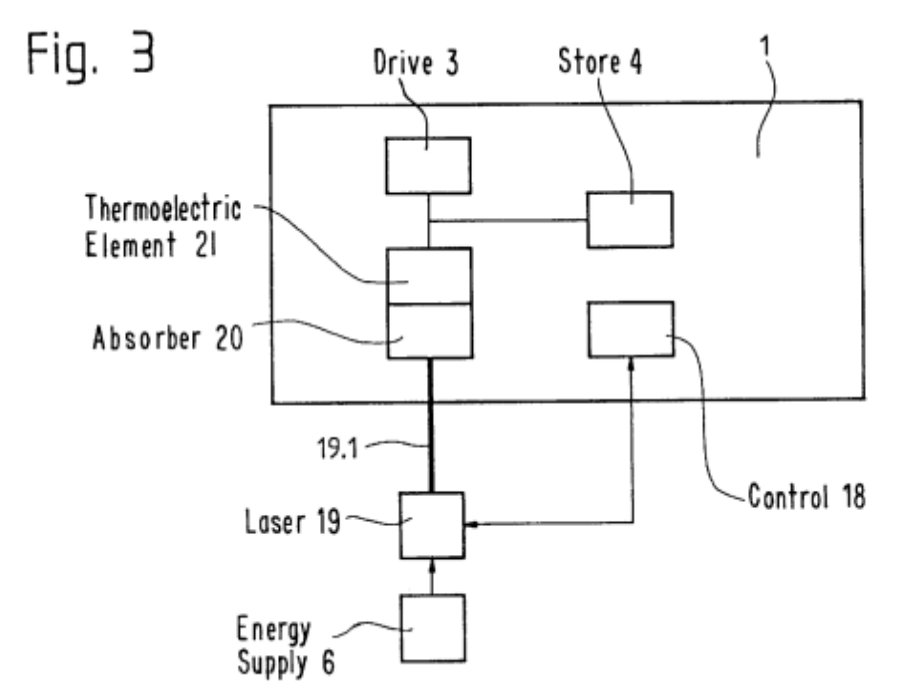
Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using light, e.g. lasers

The figure below is an illustrative example for this subgroup. A laser 19.1 emitted by laser unit 19 heats absorber 20 and heat is converted into electrical energy by thermoelectric element 21.

Fig. 3



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Non-electric transmission systems using light waves	G08C 23/04
Lasers	H01S 3/00
Transmission systems employing infrared, visible or ultraviolet light	H04B 10/00

H02J 50/40

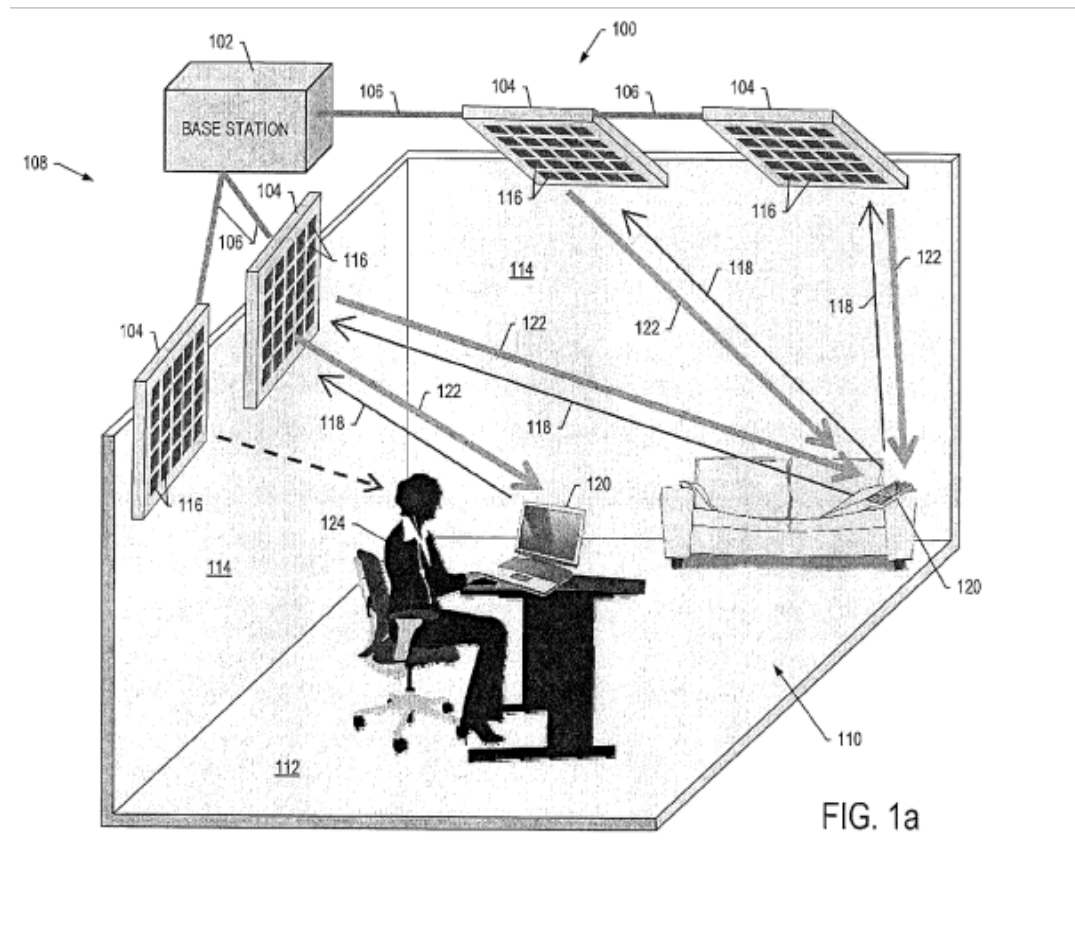
using two or more transmitting or receiving devices ([H02J 50/50](#) takes precedence)

Definition statement

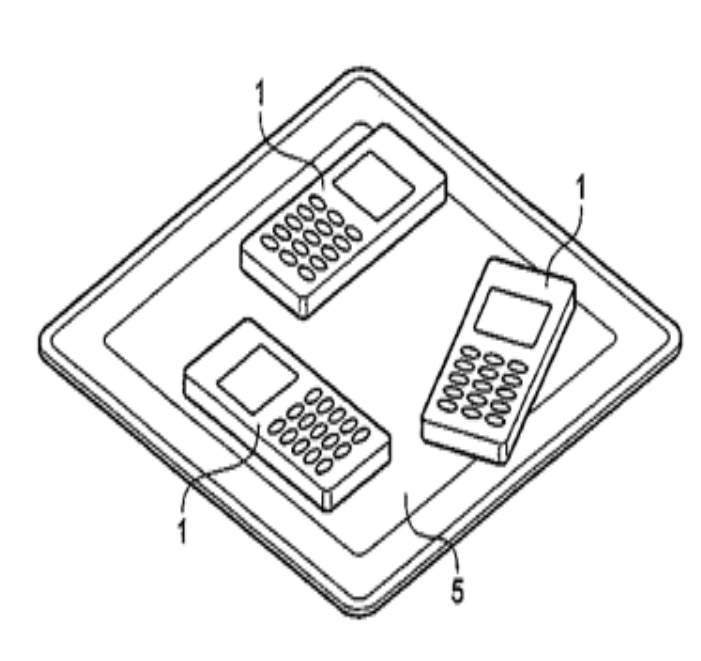
This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power involving two or more transmitting or receiving devices.

The figure below is also an illustrative example for this subgroup. In the figure, the several transmitting devices transmit electric power to several receiving devices simultaneously.



The figure below is also an illustrative example of this subgroup with two or more receiving devices involved. In the figure, the transmitting device transmits electric power to several receiving devices 1 simultaneously



References

Limiting references

This place does not cover:

using additional energy repeaters between transmitting devices and receiving devices	H02J 50/50
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Radio transmission diversity systems using a plurality of spaced independent aerials	H04B 7/04
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H02J 50/50

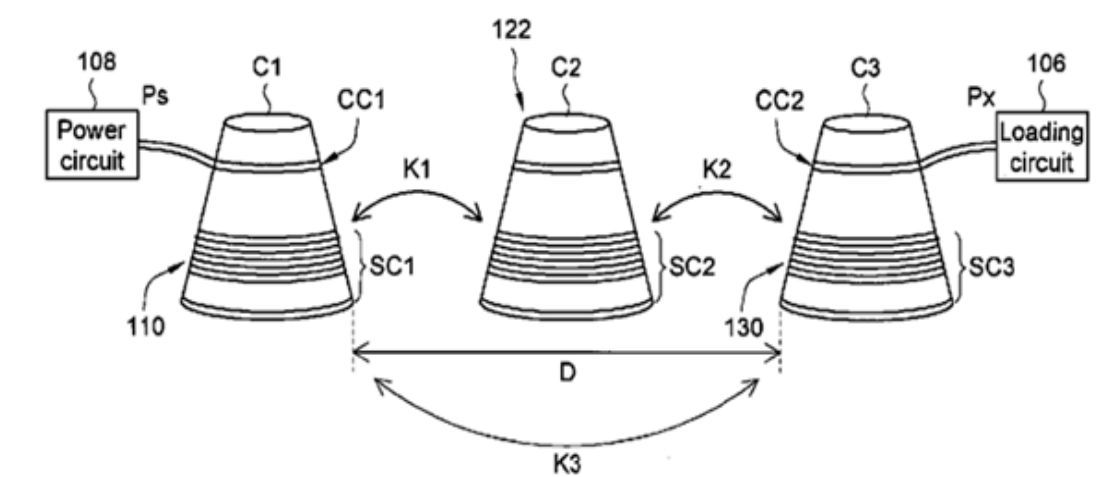
using additional energy repeaters between transmitting devices and receiving devices

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power using additional energy repeaters between transmitting devices and receiving devices. The repeater(s) must be physically located between the transmitting devices the receiving devices, and must be separate from them.

The figure below is an example falling within the scope of this subgroup. In the figure, the repeater C2 repeats electric power transmission between the transmitting device C1 and the receiving device C3.



H02J 50/60

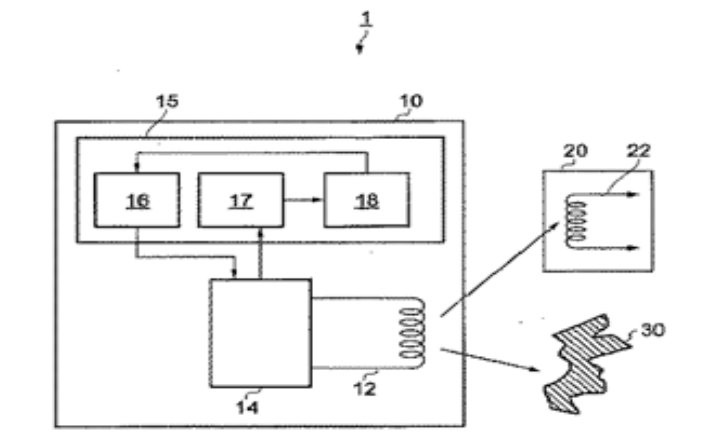
responsive to the presence of foreign objects, e.g. detection of living beings

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power responsive to the presence of foreign objects, wherein active parts of these circuit arrangements or systems, e.g. coils or antennas, are involved in the detection of, or the response to the presence of, foreign objects.

The figure below is an illustrative example for this subgroup. In the figure, the transmitting device 10 detects the presence of the foreign object 30.



Relationships with other classification places

Mechanical aspects related to mechanical removing of foreign object are classified in the relevant field of technology.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Detection of object presence using reflection of radio waves	G01S 13/04
Detection of object presence using reflection of acoustic waves	G01S 15/04
Electric or magnetic detection of objects	G01V 3/08 ; G01V 3/15
Optical detection of objects	G01V 8/10

H02J 50/70

involving the reduction of electric, magnetic or electromagnetic leakage fields

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of transformers or inductances - special means for preventing or reducing unwanted electric or magnetic effects, e.g. leakage fields	H01F 27/34
Devices for absorbing waves radiated from an aerial	H01Q 17/00
Suppression or limitation of noise or interference	H04B 15/02
Screening of apparatus or components against electric or magnetic fields	H05K 9/00

H02J 50/80

involving the exchange of data, concerning supply or distribution of electric power, between transmitting devices and receiving devices

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

IC cards	G06K 19/07
Transmitting signals characterised by the use of a wireless electrical link	G08C 17/00
Non-electric signal transmission systems	G08C 23/00
Responders; (passive) Transponders	H04B 1/59
Near-field transmission systems, e.g. inductive loop type	H04B 5/00
Transmission systems employing electromagnetic waves other than radio-waves	H04B 10/00

H02J 50/90

involving detection or optimisation of position, e.g. alignment

Definition statement

This place covers:

Circuit arrangements or systems for wireless supply or distribution of electric power electrically detecting and/or optimising the relative position between emitters, receivers and repeaters, aiming to increase the efficiency of the wireless power transmission, wherein active parts of these circuit arrangements or systems, e.g. coils or antennas, are involved in the detection and/or optimising of the position.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Detection of object position using reflection of radio waves	G01S 13/06
Detection of object position using reflection or reradiation of electromagnetic waves other than radio waves	G01S 17/06
Control of position of vehicles, e.g. automatic pilot	G05D 1/00
Position control	G05D 3/00