

2015342739 24 Jun 2021



24 June 2021

The Commissioner of Patents
IP Australia

FPA ref: S50165987:AFM:ts
Principal: John Dower

Dear Commissioner

Sunbeam Corporation Pty Ltd
Australian patent application no 2015342739
Power supply coupler

We refer to the first examination report dated 9 November 2020. We request that the specification be amended and attach:

- 1 Statement of Proposed Amendments

We make the following comments in respect of the examiner's objections.

Amendments

Applicant is amending the claims in line with those of US Patent No. 10,135,179 B2 granted from corresponding US Application No. 15/525,039.

Accordingly, amongst other features, each of amended independent claims 1, 8 and 17 refers to:

“a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source”.

Further, each of these amended independent claims now refers to the establishment of an electrical connection between *“the coupler and the appliance”* (claim 1), *“the coupler and the first cordless appliance”* (claim 8) and *“the second coupler and the further coupler or the first appliance”*, in a manner that allows the first feature to *“rotate freely about”* either *“the complementary coupler”* (claims 1 and 8) or *“the further coupler or the first appliance”* (claim 17).

Section 40 (support, disclosure, clarity, lack of unity)

Under item 1 of the examination report, claims 1 to 11 and 21 to 31; claims 12 to 20; claims 32 to 36; and claims 37 to 44 were considered to define four separate inventions.

Thanks are extended to the examiner for their detailed explanation of this unity objection. Whilst the applicant does not necessarily agree with or concede the examiner's claim interpretation, the applicant has amended independent claims 1, 8 and 17 such that they each contain at least those features discussed above. The applicant respectfully submits that at least the feature of *“a circular first power terminal and a second power terminal”* as defined within the independent claims should be considered as a 'special technical feature', for reasons that will become clearer from the discussion below. Accordingly, for at least this reason, said amended independent claims should be considered to satisfy the requirements of unity.

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Novelty and inventive step

At items 2 and 3 of the report, the invention as defined by claims 1 to 11 and 21 to 31 was considered to lack an inventive step (i.e. is obvious) in light of each of US 2013/0303000 (**D1**), GB 2510045 (**D2**), and WO 1996/022718 (**D3**)

At item 4 of the report, the invention as defined by claims 1, 4 – 7, 10, 11, 21 – 24, and 27 – 31 was considered to lack novelty and an inventive step in light of AU 2014228898 (**D4**) for the reasons “discussed in detail under 35 USC § 102 in paragraph 8 of the USPTO Non-Final Rejection dated 1 February 20018 during the prosecution of family member application no. 15/525039”.

As can be taken from the discussion above, amended independent claims 1, 8 and 17 correspond to independent claims 1, 8 and 17 of US Patent No. 10,135,179 B2. For at least the reasons disclosed in the Notice of Allowance issued 16 July 2018 for , the applicant respectfully submits that said amended independent claims, along with their dependent claims, are novel and involve an inventive step. More specifically, the applicant respectfully submits that none of the prior art documents have been shown to teach or suggest the specific configuration discussed above, namely that of:

“a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source”.

In addition, the applicant respectfully submits that none of the prior art documents have been shown to teach or suggest such a configuration in combination with a structure that facilitates the establishment of an electrical connection between a coupler and an appliance, or a further coupler, in a manner that allows the coupler to “rotate freely about” either “the complementary coupler” of the appliance or “the further coupler or the first appliance”.

Given the discussion above, the applicant respectfully submits that amended independent claims 1, 8 and 17, along with their dependent claims, are novel and involve an inventive step.

Favourable reconsideration and acceptance of this application is requested.

Any request for postponement of acceptance is hereby withdrawn.

Yours sincerely

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AUSTRALIA

Patents Act 1990

STATEMENT OF PROPOSED AMENDMENTS

Application No:	2015342739
Applicant	Sunbeam Corporation Pty Ltd

The applicant requests leave to amend the complete specification accompanying this application as follows:

1.	Delete pages 2-6 presently on file.	Substitute new pages 2-6 and 6a attached in duplicate, the second copy being a manuscript copy.
2.	Delete all claim pages presently on file.	Substitute new claim pages 16-20 attached in duplicate, the second copy being a manuscript copy.

Dated : 24 June 2021

FPA Patent Attorneys Pty Ltd

for the applicant

TO: The Commissioner of Patents

Our Ref: S50165987:AFM

- a coupler comprising
 - a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source; and
 - a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;
 - a complementary coupler on the appliance, comprising
 - complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler; and
 - an engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the engaging region, thereby engaging the power terminals and complementary power terminals and establishing an electrical connection between the coupler and the appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

The engaging region may be ferromagnetic or may comprise one or more permanent magnets or electro-magnets. The engaging region and the magnetic coupling region may be annular in shape. The magnetic coupling region may comprise a plurality of permanent magnets defining an annular area. In use, the complementary coupling on the appliance may be provided on a non-horizontal surface, preferably a side surface. The power terminals may comprise a 3-pole or a 5-pole connection.

The system may further comprise an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that the complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

The coupler may have a body comprising an upper housing and a lower housing, wherein a gap is formed between said upper housing and said lower housing so as to

extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

The disclosure also relates to a system for providing mains power to a cordless appliance, comprising:

- 5 a coupler comprising
 - symmetrically configured concentric power terminals that in use are connected to a mains power source; and
 - an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture,
- 10 wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

15 The coupler may comprise a magnetic coupling region disposed concentrically around an outer periphery of the power terminals.

The magnetic coupling region may be configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the complementary power terminals on the cordless appliance, thereby engaging the power terminals and establishing an electrical connection
20 between the coupler and the cordless appliance.

The magnetic coupling region may be configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the aperture on the adapter base, thereby engaging the coupler and the adapter base.

25 The disclosure further relates to a system for providing mains power to a cordless appliance, comprising:

- a coupler comprising symmetrically configured concentric power terminals that in use are connected to a mains power source; and

a complementary coupler on the appliance, comprising complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler;

5 wherein the coupler has a body comprising an upper housing and a lower housing, and a gap is formed between said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

The disclosure also relates to a system for providing mains power to a cordless appliance, comprising:

10 a coupler comprising:
symmetrically configured concentric power terminals that in use are connected to a mains power source, and

first coupling means disposed concentrically around an outer periphery of the power terminals; and

15 an adapter base comprising
a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, and

a second coupling means disposed around the aperture, wherein the first and second coupling means interact to attach the coupler to the adapter base such that
20 the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

The first coupling means may comprise a magnetic coupling region, which may
25 comprise one or more permanent magnets or electromagnets. The second coupling means may comprise a ferromagnetic material, or a permanent magnet. Alternatively or additionally, the first and second coupling means may comprise a bayonet attachment, one or more snap clips or a 360 degree ball lock.

The adapter base may comprise a cable to connect to the mains power source
30 and a housing in which the cable may be retracted.

In yet a further aspect, the disclosure relates to a coupler for providing mains power to cordless appliances in a plurality of attachment configurations, the coupler comprising a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source, and a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;

wherein in a first attachment configuration the coupler is attached to a complementary coupler on a first cordless appliance, the complementary coupler having complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler and a first engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the first engaging region, thereby engaging the power terminals and complementary power terminals and establishing an electrical connection between the coupler and the first cordless appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

In a second attachment configuration the coupler may be attached to an adapter base having a planar surface that in use supports a second cordless appliance, the planar surface defining an aperture with a second engaging region disposed around the aperture, wherein a magnetic attraction between the magnetic coupling region and the second engaging region acts to attach the coupler to the adapter base such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the second cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the second cordless appliance.

In a third attachment configuration, the coupler may be attached to a second adapter base having a planar surface that in use supports a third cordless appliance, the planar surface defining an aperture, wherein in use the coupler and the second adapter base are co-located such that the concentric power terminals are accessible via

the aperture and a magnetic attraction between the magnetic coupling region and a second engaging region on the third cordless appliance acts to attach the coupler to the third cordless appliance such that complementary power terminals on the third cordless appliance are engageable with the concentric power terminals to establish an electrical
5 connection between the coupler and the third cordless appliance.

In yet another aspect, the disclosure relates to a stacked magnetic coupling system for providing mains power to a plurality of appliances, comprising:

a first coupler comprising
a circular first power terminal and a second power terminal, wherein the
10 second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source, and

a first magnetic coupling region disposed concentrically around the first set
15 of power terminals;

a second coupler comprising
a complementary circular first power terminal and a complementary
circular second power terminal, wherein the complementary second power terminal is
positioned inside the complementary first power terminal and configured to engage with
20 the first set of power terminals; and

a first engaging region disposed concentrically around the complementary
terminals, wherein a magnetic force provides a mutual attraction between the first
magnetic coupling region and the first engaging region, thereby engaging the first set of
power terminals and the complementary terminals and establishing an electrical
25 connection between the first coupler and the second coupler;

a second set of symmetrically configured power terminals that in use are
coupled to corresponding terminals on a further coupler or on a first appliance;

a second magnetic coupling region disposed concentrically around the
second set of power terminals, wherein the second magnetic coupling region provides a
30 mutual attraction with a corresponding second engaging region on the further coupler or the first appliance, thereby engaging the second set of power terminals and the corresponding terminals and establishing an electrical connection between the second

coupler and the further coupler or the first appliance in a manner that allows the second coupler to rotate freely about the further coupler or the first appliance; and

a lead providing an electrical connection between the second coupler and a second appliance.

5 The engaging regions may be magnetic or magnetisable. The first and second magnetic coupling regions may be disposed around the outer periphery of first and second set of power terminals. The couplers may be symmetrically configured so that they are able to connect at any (0-360 degree) coupling orientation. The system may include a lead which terminates in a coupler corresponding to the first coupler.

10 As used herein, except where the context requires otherwise, the term "comprise" and variations of the term, such as "comprising", "comprises" and "comprised", are not intended to exclude further additives, components, integers or steps.

15 Further aspects of the present invention and further embodiments of the aspects described in the preceding paragraphs will become apparent from the following description, given by way of example and with reference to the accompanying drawings.

CLAIMS:

1. A system for providing mains power to a cordless appliance, the system
5 comprising:
 - a coupler comprising:
 - a circular first power terminal and a second power terminal, wherein the
second power terminal is positioned inside the circular first power terminal concentric
with the first power terminal such that a combination of the first and second power
10 terminals is symmetrical, wherein the first and second power terminals are connected to
a main power source; and
 - a magnetic coupling region disposed concentrically around an outer
periphery of the power terminals;
 - a complementary coupler on the appliance, comprising
15 complementary power terminals configured to engage with the
symmetrically configured concentric power terminals of the coupler; and
 - an engaging region disposed concentrically around an outer periphery of
the complementary terminals, wherein a magnetic force provides a mutual attraction
between the magnetic coupling region and the engaging region, thereby engaging the
20 power terminals and complementary power terminals and establishing an electrical
connection between the coupler and the appliance in a manner that allows the coupler
to rotate freely about the complementary coupler.
2. The system according to claim 1, wherein the magnetic coupling region
comprises a plurality of permanent magnets defining an annular area.
- 25 3. The system according to claim 2, wherein the plurality of permanent magnets are
circumferentially positioned at unequal intervals around the annular area.
4. The system according to claim 3, wherein the plurality of permanent magnets are
positioned closer to one another in the vicinity of a supply cable that, in use, connects
the power terminals to the mains power source.
- 30 5. The system according to any one of claims 1 to 4, wherein, in use, the
complementary coupling on the appliance is provided on a non-horizontal surface.

6. The system according to any one of claims 1-5, further comprising an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that the complementary
5 power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

7. The system according to any one of claims 1-6, the coupler having a body
10 comprising an upper housing and a lower housing, wherein a gap is formed between said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

15 8. A coupler for providing mains power to cordless appliances in a plurality of attachment configurations, the coupler comprising a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first
20 and second power terminals are connected to a main power source, and a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;

wherein in a first attachment configuration the coupler is attached to a complementary coupler on a first cordless appliance, the complementary coupler having
25 complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler and a first engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the first engaging region, thereby engaging the power terminals and complementary
30 power terminals and establishing an electrical connection between the coupler and the first cordless appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

9. The coupler according to claim 8, wherein, in a second attachment configuration, the coupler is attached to an adapter base having a planar surface that in use supports a second cordless appliance, the planar surface defining an aperture with a second engaging region disposed around the aperture, wherein a magnetic attraction between the magnetic coupling region and the second engaging region acts to attach the coupler to the adapter base such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the second cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the second cordless appliance.
10. The coupler according to claim 9, wherein, in a third attachment configuration, the coupler is attached to a second adapter base having a planar surface that in use supports a third cordless appliance, the planar surface defining an aperture, wherein in use the coupler and the second adapter base are co-located such that the concentric power terminals are accessible via the aperture and a magnetic attraction between the magnetic coupling region and a second engaging region on the third cordless appliance acts to attach the coupler to the third cordless appliance such that complementary power terminals on the third cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the third cordless appliance.
11. The coupler according to any one of claims 8 to 10, the coupler having a body comprising an upper housing and a lower housing, wherein a gap is formed between said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.
12. The coupler according to claim 11, wherein the gap extends along the entire length of the perimeter of the coupler body except for a peripheral connecting region where a supply cable enters the coupler body.
13. The coupler according to claim 11, wherein the gap extends along the entire length of the perimeter of the coupler body.

14. The coupler according to any one of claims 11 to 13, wherein the coupler body has a substantially circular shape in plan view and further comprises a middle housing positioned within a cavity formed between the upper housing and the lower housing so as to extend along the interior periphery of the upper housing, the middle housing
5 containing wiring that extends from a supply cable that enters the coupler body to the power terminal, such that said wiring is isolated from any liquids that flow through the coupler body.

15. The coupler according to claim 14, wherein the lower housing has a substantially conical shape with an apex located at a substantially radial centre of the coupler body.

10 16. The coupler according to claim 15, wherein the incline of the conical lower housing is at least 3 degree.

17. A stacked magnetic coupling system for providing mains power to a plurality of appliances, the system comprising:

a first coupler comprising

15 a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals is symmetrical, wherein the first and second power terminals are connected to a main power source, and

20 a first magnetic coupling region disposed concentrically around the first set of power terminals;

a second coupler comprising

25 a complementary circular first power terminal and a complementary circular second power terminal, wherein the complementary second power terminal is positioned inside the complementary first power terminal and configured to engage with the first set of power terminals; and

30 a first engaging region disposed concentrically around the complementary terminals, wherein a magnetic force provides a mutual attraction between the first magnetic coupling region and the first engaging region, thereby engaging the first set of power terminals and the complementary terminals and establishing an electrical connection between the first coupler and the second coupler;

a second set of symmetrically configured power terminals that in use are coupled to corresponding terminals on a further coupler or on a first appliance;

5 a second magnetic coupling region disposed concentrically around the second set of power terminals, wherein the second magnetic coupling region provides a mutual attraction with a corresponding second engaging region on the further coupler or the first appliance, thereby engaging the second set of power terminals and the corresponding terminals and establishing an electrical connection between the second coupler and the further coupler or the first appliance in a manner that allows the second coupler to rotate freely about the further coupler or the first appliance; and

10 a lead providing an electrical connection between the second coupler and a second appliance.

18. The system according to claim 17, wherein the first and second magnetic coupling regions are disposed around the outer periphery of first and second set of power terminals.

15 19. The system according to any one of claims 17 to 18, wherein the couplers are symmetrically configured so that they are able to connect at any (0-360) coupling orientation.

20. The system according to any one of claims 17 to 19, wherein the system includes a lead which terminates in a coupler corresponding to the first coupler.

20

- a coupler comprising
- ~~symmetrically configured~~ a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals ~~that in use is symmetrical~~, wherein the first and second power terminals are connected to a main power source; and
- a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;
- a complementary coupler on the appliance, comprising
- complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler; and
- an engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the engaging region, thereby engaging the power terminals and complementary power terminals and establishing an electrical connection between the coupler and the appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

The engaging region may be ferromagnetic or may comprise one or more permanent magnets or electro-magnets. The engaging region and the magnetic coupling region may be annular in shape. The magnetic coupling region may comprise a plurality of permanent magnets defining an annular area. In use, the complementary coupling on the appliance may be provided on a non-horizontal surface, preferably a side surface. The power terminals may comprise a 3-pole or a 5-pole connection.

The system may further comprise an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that the complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

The coupler may have a body comprising an upper housing and a lower housing, wherein a gap is formed between said upper housing and said lower housing so as to

extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

~~In another aspect, t~~The disclosure also relates to a system for providing mains power to a cordless appliance, comprising:

- 5 a coupler comprising
- symmetrically configured concentric power terminals that in use are connected to a mains power source; and
 - an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture,
- 10 wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

The coupler may comprise a magnetic coupling region disposed concentrically
15 around an outer periphery of the power terminals.

The magnetic coupling region may be configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the complementary power terminals on the cordless appliance, thereby engaging the power terminals and establishing an electrical connection
20 between the coupler and the cordless appliance.

The magnetic coupling region may be configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the aperture on the adapter base, thereby engaging the coupler and the adapter base.

25 ~~In yet a further aspect, t~~The disclosure further relates to a system for providing mains power to a cordless appliance, comprising:

a coupler comprising symmetrically configured concentric power terminals that in use are connected to a mains power source; and

a complementary coupler on the appliance, comprising complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler;

5 wherein the coupler has a body comprising an upper housing and a lower housing, and a gap is formed between said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

~~In yet another aspect, t~~The disclosure also relates to a system for providing mains power to a cordless appliance, comprising:

10 a coupler comprising:

symmetrically configured concentric power terminals that in use are connected to a mains power source, and

first coupling means disposed concentrically around an outer periphery of the power terminals; and

15 an adapter base comprising

a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, and

a second coupling means disposed around the aperture, wherein the first and second coupling means interact to attach the coupler to the adapter base such that
20 the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.

The first coupling means may comprise a magnetic coupling region, which may
25 comprise one or more permanent magnets or electromagnets. The second coupling means may comprise a ferromagnetic material, or a permanent magnet. Alternatively or additionally, the first and second coupling means may comprise a bayonet attachment, one or more snap clips or a 360 degree ball lock.

The adapter base may comprise a cable to connect to the mains power source
30 and a housing in which the cable may be retracted.

In yet a further aspect, the disclosure relates to a coupler for providing mains power to cordless appliances in a plurality of attachment configurations, the coupler comprising ~~symmetrically configured~~ a circular first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals ~~that in use is~~ symmetrical, wherein the first and second power terminals are connected to a mains power source, and a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;

wherein in a first attachment configuration the coupler is attached to a complementary coupler on a first cordless appliance, the complementary coupler having complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler and a first engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the first engaging region, thereby engaging the power terminals and complementary power terminals and establishing an electrical connection between the coupler and the first cordless appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

In a second attachment configuration the coupler may be attached to an adapter base having a planar surface that in use supports a second cordless appliance, the planar surface defining an aperture with a second engaging region disposed around the aperture, wherein a magnetic attraction between the magnetic coupling region and the second engaging region acts to attach the coupler to the adapter base such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the second cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the second cordless appliance.

In a third attachment configuration, the coupler may be attached to a second adapter base having a planar surface that in use supports a third cordless appliance, the planar surface defining an aperture, wherein in use the coupler and the second adapter base are co-located such that the concentric power terminals are accessible via

the aperture and a magnetic attraction between the magnetic coupling region and a second engaging region on the third cordless appliance acts to attach the coupler to the third cordless appliance such that complementary power terminals on the third cordless appliance are engageable with the concentric power terminals to establish an electrical
 5 connection between the coupler and the third cordless appliance.

In yet another aspect, the disclosure relates to a stacked magnetic coupling system for providing mains power to a plurality of appliances, comprising:

a first coupler comprising

10 a circular first ~~set~~ power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of ~~symmetrically configured~~ the first and second power terminals ~~that in use is symmetrical, wherein the first and second power terminals~~ are connected to a mains power source, and

15 a first magnetic coupling region disposed concentrically around the first set of power terminals;

a second coupler comprising

20 a complementary ~~terminals~~ circular first power terminal and a complementary circular second power terminal, wherein the complementary second power terminal is positioned inside the complementary first power terminal and configured to engage with the first set of power terminals; and

a first engaging region disposed concentrically around the complementary terminals, wherein a magnetic force provides a mutual attraction between the first magnetic coupling region and the first engaging region, thereby engaging the first set of power terminals and the complementary terminals and establishing an electrical
 25 connection between the first coupler and the second coupler;

a second set of symmetrically configured power terminals that in use are coupled to corresponding terminals on a further coupler or on a first appliance;

a second magnetic coupling region disposed concentrically around the second set of power terminals, wherein the second magnetic coupling region provides a
 30 mutual attraction with a corresponding second engaging region on the further coupler or the first appliance, thereby engaging the second set of power terminals and the corresponding terminals and establishing an electrical connection between the second

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coupler and the further coupler or the first appliance in a manner that allows the second coupler to rotate freely about the further coupler or the first appliance; and

_____ a lead providing an electrical connection between the second coupler and a second appliance.

5 The engaging regions may be magnetic or magnetisable. The first and second magnetic coupling regions may be disposed around the outer periphery of first and second set of power terminals. The couplers may be symmetrically configured so that they are able to connect at any (0-360 degree) coupling orientation. The system may include a lead which terminates in a coupler corresponding to the first coupler.

10 As used herein, except where the context requires otherwise, the term "comprise" and variations of the term, such as "comprising", "comprises" and "comprised", are not intended to exclude further additives, components, integers or steps.

15 Further aspects of the present invention and further embodiments of the aspects described in the preceding paragraphs will become apparent from the following description, given by way of example and with reference to the accompanying drawings.

CLAIMS:

1. A system for providing mains power to a cordless appliance, the system
5 comprising:
a coupler comprising:
~~symmetrically configured~~ a circular first power terminal and a second
power terminal, wherein the second power terminal is positioned inside the circular first
power terminal concentric with the first power terminal such that a combination of the
10 first and second power terminals ~~that in use is symmetrical, wherein the first and second~~
power terminals are connected to a mains power source; and
a magnetic coupling region disposed concentrically around an outer
periphery of the power terminals;
a complementary coupler on the appliance, comprising
15 complementary power terminals configured to engage with the
symmetrically configured concentric power terminals of the coupler; and
an engaging region disposed concentrically around an outer periphery of
the complementary terminals, wherein a magnetic force provides a mutual attraction
between the magnetic coupling region and the engaging region, thereby engaging the
20 power terminals and complementary power terminals and establishing an electrical
connection between the coupler and the appliance in a manner that allows the coupler
to rotate freely about the complementary coupler.
- ~~2. The system according to claim 1, wherein the engaging region comprises one of
the following: a ferromagnetic material; one or more permanent magnets; and one or
25 more electro-magnets.~~
- ~~3. The system according to claim 1 or 2, wherein the engaging region and the
magnetic coupling region are annular in shape.~~
- 4~~2~~. The system according to ~~any one of claims 1 to 3~~, wherein the magnetic coupling
region comprises a plurality of permanent magnets defining an annular area.
- 30 5~~3~~. The system according to claim 4~~2~~, wherein the plurality of permanent magnets
are circumferentially positioned at unequal intervals around the annular area.

64. The system according to claim 53, wherein the plurality of permanent magnets are positioned closer to one another in the vicinity of a supply cable that, in use, connects the power terminals to the mains power source.

5 75. The system according to any one of claims 1 to 64, wherein, in use, the complementary coupling on the appliance is provided on a non-horizontal surface.

~~8. The system according to claim 7, wherein, in use, the complementary coupling on the appliance is provided on a side surface.~~

~~9. The system according to any one of claims 1 to 8, wherein the power terminals comprise a 3-pole or a 5-pole connection.~~

10 106. The system according to any one of claims 1-95, further comprising an adapter base comprising a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that the complementary power terminals on the cordless appliance are engageable with the concentric power
15 terminals to establish an electrical connection between the coupler and the cordless appliance.

147. The system according to any one of claims 1-106, the coupler having a body comprising an upper housing and a lower housing, wherein a gap is formed between
20 said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

12. A system for providing mains power to a cordless appliance, the system
25 comprising:

~~a coupler comprising~~

~~— symmetrically configured concentric power terminals that in use are connected to a mains power source; and~~

~~— an adapter base comprising a planar surface that in use supports the
30 cordless appliance, the planar surface defining an aperture,~~

~~wherein in use the coupler is positioned such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the cordless appliance.~~

5 ~~13.— The system according to claim 12, wherein the coupler comprises a magnetic coupling region disposed concentrically around an outer periphery of the power terminals.~~

10 ~~14.— The system according to claim 13, wherein the magnetic coupling region is configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the complementary power terminals on the cordless appliance, thereby engaging the power terminals and establishing an electrical connection between the coupler and the cordless appliance.~~

15 ~~15.— The system according to claim 14, wherein the magnetic coupling region is configured to provide a mutual attraction between the magnetic coupling region and a complementary engaging region disposed concentrically around the aperture on the adapter base, thereby engaging the coupler and the adapter base.~~

~~16.— A system for providing mains power to a cordless appliance, the system comprising:~~

~~a coupler comprising:~~

20 ~~—— symmetrically configured concentric power terminals that in use are connected to a mains power source, and~~

~~—— first coupling means disposed concentrically around an outer periphery of the power terminals; and~~

~~an adapter base comprising~~

25 ~~—— a planar surface that in use supports the cordless appliance, the planar surface defining an aperture, and~~

30 ~~—— a second coupling means disposed around the aperture, wherein the first and second coupling means interact to attach the coupler to the adapter base such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the cordless appliance are engageable with the concentric power~~

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~~terminals to establish an electrical connection between the coupler and the cordless appliance.~~

5 ~~17. The system according to claim 16, wherein the first coupling means comprises a magnetic coupling region, which comprises one or more permanent magnets or electro-~~
~~magnets.~~

~~18. The system according to claim 16 or 17, wherein the second coupling means comprises a ferromagnetic material or a permanent magnet.~~

10 ~~19. The system according to any one of claims 16 to 18, wherein the first and second coupling means comprise one of the following: a bayonet attachment; one or more snap clips; and a 360 degree ball lock.~~

~~20. The system according to any one of claims 12 to 19, wherein the adapter base comprises a cable to connect to the mains power source and a housing within which in which the cable may be retracted.~~

15 ~~24g.~~ A coupler for providing mains power to cordless appliances in a plurality of attachment configurations, the coupler comprising ~~symmetrically configured a circular~~ first power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of the first and second power terminals ~~that in use is~~ symmetrical, wherein the first and second power terminals are connected to a mains
 20 power source, and a magnetic coupling region disposed concentrically around an outer periphery of the power terminals;

25 wherein in a first attachment configuration the coupler is attached to a complementary coupler on a first cordless appliance, the complementary coupler having complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler and a first engaging region disposed concentrically around an outer periphery of the complementary terminals, wherein a magnetic force provides a mutual attraction between the magnetic coupling region and the first engaging region, thereby engaging the power terminals and complementary power terminals and establishing an electrical connection between the coupler and the

first cordless appliance in a manner that allows the coupler to rotate freely about the complementary coupler.

5 229. The coupler according to claim 248, wherein, in a second attachment configuration, the coupler is attached to an adapter base having a planar surface that in use supports a second cordless appliance, the planar surface defining an aperture with a second engaging region disposed around the aperture, wherein a magnetic attraction between the magnetic coupling region and the second engaging region acts to attach the coupler to the adapter base such that the concentric power terminals are accessible via the aperture such that complementary power terminals on the second cordless
10 appliance are engageable with the concentric power terminals to establish an electrical connection between the coupler and the second cordless appliance.

2310. The coupler according to claim 229, wherein, in a third attachment configuration, the coupler is attached to a second adapter base having a planar surface that in use supports a third cordless appliance, the planar surface defining an aperture, wherein in
15 use the coupler and the second adapter base are co-located such that the concentric power terminals are accessible via the aperture and a magnetic attraction between the magnetic coupling region and a second engaging region on the third cordless appliance acts to attach the coupler to the third cordless appliance such that complementary power terminals on the third cordless appliance are engageable with the concentric
20 power terminals to establish an electrical connection between the coupler and the third cordless appliance.

2411. The coupler according to any one of claims 248 to 2310, the coupler having a body comprising an upper housing and a lower housing, wherein a gap is formed between said upper housing and said lower housing so as to extend along at least a
25 portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.

~~25.—The coupler according to claim 24, wherein the gap extends along more than half the length of the perimeter of the coupler body.~~

~~26.—The coupler according to claim 24 or 25, wherein the gap extends along more
30 than three quarters of the length of the perimeter of the coupler body.~~

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2712. The coupler according to ~~any one of claims 24 to 26~~11, wherein the gap extends along the entire length of the perimeter of the coupler body except for a peripheral connecting region where a supply cable enters the coupler body.

5 2813. The coupler according to ~~any one of claims 24 to 26~~11, wherein the gap extends along the entire length of the perimeter of the coupler body.

2914. The coupler according to any one of claims 2411 to 2813, wherein the coupler body has a substantially circular shape in plan view and further comprises a middle housing positioned within a cavity formed between the upper housing and the lower housing so as to extend along the interior periphery of the upper housing, the middle housing containing wiring that extends from a supply cable that enters the coupler body to the power terminal, such that said wiring is isolated from any liquids that flow through the coupler body.

10

3015. The coupler according to claim 2914, wherein the lower housing has a substantially conical shape with an apex located at a substantially radial centre of the coupler body.

15

3416. The coupler according to claim 3015, wherein the incline of the conical lower housing is at least 3 degree.

3217. A stacked magnetic coupling system for providing mains power to a plurality of appliances, the system comprising:

20 a first coupler comprising

a circular first ~~set~~ power terminal and a second power terminal, wherein the second power terminal is positioned inside the circular first power terminal concentric with the first power terminal such that a combination of ~~symmetrically configured~~ the first and second power terminals ~~that in use is symmetrical, wherein the~~ first and second power terminals are connected to a mains power source, and

25

a first magnetic coupling region disposed concentrically around the first set of power terminals;

a second coupler comprising

a complementary ~~terminals~~ circular first power terminal and a complementary circular second power terminal, wherein the complementary second

30

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power terminal is positioned inside the complementary first power terminal and
 configured to engage with the first set of power terminals; and

5 a first engaging region disposed concentrically around the complementary terminals, wherein a magnetic force provides a mutual attraction between the first magnetic coupling region and the first engaging region, thereby engaging the first set of power terminals and the complementary terminals and establishing an electrical connection between the first coupler and the second coupler;

a second set of symmetrically configured power terminals that in use are coupled to corresponding terminals on a further coupler or on a first appliance;

10 a second magnetic coupling region disposed concentrically around the second set of power terminals, wherein the second magnetic coupling region provides a mutual attraction with a corresponding second engaging region on the further coupler or the first appliance, thereby engaging the second set of power terminals and the corresponding terminals and establishing an electrical connection between the second
 15 coupler and the further coupler or the first appliance in a manner that allows the second coupler to rotate freely about the further coupler or the first appliance; and

_____ a lead providing an electrical connection between the second coupler and a second appliance.

~~33.—The system according to claim 32, wherein the engaging regions are magnetic or magnetisable.~~

~~34~~18. The system according to claims ~~32 or 33~~17, wherein the first and second magnetic coupling regions are disposed around the outer periphery of first and second set of power terminals.

~~35~~19. The system according to any one of claims ~~32~~17 to ~~34~~18, wherein the couplers are symmetrically configured so that they are able to connect at any (0-360) coupling orientation.

~~36~~20. The system according to any one of claims ~~32~~17 to ~~35~~19, wherein the system includes a lead which terminates in a coupler corresponding to the first coupler.

~~37.—A system for providing mains power to a cordless appliance, comprising:~~

~~a coupler comprising symmetrically configured concentric power terminals that in use are connected to a mains power source; and~~

5 ~~a complementary coupler on the appliance, comprising complementary power terminals configured to engage with the symmetrically configured concentric power terminals of the coupler;~~

~~wherein the coupler has a body comprising an upper housing and a lower housing, and a gap is formed between said upper housing and said lower housing so as to extend along at least a portion of the perimeter of the coupler body and thereby enable liquid to flow out of the coupler body.~~

10 ~~38.—The coupler according to claim 37, wherein the gap extends along more than half the length of the perimeter of the coupler body.~~

~~39.—The coupler according to claim 37 or 38, wherein the gap extends along more than three quarters of the length of the perimeter of the coupler body.~~

15 ~~40.—The coupler according to any one of claims 37 to 39, wherein the gap extends along the entire length of the perimeter of the coupler body except for a peripheral connecting region where a supply cable enters the coupler body.~~

~~41.—The coupler according to any one of claims 37 to 39, wherein the gap extends along the entire length of the perimeter of the coupler body.~~

20 ~~42.—The coupler according to any one of claims 37 to 41, wherein the coupler body has a substantially circular shape in plan view and further comprises a middle housing positioned within a cavity formed between the upper housing and the lower housing so as to extend along the interior periphery of the upper housing, the middle housing containing wiring that extends from a supply cable that enters the coupler body to the power terminal, such that said wiring is isolated from any liquids that flow through the~~
25 ~~coupler body.~~

~~43.—The coupler according to claim 42, wherein the lower housing has a substantially conical shape with an apex located at a substantially radial centre of the coupler body.~~

~~44.—The coupler according to claim 43, wherein the incline of the conical lower housing is at least 3 degree.~~