

CLAIMS

1. A method for increasing the power transfer efficiency of a wireless induction power and/or data transfer system comprising a magnetic field transmitter which is positioned on a first side of a barrier and a magnetic field receiver which is positioned on a second side of the barrier opposite the first side, the method comprising:

disposing at least one flux flow member in the barrier at least partially between the transmitter and the receiver, the flux flow member comprising a magnetic permeability different from a magnetic permeability of the barrier;

wherein the flux flow member is a separate member from the transmitter and the receiver; and

wherein the flux flow member increases the amount of magnetic flux generated by the transmitter which is coupled through the barrier and into the receiver.

2. ~~The method of claim 1~~A method for increasing the power transfer efficiency of a wireless induction power and/or data transfer system comprising a magnetic field transmitter which is positioned on a first side of a barrier and a magnetic field receiver which is positioned on a second side of the barrier opposite the first side, the method comprising:

disposing at least one flux flow member in the barrier at least partially between the transmitter and the receiver, the flux flow member comprising a magnetic permeability different from a magnetic permeability of the barrier;

wherein the flux flow member increases the amount of magnetic flux generated by the transmitter which is coupled through the barrier and into the receiver,

wherein the at least one flux flow member comprises a magnetic permeability lower than the magnetic permeability of the barrier, the transmitter comprises two transmitter poles, and the step of disposing at least one flux flow member in or adjacent the barrier comprises:

incorporating the flux flow member into the barrier such that at least a portion of the flux flow member is positioned between the transmitter poles;

wherein the flux flow member inhibits the magnetic flux generated by the transmitter from shorting through the barrier between the transmitter poles.

3. The method of claim 2, wherein the flux flow member comprises a thickness which is approximately the same as a thickness of the barrier at an interface between the barrier and the flux flow member.

4. The method of claim 2, wherein the flux flow member comprises an elongated member which is positioned between the transmitter poles.

5. The method of claim 4, wherein the flux flow member extends through the barrier generally perpendicular to the transmitter poles.

6. The method of claim 5, wherein the flux flow member comprises a length which is sufficient to prevent the magnetic flux generated by the transmitter from shorting through the barrier around the ends of the flux flow member.

7. The method of claim 5, wherein the flux flow member conforms to the shape of the barrier.

8. The method of claim 5, wherein the flux flow member conforms to the cross sectional configuration of the barrier.

9. The method of claim 2, wherein the flux flow member comprises at least a generally straight first portion which is positioned between the transmitter poles.

10. The method of claim 9, wherein the flux flow member comprises at least a second portion which is positioned around the first portion and both of the transmitter poles.

11. The method of claim 2, wherein the at least one flux flow member comprises a first flux flow member which is positioned around one of the transmitter poles.

12. The method of claim 11, wherein the at least one flux flow member comprises a second flux flow member which is positioned around the other of the transmitter poles.

13. The method of claim 2, wherein the flux flow member comprises a first hole which is aligned with one of the transmitter poles.

14. The method of claim 13, wherein the flux flow member comprises a second hole which is aligned with the other of the transmitter poles.

15. The method of claim 2, wherein the step of incorporating the flux flow member into the barrier comprises:

forming the flux flow member in a desired shape;
forming a corresponding opening in the barrier; and
securing the flux flow member to the barrier in or over the opening.

16. The method of claim 15, wherein the step of securing the flux flow member to the barrier comprises welding the flux flow member to the barrier.

17. The method of claim 2, wherein the step of incorporating the flux flow member into the barrier comprises:

providing the barrier in separate barrier sections; and
welding the barrier sections together;
wherein the flux flow member comprises the resulting weld bead.

18. The method of claim 1, wherein the at least one flux flow member comprises a magnetic permeability greater than the magnetic permeability of the barrier, the transmitter includes two transmitter poles, the receiver comprises two receiver poles which are generally aligned with the transmitter poles, and the step of disposing at least one flux flow member in or adjacent the barrier comprises:

incorporating the flux flow member into the barrier between a first transmitter pole and a first receiver pole and between a second transmitter pole and a second receiver pole;

wherein the flux flow member facilitates the flow of magnetic flux between the transmitter poles and the receiver poles.

19. The method of claim 18, wherein the step of incorporating the at least one flux flow member into the barrier comprises incorporating a first flux flow member into the barrier between the first transmitter pole and the first receiver pole and incorporating a second flux flow member into the barrier between the second transmitter pole and the second receiver pole.

20. The method of claim 19, wherein the barrier comprises a first housing in which the transmitter is located and a second housing in which the receiver is located, and the step of incorporating the first and second flux flow members into the barrier comprises attaching the flux flow members to at least one of the housings.

21. A wireless induction power and/or data transfer system which comprises:

a magnetic field transmitter which is positioned on a first side of a barrier;

a magnetic field receiver which is positioned on a second side of the barrier opposite the first side; and

at least one flux flow member which is disposed in the barrier at least partially between the transmitter and the receiver, the flux flow member comprising a magnetic permeability different from a magnetic permeability of the barrier;

wherein the flux flow member is a separate member from the transmitter and the receiver; and

wherein the flux flow member increases the amount of magnetic flux generated by the transmitter which is coupled through the barrier and into the receiver.

22. The system of claim 21A wireless induction power and/or data transfer system which comprises:

a magnetic field transmitter which is positioned on a first side of a barrier;

a magnetic field receiver which is positioned on a second side of the barrier opposite the first side; and

at least one flux flow member which is disposed in the barrier at least partially between the transmitter and the receiver, the flux flow member comprising a magnetic permeability different from a magnetic permeability of the barrier;

wherein the flux flow member increases the amount of magnetic flux generated by the transmitter which is coupled through the barrier and into the receiver,

wherein the at least one flux flow member comprises a magnetic permeability lower than the magnetic permeability of the barrier, the transmitter comprises two transmitter poles, and at least a portion of the flux flow member is positioned between the transmitter poles.

23. The system of claim 22, wherein the flux flow member comprises a thickness which is approximately the same as a thickness of the barrier at an interface between the barrier and the flux flow member.

24. The system of claim 22, wherein the flux flow member comprises an elongated member which is positioned between the transmitter poles.

25. The system of claim 24, wherein the flux flow member extends through the barrier generally perpendicular to the transmitter poles.

26. The system of claim 25, wherein the flux flow member comprises a length which is sufficient to prevent the magnetic flux generated by the transmitter from shorting through the barrier around the ends of the flux flow member.

27. The system of claim 25, wherein the flux flow member conforms to the shape of the barrier.

28. The system of claim 25, wherein the flux flow member conforms to the cross sectional configuration of the barrier.

29. The system of claim 22, wherein the flux flow member comprises at least a generally straight first portion which is positioned between the transmitter poles.

30. The system of claim 29, wherein the flux flow member comprises at least a second portion which is positioned around the first portion and both of the transmitter poles.

31. The system of claim 22, wherein the at least one flux flow member comprises a first flux flow member which is positioned around one of the transmitter poles.

32. The system of claim 31, wherein the at least one flux flow member comprises a second flux flow member which is positioned around the other of the transmitter poles.

33. The system of claim 22, wherein the flux flow member comprises a first hole which is aligned with one of the transmitter poles.

34. The system of claim 33, wherein the flux flow member comprises a second hole which is aligned with the other of the transmitter poles.

35. The system of claim 22, wherein the barrier comprises an opening and the flux flow member is secured to the barrier in or over the opening.

36. The system of claim 35, wherein the flux flow member is welded to the barrier.

37. The system of claim 22, wherein the barrier comprises separate barrier sections and the flux flow member comprises a weld bead which is formed by welding the barrier sections together.

38. The system of claim 21, wherein the at least one flux flow member comprises a magnetic permeability greater than the magnetic permeability of the

barrier, the transmitter includes two transmitter poles, the receiver comprises two receiver poles which are generally aligned with the transmitter poles, and the flux flow member is positioned between a first transmitter pole and a first receiver pole and between a second transmitter pole and a second receiver pole.

39. The system of claim 38, wherein the at least one flux flow member comprises a first flux flow member which is positioned between the first transmitter pole and the first receiver pole a second flux flow member which is positioned between the second transmitter pole and the second receiver pole.

40. The system of claim 39, wherein the barrier comprises a first housing in which the transmitter is located and a second housing in which the receiver is located, and the first and second flux flow members are attached to at least one of the housings.