Claims

1. A receiving device (1) for receiving a magnetic field and for producing electric energy by magnetic induction, wherein
- the receiving device (1) comprises coils (33, 35, 37) of at least one electric line and wherein the magnetic field induces an electric voltage in the coils (33, 35, 37) during operation,
- the receiving device (1) and the coils (33, 35, 37) are adapted to receive the magnetic field from a receiving side of the receiving device (1),
- the receiving device (1) comprises a field shaping arrangement (61) formed by magnetizable material adapted to shape magnetic field lines of the magnetic field,
- the field shaping arrangement (61) is placed behind the coils (33, 35, 37), if viewed from the receiving side of the receiving device (1),
- a depth, to be measured in the direction from the receiving side of the receiving device (1) to the side of the receiving device (1) opposite to the receiving side, of the field shaping arrangement (61) varies,characterized in that
the depth of the magnetizable material is larger at locations, if viewed from the receiving side, behind regions of the coils where the electromagnetic field produced by electric currents through the coils (33, 35, 37) is larger due to an overlap of different coils in the respective regions compared to locations behind regions of the coils where there is no overlap of coils.

2. A receiving device (1) for receiving a magnetic field and for producing electric energy by magnetic induction, wherein
- the receiving device (1) comprises at least one coil (33, 35, 37) of at least one electric line and wherein the magnetic field induces an electric voltage in the at least one coil (33, 35, 37) during operation,
- the receiving device (1) and the at least one coil (33, 35, 37) are adapted to receive the magnetic field from a receiving side of the receiving device (1),
- the receiving device (1) comprises a field shaping arrangement (61) formed by magnetizable material adapted to shape magnetic field lines of the magnetic field,
- the field shaping arrangement (61) is placed behind the at least one coil (33, 35, 37), if viewed from the receiving side of the receiving device (1),
- a depth, to be measured in the direction from the receiving side of the receiving device (1) to the side of the receiving device (1) opposite to the receiving side, of the field shaping

arrangement (61) varies,characterized in that
the depth of the magnetizable material is larger at locations, if viewed from the receiving side, behind regions of the at least one coil where the electromagnetic field produced by electric currents through the at least one coil (33, 35, 37) is larger due to more parallel electric lines in the respective regions compared to locations behind regions of the at least one coil where there are less parallel electric lines.

3. The receiving device of claim 1 or 2, characterized in that the field shaping arrangement (61) is formed by a plurality of field shaping elements (62) made of the magnetizable material.

4. The receiving device of claim 3, characterized in that the field shaping elements (62) have equally large depths and wherein the depth of the field shaping arrangement (61) varies, because different numbers of the field shaping elements (62) are stacked upon each other in the direction from the receiving side to the side opposite to the receiving side.

5. The receiving device of one of claims 1 to 4, characterized in that variations of the depth of the field shaping arrangement (61) are compensated by at least one compensating element (72) made of non-magnetizable material.

6. The receiving device of claim 5, characterized in that the variations of the depth are compensated so that the depth of a combined arrangement consisting of the field shaping arrangement (61) and of the at least one compensating element (72) is constant.

7. A method of manufacturing a receiving device (1) for receiving a magnetic field and for producing electric energy by magnetic induction, wherein
- coils (33, 35, 37) of at least one electric line are provided, wherein each of the coils (33, 35, 37) comprises an inductance, so that the magnetic field induces an electric voltage in the coil (33, 35, 37) during operation of the receiving device (1),
- the coils (33, 35, 37) are arranged to receive the magnetic field from a receiving side of the receiving device,
- a field shaping arrangement (61), formed by magnetizable material adapted to shape magnetic field lines of the magnetic field, is placed behind the coils (33, 35, 37), if viewed

from the receiving side of the receiving device (1),so that a depth, to be measured in the direction from the receiving side of the receiving device (1) to the side of the receiving device (1) opposite to the receiving side, of the field shaping arrangement (61) varies,
characterized in that
the depth of the magnetizable material is designed to be larger at locations, if viewed from the receiving side, behind regions of the coils where the electromagnetic field produced by electric currents through the coils (33, 35, 37) is larger due to an overlap of different coils in the respective regions compared to locations behind regions of the coils where there is no overlap of coils.

8. A method of manufacturing a receiving device (1) for receiving a magnetic field and for producing electric energy by magnetic induction, wherein
- at least one coil (33, 35, 37) of at least one electric line is provided, wherein the at least one coil (33, 35, 37) comprises an inductance, so that the magnetic field induces an electric voltage in the coil (33, 35, 37) during operation of the receiving device (1),
- the at least one coil (33, 35, 37) is arranged to receive the magnetic field from a receiving side of the receiving device,
- a field shaping arrangement (61), formed by magnetizable material adapted to shape magnetic field lines of the magnetic field, is placed behind the at least one coil (33, 35, 37), if viewed from the receiving side of the receiving device (1),

so that a depth, to be measured in the direction from the receiving side of the receiving device (1) to the side of the receiving device (1) opposite to the receiving side, of the field shaping arrangement (61) varies,
characterized in that
the depth of the magnetizable material is designed to be larger at locations, if viewed from the receiving side, behind regions of the at least one coil where the electromagnetic field produced by electric currents through the at least one coil (33, 35, 37) is larger due to more parallel electric lines in the respective regions compared to locations behind regions of the at least one coil where there are less parallel electric lines.

9. The method of claim 7 or 8, characterized in that the field shaping arrangement (61) is formed by a plurality of field shaping elements (62) made of the magnetizable material.

10. The method of claim 9, characterized in that field shaping elements (62) are used which have equally large depths and wherein the depth of the field shaping arrangement (61) is varied by stacking different numbers of the field shaping elements (62) upon each other in the direction extending from the receiving side to the side opposite to the receiving side.

11. The method of one of claims 7 to 10, characterized in that variations of the depth of the field shaping arrangement (61) are compensated by at least one compensating element (72) made of non-magnetizable material.

12. The method of claim 11, characterized in that the variations of the depth are compensated so that the depth of a combined arrangement consisting of the field shaping arrangement (61) and of the at least one compensating element (72) is constant.