CLAIMS

1. A woven fabric formed of a first set of yarns (12) extending in a first direction and a second set of yarns (14) extending in a second direction, the first and second sets of yarns being woven together, the first set of yarns (12) including at least one first electrical conductor (16) and the second set of yarns (14) including at least one second electrical conductor (18), the first and second electrical conductors (16, 18) crossing over one another at a crossing point (20), wherein a non-conductive element (24) in the form of at least one non-conductive yarn of the first set of yarns is interposed directly between the first and second electrical conductors (16, 18) at the crossing point to provide a physical barrier between the first and second electrical conductors (16, 18); wherein the non-conductive element (24) is formed of at least two non-conductive yarns (30, 32) of the first set of yarns (12) , and wherein the at least two non-conductive yarns (30, 32) extend on opposing sides of the first conductor (16) and are laterally arranged over the first conductor (16) at the crossing point (20) so as to be interposed between the first and second conductors (16, 18) at the crossing point (20).

2. A woven fabric according to claim 1, wherein the second set of yarns (14) includes at least one non-conductive floating yarn (40) extending over said non-conductive element (30, 32) at the crossing point (20), said at least one non-conductive floating yarn (40) of the second set being disposed below the second conductor (18) at the crossing point, such that the first and second conductors (16, 18) are disposed on opposing sides of said non-conductive element (30, 32) and said non-conductive floating yarn or yarns (40) of the second set at the crossing point (20).

3. A woven fabric according to claim 2, including first and second spacer non-conductive yarns in said second set of yarns, said first and second spacer yarns being disposed between said non-conductive floating yarn or yarns and the second conductor.

4. A woven fabric according to any preceding claim, wherein the first set of yarns (12) includes first and second tie yarns (50, 52) extending over the second conductor (18) to hold the second conductor in position.

5. A woven fabric according to any preceding claim, wherein the first and second conductors (16, 18) are conductive yarns.

6. A woven fabric according to claim 5, wherein the non-conductive element (30):

has a greater number of strands or filaments than a number of strands or filaments of the first conductor (16); and/or

has a greater width than a width of the first conductor (16); and/or

is laterally expandable relative to the first conductor (16).

7. A woven fabric according to any preceding claim, including a plurality of first and second conductors (16) and a plurality of crossing points (20) therebetween, at least one of the crossing points (20) having non-conductive elements (30) separating the crossing first and second conductors (16, 18) and wherein optionally at one or more of the crossing points (22) at least one pair of first and second conductors (16, 18) touch one another to make an electrical connection therebetween.

8. A method of making a conductive woven fabric, including the steps of:

providing for one of the warp and the weft a first set of yarns (12) including at least one first electrical conductor (16);

providing for the other of the warp and the weft a second set of yarns (14) including at least one second electrical conductor (18);

weaving the first and second sets of yarns and conductors, wherein the first and second electrical conductors cross over one another at a crossing point (20); and

weaving a non-conductive element (24) formed of at least two non-conductive yarns (30, 32) of the first set of yarns (12) so as to be interposed directly between the first and second electrical conductors (16, 18) at the crossing point to provide a physical barrier between the first and second electrical conductors; and pressing the at least two non-conductive yarns (30, 32) laterally together over the first conductor (16) at the crossing point to provide a physical barrier between the first and second conductors (16, 18).

9. A method according to claim 8, including the steps of disposing the at least two non-conductive yarns (30, 32) on opposing sides of the first conductor (16) and pressing the at least two non-conductive yarns together (30, 32) over the first conductor at the crossing point so as to be interposed between the first and second conductors (16, 18) at the crossing point (20).

10. A method according to claim 8 or 9, wherein the second set of yarns incudes at least one non-conductive floating yarn (40) and the method includes weaving said non-conductive floating yarn over said non-conductive yarn or yarns (30, 32) of the first set at the crossing point and disposing said at least one non-conductive floating yarn (40) of the second set below the second conductor at the crossing point, such that the first and second conductors are disposed on opposing sides of said non-conductive yarn or yarns of the first set and said non-conductive floating yarn or yarns at the crossing point.

11. A method according to claim 10, including the steps of providing first and second spacer non-conductive yarns in said second set of yarns, and disposing said first and second spacer yarns between said non-conductive floating yarn or yarns and the second conductor.

12. A method according to any one of claims 8 to 11, including the step of providing in the first set of yarns first and second tie yarns (50, 52) and weaving the tie yarns so as to extend over the second conductor (18) to hold the second conductor in position.

13. A method according to any one of claims 8 to 12, wherein:

the non-conductive yarn or yarns (30, 32) of the non-conductive element (24) has or have a greater number of strands than a number of strands of the first conductor; and/or

the non-conductive element (24) has a greater width than a width of the first conductor; and/or

the non-conductive element (24) is laterally expandable relative to the first conductor.

14. A method according to any one of claims 8 to 13, including the steps of providing a plurality of first and second conductors (16, 18) and weaving said pluralities of first and second conductors so as to have a plurality of crossing points (20, 22) therebetween, at least one of the crossing points having non-conductive elements separating the crossing first and second conductors, and optionally weaving the yarns such that at one or more of the crossing points (22) at least one pair of first and second conductors (16, 18) touch one another to made an electrical connection therebetween.

15. A method according to any one of claims 8 to 14, wherein the first and/or second electrical conductors are subject to warp and/or weft floats over or under more than one yarn in order to allow the insertion of the non-conductive elements.

16. A method according to any one of claims 8 to 15, wherein the fabric has a greater pick-density at the crossover points compared to a pick-density of the fabric beyond the crossover points.

17. A method according to any one of claims 8 to 16, including the step of reducing weft insertion tension of the second conductor relative to adjacent non-conductive yarns of the second set.

18. A system for weaving a conductive fabric including a weaving loom arranged to weave according to the method of any one of claims 8 to 17, the weaving loom including a first warp beam (121) for carrying non-conductive warp yarns and a second warp beam (122) for carrying conductive warp yarns, a first harness (123) operable to move heddles through which the conductive warp yarn is threaded, a plurality of harnesses (124, 126, 127) for carrying non-conductive warp yarns, the first harness (123) being independent of the plurality of harnesses, a second harness (124) of the plurality of harnesses is operable to move heddles (125) on which the non-conductive warps yarns adjacent to conductive warp yarn are threaded, the second harness (124)

being independent of the others (126, 127) of the plurality of harnesses that are arranged to carry a remainder of the non-conductive warp yarns, and at least one heddle through which a warp yarn can be threaded.

19. A system according to claim 18, wherein the second warp beam (122) is separable from the first warp beam (121).

20. A system according to claim 18 or 19, wherein the system includes a controller for controlling weaving elements of the system, the controller being operable:

to increase pick-density locally to a crossover point relative to pick density beyond a crossover point; and/or

to control the drive of a positive-drive weaving loom, by momentarily halting or slowing the loom take-up of a direct-(geared-)drive weaving loom and/or performing multiple beat operations with a reed of the loom for each weft insertion; and/or

to reduce weft insertion tension of the second conductive yarn relative to adjacent non-conductive weft yarns, optionally by varying a timing of weft insertion, to vary shed geometry.

21. An item of apparel incorporating a fabric according to any one of claims 1 to 7, said item optionally being a jacket, coat, vest, trousers or a cape, helmet or gloves.