

**[0085]** A Typical Example

**[0086]** This section details an example of weaving instructions for constructing a typical piece of fabric. A piece of fabric of arbitrary size may be reproduced from these specifications, although the repeat for a 250 mm width has been included. The crossover points are evenly spaced in a grid some 8.5 mm apart. Using the specified yarns and weave structures, the pressure threshold of the crossover points is roughly 80 kiloPascals, equivalent to 4 Newton force on a typical fingertip area of 50 square millimetres. The specifications also incorporate two bus-bars in the warp yarns, at either side of the piece of fabric.

**[0087]** The warp has been designed with two selvage edges consisting of a twisted multi-filament yarn, BASF F901 G004, 8 warp threads at either edge of the warp on shafts 1-4, shown diagrammatically in **FIG. 10(a)**.

**[0088]** The warp continues to use a 100% cotton 2/18's yarn set at 24 ends per inch. This is interspersed with conductive mono-filament type BASF F901 A013 every 8 warp threads on shafts 8, 16 and 24.

**[0089]** The lifting sequence/peg plan determines the order in which the shafts are moved to lift or leave the warp threads.

**[0090]** A weft thread of the same cotton is passed through the shed of lifted warp threads, as in the peg plan of **FIG. 10(b)** and substituted with the conductive mono-filament F901 A013 on every 6th pick. This determines the weft thread floats over the conductive warp threads.

**[0091]** Individually Addressable Multiplexed Switches within a Woven Fabric Construction

**[0092]** **FIG. 12** shows an embodiment of individually addressable multiplexed switches which can be formed from any of the embodiments described above. As can be seen, a grid of conductor crossover points are produced, by any of the above-described methods, and two bus bars provided with the permanent electrical connections as shown in the Figure. The switches provide, when closed, the closed circuits as shown in the example matrix configurations. More specifically, when each input line D\* is connected to a positive potential in turn, the three resulting 3-bit patterns produced at the outputs Q1, Q2, Q3 uniquely identify a closed switch within the matrix of crossovers. Connecting the matrix to the inputs D1, D2 and D3 and outputs Q1, Q2 and Q3 according to a binary code allows more graceful response to multiple closed switches therein.

1. A fabric provided with a single layer including warp and weft filaments within said single layer, wherein the warp filaments include at least one first elongated electrical conductor and the weft filaments include at least one second elongated electrical conductor, said first conductor or conductors being crossed by said second conductor or conductors, said conductors being normally biased apart at a crossover point of said conductors with an air gap between them resulting from insulating fibres or filaments which bias the first and second conductors apart at the crossover point, whereby application of pressure in a direction substantially normal to a plane of the fabric causes the conductors to make contact.

2. A fabric according to claim 1, including a plurality of spaced first conductors and/or a plurality of spaced second conductors, forming a plurality of said crossover points.

3. A fabric according to claim 1 or 2, wherein each conductor comprises electrically conductive filaments or fibres.

4. A fabric according to any one of claims 1 to 3, which is woven, knitted, non-woven or plaited.

5. A fabric according to any preceding claim, wherein said biasing apart is effected by locating an electrical conductor of relatively smaller cross-section between insulating filaments or fibres of relatively larger cross-section.

6. A fabric according to any one of claims 1 to 4, wherein the weave includes warp and/or weft floats over more than one yarn to effect the biasing apart of first and second electrical conductors at the crossover point.

7. A fabric according to any one of claims 1 to 4, wherein said biasing apart is effected by employing, as at least one of the electrical conductors, an electrical conductor including insulating filament or fibre wound around it to leave the surface of the conductor exposed at the crossover point.

8. A fabric according to any one of claims 1 to 4, wherein said biasing apart is effected by twisting at least one of the electrical conductors together with insulating filament or fibre.

9. A fabric according to any one of claims 1 to 4, wherein said biasing apart is effected by employing, as at least one of the electrical conductors, an electrical conductor which is supported on and between deformable protuberances of an insulating filament or fibre.

10. A fabric according to any one of claims 1 to 4, wherein said biasing apart is effected by employing, as at least one of the electrical conductors, a fibre including an insulating yarn and a conductive yarn, the insulating yarn including portions extending beyond the conductive yarn.

11. A fabric according to claim 10, wherein there are provided two or more conductive yarns helically wound around the insulating yarn.

12. A fabric according to any preceding claim, wherein the electrical conductors have an electrical property which is proportional to the length of the conductor, whereby the length of a conductor or plurality of connecting conductors can be determined from measurement of that property.

13. A fabric according to claim 12, wherein the electrical property is electrical resistance.

14. A fabric according to any preceding claim, including at least one set of spaced electrical conductors, at least some of said set being electrically connected together to form at least one bus bar.

15. A fabric according to claim 14, wherein said set of spaced electrical conductors comprises electrically conductive filaments or fibres in the warp or weft of a woven construction and electrical connection between conductors of that set is provided by one or more electrically conducting filaments or fibres in the weft or warp, respectively.

16. A fabric according to claim 14, wherein set of spaced electrical conductors comprises electrically conductive filaments or fibres in the warp or weft of a woven construction and said electrical connection is effected after the weaving process.