3B or 3C may result in a tunable element that has less optical loss.

[0053] FIG. 3E shows a further cross-section through the tunable element 300 shown in FIG. 3A; however, unlike the earlier cross-sections (shown in FIGs. 3B-3D), the cross-section shown in FIG. 3E is taken perpendicular to the direction of propagation of the light through the second section of waveguide 302, as indicated by the dotted line Y-Y' in FIG. 3A. As shown in FIG. 3E, although the resistive heating pad 304 is the same length as the second section of waveguide 302, as measured along the direction of propagation, the resistive heating pad 304 may be wider than the second section of waveguide 302, as measured perpendicular to the direction of propagation, although in other examples the width of the resistive heating pad 304 and the second section of waveguide 302 may be the same or the resistive heating pad 304 may be narrower than the second section of waveguide 302.

[0054] Whilst FIGs. 3A-3E show the dimensions of the waveguide sections (e.g. width and thickness, with the width being measured perpendicular to the direction of propagation and in the plane of the waveguide section and thickness being measured perpendicular to both the direction of propagation and the plane of the waveguide section) being substantially the same, in most examples, the width and/or thickness of the second waveguide section 302 is different to the width and/or thickness of the first and third waveguide sections 301, 303, with the first and third waveguide sections 301, 303 having identical width and thickness. Whilst the actual dimensions of the different waveguide sections may be chosen when designing the tuning element 300 (or the waveguide device comprising the tuning element 300), if the refractive index of the second material (that forms the second waveguide section 302) is higher than the refractive index of the first material, then propagating light is more strongly confined within the waveguide and the width and/or thickness of the second waveguide section 302 may be smaller than the width and/or thickness of the first and third waveguide sections 301, 303. In an example, the first and third waveguide sections 301, 303 may be formed from SiN (n=2) and be 400nm thick and lOOOnm wide, whereas the second waveguide section 302 may be formed from Si (n=3.5) and may be 220nm thick and 500nm wide.

[0055] Furthermore, whilst FIGs. 3B-3E show the resistive heating pad 304 being formed above all of the waveguide sections 301-303, in other examples, the orientation may be inverted, such that the resistive heating pad 304 may be formed in a plane lower than all of the waveguide sections 301-303.

[0056] In a variation on the tunable element 300 shown in FIGs. 3A-3E and described above, is shown in FIGs. 3F and 3G. In this example tunable element 320, instead of a single resistive heating pad 304 in a layer above or below the second waveguide section 302, there are two resistive heating pads 304A, 304B, one either side of the