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(54) Title: A PHOTOVOLTAIC ELEMENT WITH AN INCLUDED RESONATOR

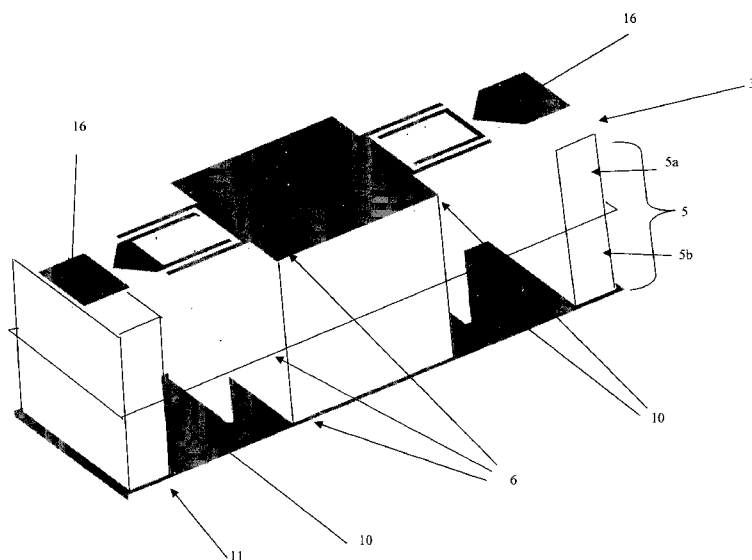


Fig. 3

(57) Abstract: A photovoltaic element including a resonator is arranged on a semiconductor structure (5) that is constituted by a region without electromagnetic damping (5a), whose upper plane forms the plane of incidence (3), and a region with electromagnetic damping (5b), both regions being bound by virtual boundaries (6) of variation in material properties. At least one 2D-3D resonator (4) is surrounded by a dielectric (10) and configured on the semiconductor structure (5), with a relative electrode (1) bordering on the region with electromagnetic damping (5b). The photovoltaic element having a resonator arranged on a semiconductor structure (5) uses the structure (5) and its characteristics to set suitable conditions for the impingement of an electromagnetic wave and its transformation to a stationary form of the electromagnetic field and not to secure the generation of an electric charge. The 2D-3D resonator produces electric current or voltage, which is conducted with the help of a nonlinear component (15) to a connecting component (16). The nonlinear element (15) shapes the signal on the resonant circuit; this signal

is then filtered (rectified) to a further utilizable shape. The planar and spatial resonator (2D-3D resonator) is designed in such a manner that prevents the electromagnetic wave passing through the semiconductor structure (5) from being reflected back to the 2D-3D resonator created in the structure (5). The semiconductor structure (5) does not generate a backward electromagnetic wave propagating in the direction of the impinging electromagnetic wave emitted by a source such as the Sun. The region with electromagnetic damping (5b) has the function of suppressing the reflected wave. Thus, the resonator behaves like an ideal impedance-matched component for the proposed frequency spectrum. The semiconductor structure (5) is set in such a manner that the conductivity increases in the electromagnetic damping region (5b) in the direction of the relative electrode (11), which leads to a wide resonance curve in the photovoltaic element components.