back through the TOLED **(30)**, summing with the light **(48)** originally emitted towards the rear screen **(10)** (of the same polarisation) with the resultant light **(49)** having a Jones Vector of

$$\begin{bmatrix} 1 \\ 0 \end{bmatrix}.$$

[0114] The resultant linearly polarised illumination **(49)** passes through the optical retarder **(45)** which applies a corresponding phase shift. In the embodiment shown the retarder **(45)** produces a quarter wavelength phase shift, as denoted by its corresponding Jones matrix

$$e^{\frac{i\pi}{4}}\begin{bmatrix} 1 & 0 \\ 0 & -i \end{bmatrix}.$$

[0115] The resultant transmission is given by the equation;

$$e^{\frac{i\pi}{4}}\begin{bmatrix} 1 & 0 \\ 0 & -i \end{bmatrix}\begin{bmatrix} 1 \\ 0 \end{bmatrix} = e^{\frac{i\pi}{4}}\begin{bmatrix} 1 \\ 0 \end{bmatrix}. \quad \text{-i)}$$

[0116] The resultant retarded light **(50)** is reflected by the liquid crystal of the rear cholesteric display **(10)**, which behaves essentially as a circular polariser. Given that the Jones matrix of the rear display is

$$\frac{e^{\frac{i\pi}{4}}}{2}\begin{bmatrix} 1 \\ -i \end{bmatrix},$$

[0117] the resultant reflected light **(51)** is described by the equation;

$$\frac{1}{2}\begin{bmatrix} 1 & i \\ -i & 1 \end{bmatrix}e^{\frac{i\pi}{4}}\begin{bmatrix} 1 \\ 0 \end{bmatrix} = \frac{e^{\frac{i\pi}{4}}}{2}\begin{bmatrix} 1 \\ -i \end{bmatrix}. \quad \text{-ii)}$$

[0118] The reflected light **(51)** is then re-transmitted through the retarder **(45)** with a further quarter wave retardation wit a resultant linearly polarised output given by the equation;

$$e^{\frac{i\pi}{4}}\begin{bmatrix} 1 & 0 \\ 0 & -i \end{bmatrix}\frac{e^{\frac{i\pi}{4}}}{2}\begin{bmatrix} 1 \\ -i \end{bmatrix} = \frac{e^{\frac{i\pi}{2}}}{2}\begin{bmatrix} 1 \\ 1 \end{bmatrix}. \quad \text{-iii)}$$

[0119] The light **(51)** transmitted through the retarder **(45)** passes again through the TOLED layer **(30)**. As the Jones matrix of the TOLED **(30)** is the identity matrix

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix},$$

[0120] the resultant effect of the transmission, as given by the equation;

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\frac{e^{\frac{i\pi}{2}}}{2}\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \frac{e^{\frac{i\pi}{2}}}{2}\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \quad \text{-iv)}$$

[0121] leaves the resultant light **(53)** unchanged.

[0122] The light **(53)** re-transmitted through the TOLED **(30)** then passes through the wire grid polariser **(44)** described by a Jones matrix of

$$\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$$

[0123] with the resultant transmitted light **(54)** given by the equation;

$$\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}\frac{e^{\frac{i\pi}{2}}}{2}\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \frac{e^{\frac{i\pi}{2}}}{2}\begin{bmatrix} 0 \\ 1 \end{bmatrix}. \quad \text{v)}$$

[0124] The resultant light **(54)** transmitted through the wire grid polariser **(44)** preserves all the polarising attributes of each portion of the any image generated on the rear screen **(10)**, maintaining the relative luminosity between the darkened and light areas. In the embodiment shown in **FIG. 8**, this light **(54)** then passes through the front screen **(20)**.

[0125] However, in alternative embodiments, the combination of the TOLED **(30)**, wire grid polariser **(44)** and (optionally) the optical retarder **(45)**, collectively forming an illumination assembly **(55)** may be located in front of a multi-screen display or even used as a transparent illumination means enabling a user to illuminate a scene whilst viewing the scene from the same axis as the illumination source.

[0126] The inclusion of the retarder **(45)** is optional depending on the reflective properties of the rear display **(10)**. The retarder **(45)** is thus used to correct the oscillation plane of the electric field (i.e. the polarisation) to ensure the eventual transmission through the wire grid polariser **(44)** is achieved with the minimum of absorption losses.

[0127] In the above example, the rear display **(10)** is a cholesteric transflective liquid crystal, which acts as a circular polariser. Dependent on the polarisation of the incident light **(49)**, the light reflected from the rear screen **(10)** may be one of the following:

[0128] i. the incident light is randomly polarized in which case that which is reflected will be circularly polarized;