

- a quarter wave plate converts the circularly polarized light transmitted by the first and second layers into linearly polarized light.
- 12.** A reflective cholesteric liquid crystal color filter as in claim 2 wherein,
- an added layer of reflective color filters forms a black matrix by overlapping the color filters in the first and second layers to reflect the colors not reflected by the first and second layers.
- 13.** A reflective cholesteric liquid crystal color filter as in claim 12 wherein,
- a circular polarizer of opposite handedness of the cholesteric liquid crystals in the first and second layers polarizes unpolarized light incident thereon,
- a quarter wave plate converts the circularly polarized light transmitted by the first and second layers into linearly polarized.
- 14.** A reflective cholesteric liquid crystal color filter as in claim 7 wherein,
- a circular polarizer of opposite handedness of the cholesteric liquid crystals in the first and second layers polarizes unpolarized light incident thereon,
- a black matrix layer blocks light from the polarizer before it is transmitted to the first and second layers,
- a quarter wave plate converts the circularly polarized light transmitted by the first and second layers into linearly polarized light.
- 15.** A reflective cholesteric liquid crystal color filter as in claim 8 wherein,
- a circular polarizer of opposite handedness of the cholesteric liquid crystals in the first and second layers polarizes unpolarized light incident thereon,
- a quarter wave plate converts the circularly polarized light transmitted by the first and second layers into linearly polarized light.
- 16.** A reflective cholesteric liquid crystal color filter as in claim 11 wherein,
- the circular polarizer is a broad band cholesteric liquid crystal polarizer.
- 17.** A reflective cholesteric liquid crystal color filter as in claim 14 wherein,
- the circular polarizer is a broad band cholesteric liquid crystal polarizer.
- 18.** A reflective cholesteric liquid crystal color filter as in claim 15 wherein,
- the circular polarizer is a broad band cholesteric liquid crystal polarizer.
- 19.** A reflective cholesteric liquid crystal color filter as in claim 1 wherein,
- the first layer of reflective cholesteric liquid crystal color filters of one handedness has a fifth reflecting portion having a fifth bandwidth around a fifth center wavelength,
- the second layer of reflective cholesteric liquid crystal color filters of one handedness has a sixth reflecting portion having a sixth bandwidth around a sixth center wavelength,
- the bandwidths and center wavelengths of the first layer and the second layer are the same, and overlap each other such that the first reflecting portion is vertically adjacent the third and fourth reflective portions, the second reflective portion is vertically adjacent the fourth and sixth reflective portions and the fifth reflective portion is vertically adjacent the sixth and third reflective portions,
- plus a third and a fourth layer identical to the first and second layers with opposite handedness, the third and fourth layers aligned to match the reflecting portion positions of the first and second layers, such that any incident light with a selected color is transmitted through the color filters and incident light for all other colors is reflected.
- 20.** A reflective cholesteric liquid crystal color filter as in claim 19 wherein,
- the three center wavelengths are for the colors red, green and blue.
- 21.** A reflective cholesteric liquid crystal color filter as in claim 2 wherein,
- the layers are used in displays having an array of pixels each pixel having three sub-pixels, the width of each light reflecting portions in each layer extends for two sub-pixels of a first color and four sub-pixels of a second color.
- 22.** A reflective cholesteric liquid crystal color filter as in claim 21 wherein,
- the first layer has repeating pattern with a green light reflecting portion having a width of two sub-pixels and a red light reflecting portion having a width of four sub-pixels, and the second layer has repeating pattern with a green light reflecting portion having a width of two sub-pixels and a blue light reflecting portion having a width of four sub-pixels.
- 23.** A reflective cholesteric liquid crystal color filter as in claim 12 wherein,
- the layers are used in displays having an array of pixels each pixel having three sub-pixels, the width of each light reflecting portions in each layer extends for two sub-pixels of a first color and four sub-pixels of a second color.
- 24.** A reflective cholesteric liquid crystal color filter as in claim 1 wherein,
- the layers are used in displays having an array of pixels, each pixel having three sub-pixels, where the adjacent pixels have reversed sub-pixel patterns such that adjacent pixels have reflective color portions two sub-pixel widths in size, half in each pixel, for ease of manufacture.
- 25.** A reflective cholesteric liquid crystal color filter as in claim 2 wherein,
- the layers are used in displays having an array of pixels, each pixel having three sub-pixels, where the adjacent pixels have reversed sub-pixel patterns such that adjacent pixels have reflective color portions two sub-pixel widths in size, half in each pixel, for ease of manufacture.
- 26.** A reflective cholesteric liquid crystal color filter as in claim 7 wherein,