**G02F**

**DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, GATING, MODULATING OR DEMODULATING; TECHNIQUES OR PROCEDURES FOR THE OPERATION THEREOF; FREQUENCY-CHANGING; NON-LINEAR OPTICS; OPTICAL LOGIC ELEMENTS; OPTICAL ANALOGUE/DIGITAL CONVERTERS**

(optical transfer means between sensing member and indicating or recording part in connection with measuring G01D 5/26; devices in which mathematical operations are carried out with optical elements G06E 3/00, {G06E 3/001} ; electrical signal transmission systems using optical means to convert the input signal G08C 19/36; information-recording by electric or magnetic means and reproducing by sensing optical properties G11B 11/00; static stores using optical elements G11C 13/04; transmission systems employing electromagnetic waves other than radio waves, e.g. light, infra-red radiation, H04B 10/00; optical multiplex systems H04J 14/00; pictorial communication, e.g. television H04N)

**WARNINGS**

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

   Subject matter covered by these groups is classified in the following CPC groups:
   - G02F 1/13357 covered by G02F 1/1336 and subgroups

2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

**1/00**

**Devices or arrangements for the control of the intensity, colour, phase, polarisation or direction of light arriving from an independent light source, e.g. switching, gating, or modulating:**

- Non-linear optics (thermometers using change of colour or translucency G01K 11/12; using changes in fluorescence G01K 11/32; light guide devices G02B 6/00; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source G02B 26/00; control of light in general G05D 25/00; visible signalling systems G08B 5/00; indicating arrangements for variable information by selection or combination of individual elements G09F 9/00; control arrangements or circuits for visual indicators other than cathode-ray tubes G09G 3/00; control of light sources H01S 3/10, H05B 33/08, H05B 35/00 - H05B 43/00; {photochromic filters G02B 5/23; optical logic elements G02F 3/00})

**NOTE**

This group covers only:

- devices or arrangements, e.g. cells, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements by the influence or control of physical parameters, e.g. electric fields, electric current, magnetic fields, sound or mechanical vibrations, stress or thermal effects;
- devices or arrangements in which the electric or magnetic field component of the light beams influences the optical properties of the medium, i.e. non-linear optics;
- control of light by electromagnetic waves, e.g. radio waves, or by electrons or other elementary particles.

**1/0009**

{Materials therefor}

**NOTE**

G02F 1/0009 and subgroups contain mostly non-patent literature

**1/0018**

{Electro-optical materials}
1/0027 . . .  {with ferro-electric properties (domain inversion in ferro-electric materials G02F 1/3558; ferro-electric materials in general H01G 7/02) }
1/0036 . . .  {Magneto-optical materials (magnetic materials in general H01F) }
1/0045 . . .  {Liquid crystals as far as the physical properties are concerned (chemical composition and properties of liquid crystals C09K 19/00) }
1/0054 . . .  {Structure, phase transitions, NMR, ESR, Moessbauer spectra }
1/0063 . . .  {Optical properties, e.g. absorption, reflection, non-linear effects, birefringence (non linear optics in general G02F 1/35) }
1/0072 . . .  {Mechanical, acoustic, electro-elastic, magnetoelastic properties }
1/0081 . . .  {Electric or magnetic properties }
1/009 . . .  {Thermal properties (thermometers using change of colour or translucency G01K 11/12; radiation pyrometry G01J 11/12) }
1/01 . . .  for the control of the intensity, phase, polarisation or colour (G02F 1/29, G02F 1/35 take precedence)

**WARNING**

Group G02F 1/01 is impacted by reclassification into groups G02F 1/165, G02F 1/166, G02F 1/1673, and G02F 1/169.

All groups listed in this Warning should be considered in order to perform a complete search.

1/0102 . . .  {Construcational details (G02F 1/1306, G02F 1/132 take precedence) }
1/0105 . . .  {Illumination devices (for liquid crystal cells G02F1/13357; for display devices for electronic time pieces G04G 9/0041) }
1/0107 . . .  {Gaskets, spacers, sealing of the cell; Filling and closing of the cell (for liquid crystal cells G02F 1/1339, G02F 1/1341; for electrochromic or electrolytic cells G02F 1/161) }
1/011 . . .  {in optical waveguides (G02F 1/0134, G02F 1/01708, G02F 1/025, G02F 1/035, G02F 1/0508, G02F 1/0553, G02F 1/065, G02F 1/073, G02F 1/095, G02F 1/125, G02F 1/1326, G02F 1/1225 take precedence; optical waveguides in general G02F 1/161) }
2001/0113 . . .  {made of glass, e.g. silica-based optical waveguides }
1/0115 . . .  {in optical fibres }
1/0118 . . .  {by controlling the evanescent coupling of light from a fibre into an active, e.g. electro-optic, overlay }
1/0121 . . .  {Operation of the device; Circuit arrangements not otherwise provided for (G02F 1/0337, G02F 1/0516, G02F 1/076, G02F 1/092, G02F 1/113, G02F 1/13306, G02F 1/163 take precedence) }
1/0123 . . .  {Circuits for the control or stabilisation of the bias voltage, e.g. automatic bias control [ABC] feedback loops }
1/0126 . . .  {by another light beam, i.e. opto-optical modulation (G02F 1/0176, G02F 1/0338, G02F 1/0533, G02F 1/0541, G02F 1/0558, G02F 1/135, G02F 1/293 take precedence) }
1/0128 . . .  {based on electro-mechanical, magneto-mechanical, clasto-optic effects }
1/0131 . . .  {based on elasto-optic, i.e. photoelastic effect, e.g. mechanically induced birefringence (acousto-optic devices G02F 1/11) }
1/0134 . . .  {in optical waveguides }
1/0136 . . .  {for the control of polarisation, e.g. state of polarisation [SOP] control, polarisation scrambling, TE-TM mode conversion or separation (G02F 1/0353 takes precedence) }
2001/0139 . . .  {Polarisation scrambling; Depolarisers }
2001/0142 . . .  {TE-TM mode conversion }
2001/0144 . . .  {TE-TM mode separation }
1/0147 . . .  {based on thermo-optic effects (G02F 1/132 takes precedence; tenebrescent compositions C09K 9/00; radiation pyrometry G01J 5/00; thermometers using change of colour or translucency G01K 11/12) }
1/015 . . .  based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction (G02F 1/03 takes precedence)
2001/0151 . . .  {modulating the refractive index }
2001/0152 . . .  {by free carrier effects (Plasma) }
2001/0153 . . .  {by electro-refraction (Kramers-Kronig relation) }
2001/0154 . . .  {by electro-optic effects (LEO=Pockels, QEO=Kerr) }
2001/0155 . . .  {modulating the optical absorption }
2001/0156 . . .  {by free carrier absorption }
2001/0157 . . .  {by electro-absorption effects (FK, Stark, QCSE) }
2001/0158 . . .  {with blue-shift of the absorption band }
2001/0159 . . .  {with red-shift of the absorption band }
1/017 . . .  Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells
1/01708 . . .  {in an optical waveguide structure }
1/01716 . . .  {Optically controlled superlattice or quantum well devices }
1/01725 . . .  {with a non-rectangular quantum well structure, e.g. coupled, graded, stepped quantum wells }
2001/01733 . . .  {Coupled or double quantum wells }
2001/01741 . . .  {Asymmetrically coupled or double quantum wells }
2001/0175 . . .  {with a spatially varied well profile, e.g. graded, stepped quantum wells }
2001/01758 . . .  {with an asymmetric well profile, e.g. asymmetrically stepped quantum wells }
2001/01766 . . .  {Strained superlattice or quantum well devices }
2001/01775 . . .  {involving an intersubband transition in one well, e.g. e1->e2 }
2001/01783 . . .  {Quantum wire }
2001/01791 . . .  {Quantum box or dot }
1/025 . . .  {in an optical waveguide structure (G02F 1/017, G02F 1/2257) take precedence }
1/03 . . .  based on ceramics or electro-optical crystals, e.g. exhibiting Pockels effect or Kerr effect (G02F 1/061 takes precedence)
1/0305 . . .  {Constructional arrangements (G02F 1/0327 - G02F 1/05 take precedence) }

CPC - 2019.05 2
1/0311 . . . . [Structural association of optical elements, e.g., lenses, polarizers, phase plates, with the crystal]
1/0316 . . . . [Electrodes]
1/0322 . . . . [Arrangements comprising two or more independently controlled crystals]
1/0327 . . . . [Operation of the cell; Circuit arrangements (G02F 1/05 takes precedence)]
1/0333 . . . . [addressed by a beam of charged particles, e.g., directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect (G02F 1/05 takes precedence; electrography, electrophotography G03C; screens for cathode ray tubes acting as light valves H01J 29/12)]
1/0338 . . . . [structurally associated with a photoconductive layer or having photo-refractive properties (G02F 1/05 takes precedence)]
1/0344 . . . . [controlled by a high-frequency electromagnetic wave component in an electric waveguide (G02F 1/0356, G02F 1/05, G02F 1/2255, G02F 1/3134 take precedence)]
1/035 . . . . [in an optical waveguide structure]
1/0353 . . . . [involving an electro-optic TE-TM mode conversion]
1/0356 . . . . [controlled by a high-frequency electromagnetic wave component in an electric waveguide structure]
1/05 . . . . [with ferro-electric properties (G02F 1/035, G02F 1/055 take precedence; domain inversion in ferro-electric materials G02F 1/3558; ferro-electric digital stores G11C 11/22)]
1/0508 . . . . [specially adapted for gating or modulating in optical waveguides]
1/0516 . . . . [Operation of the cell; Circuit arrangements]
1/0525 . . . . [addressed by a beam of charged particles, e.g., directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect (electrography, electrophotography G03C; screens for cathode ray tubes acting as light valves H01J 29/12)]
1/0533 . . . . [structurally associated with a photoconductive layer]
1/0541 . . . . [using photo-refractive effects (holohraphy G03H; electro-optical digital static stores using an interference pattern G11C 13/044)]
1/055 . . . . the active material being a ceramic (G02F 1/035 takes precedence)
1/0551 . . . . [Constructional details]
1/0553 . . . . [specially adapted for gating or modulating in optical waveguides]
1/0555 . . . . [Operation of the cell; Circuit arrangements]
1/0556 . . . . [specially adapted for a particular application]
1/0558 . . . . [structurally associated with a photoconductive layer or exhibiting photo-refractive properties]
1/061 . . . . based on electro-optical organic material (G02F 1/07, G02F 1/131 take precedence)
1/065 . . . . in an optical waveguide structure
1/07 . . . . based on electro-optical liquids exhibiting Kerr effect
1/073 . . . . [specially adapted for gating or modulating in optical waveguides]
1/076 . . . . [Operation of the cell; Circuit arrangements]
1/09 . . . . based on magneto-optical elements, e.g. exhibiting Faraday effect
1/091 . . . . [based on magneto-absorption or magneto-reflection]
1/092 . . . . [Operation of the cell; Circuit arrangements]
1/093 . . . . [used as non-reciprocal devices, e.g. optical isolators, circulators (G02F 1/0955 takes precedence)]
2001/094 . . . . [Based on magnetophoretic effect]
1/095 . . . . in an optical waveguide structure
1/0955 . . . . [used as non-reciprocal devices, e.g. optical isolators, circulators]
1/11 . . . . based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves ((elasto-optic effect without wave propagation G02F 1/0131; ) acousto-optical deflection G02F 1/33)
1/113 . . . . [Circuit or control arrangements]
1/116 . . . . [using an optically anisotropic medium, wherein the incident and the diffracted light waves have different polarizations, e.g. acousto-optic tunable filter [AOTF] (G02F 1/125 takes precedence)]
1/125 . . . . [in an optical waveguide structure]
1/13 . . . . [based on liquid crystals, e.g. single liquid crystal display cells (liquid crystal materials G09K 19/00)]
1/1303 . . . . [Apparatus specially adapted to the manufacture of LCDs]
1/1306 . . . . [Details]
1/1309 . . . . [Repairing; Testing (testing of optical apparatus G01M 11/00; electronic testing of displays or display drivers, e.g. of LCDs, G09G 3/006)]
1/1313 . . . . [specially adapted for a particular application]
2001/1316 . . . . [Cleaning methods or materials for cleaning part of liquid crystal cell components during the manufacturing process]
1/132 . . . . [Thermal activation of liquid crystals exhibiting a thermo-optic effect (thermometers using change of colour or translucency of liquid crystals G01K 11/165; thermally addressed liquid crystal elements in a matrix G09G 3/3603)]
1/1323 . . . . [Arrangements for providing a switchable viewing angle]
1/1326 . . . . [Liquid crystal optical waveguides or liquid crystal cells specially adapted for gating or modulating between optical waveguides]
1/133 . . . . [Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements (arrangements or circuits for control of liquid crystal elements in a segment display or a matrix, not structurally associated with these elements, respectively G09G 3/18 and G09G 3/36)]
1/13306 . . . . [Circuit arrangements or driving methods for the control of single liquid crystal cells (G02F 1/132, G02F 1/133382 take precedence)]
2001/13312 . . . . [Circuits comprising a photodetector not for feedback]
G02F

{Circuits comprising a photodetector}

{Circuits comprising a solar cell}

Constructional arrangements;
Manufacturing methods (G02F 1/135, G02F 1/136 take precedence)

{rigid substrate, e.g. inorganic}

{Flexible substrates, e.g. plastics, organic film}

{LCD panel intermediate support structure, e.g. front and back frame or bezel}

{Environmental protection, e.g. dust, humidity}

{Back frame}

{Intermediate frame, e.g. between backlight housing and front frame}

{Front frame}

{Mechanical guiding and alignment of LCD panel support components}

{Method of assembling (G02F 2201/465 takes precedence)}

{Segmented frame}

{Cover glass}

{Electromagnetic shield}

{Ion-diffusion preventing or absorbing layer}

{Plasma addressed liquid crystal cells [PALC] (plasma panels F01J 17/49)}

{for double side displays}

{Insulating layers (G02F 1/135, G02F 1/137, G02F 1/135, G02F 1/136 take precedence)}

{Charged-particles, e.g. electron-beam, addressed liquid crystals cells (screen for cathode ray tubes acting as light valves H01J 29/12; electrophotography G03G)}

{Manufacturing of individual cells out of a plurality of cells, e.g. by dicing}

{Arrangements for aligning or assembling the substrates}

{Planarisation layer}

{Combining plural substrates to produce large-area displays, e.g. tiled displays}

{Optically addressed liquid crystal cells (G02F 1/135 takes precedence)}

{Cells in which the active layer comprises a liquid crystalline polymer (liquid crystalline polymers in general C09K 19/38)}

{cell having two substrates with different characteristic, e.g. thickness or material}

{Cells with varying thickness of the liquid crystal layer}

{for displaying permanent signs or marks}

{Cells with plural compartments or having plurality of liquid crystal microcells partitioned by walls, e.g. one microcell per pixel}

{Input devices, e.g. touch-panels (specially adapted as input devices to computers G09F 3/033; touch-panels per se G06K 1/136, keyboard switches per se H01H 13/70)}

{Heating or cooling of liquid crystal cells other than for activation, e.g. circuits or arrangements for temperature control, stabilisation or uniform distribution over the cell}

{with cooling means, e.g. fans}

{Constructional means, e.g. fans}

{Constructional difference between the display region and the peripheral region}

{Constructional arrangement for sub-divided displays}

{Piezoelectric element associated with the cell}

{for suppressing after-image or image-sticking}

{based on polymer dispersed liquid crystals, e.g. microencapsulated liquid crystals (compositions C09K 19/544)}

{Holographic polymer dispersed liquid crystals}

{Network or three-dimensional gel}

{Reverse mode, i.e. clear in the off-state and scattering in the on-state}

{Structural association of cells with optical devices, e.g. polarisers or reflectors}

{Antiglare, refractive index matching layers}

{Diffusing, scattering, diffracting elements (associated to illuminating devices G02F 1/13606)}

{Luminance enhancement films}

{Filters, e.g. light shielding masks (optical filters G02B 5/20)}

{Light shielding layers, e.g. black matrix (G02F 1/136209 takes precedence)}

{Colour filters (luminescent elements G02E 1/136171)}

{Methods of making thereof, e.g. printing, electro-deposition, photolithography (photomechanical production of textured or patterned surfaces G03F)}

{overcoating}

{Interference filters}

{Light-guides, e.g. fibre-optic bundles, louvered or jalousie light-guides}

{Lenses, e.g. microlenses, Fresnel lenses (lenses in general G02B 3/00)}

{Polarisers (polarisers per se G02B 5/30)}

{Special arrangement of polariser or analyser axes}

{Colour selective polarisers (G02Y 1/1347 takes precedence)}

{Reflective polarizers (G02F 1/13362 takes precedence)}

{with a spatial distribution of the polarisation direction}

{Circular polarisers}

{Cholesteric polarisers}

{Dielectric stack polarisers}

{Wire-grid polarisers}

{Polarising beam splitters [PBS]}
1/13353 . . . . [Reflecting elements (associated to illuminating devices G02F 1/133605)]
1/13355 . . . . [Transflectors]
2001/133557 . . . . [Half-mirror]
2001/13356 . . . . [Particular location of the optical element]
2001/133562 . . . . [on the viewer side]
2001/133565 . . . . [inside the LC element, i.e. between the cell substrates]
2001/133567 . . . . [on the back side]
1/1336 . . . . [Illuminating devices (in general F21V; associated with display devices for electronic watches G04G 9/0041)]
2001/133601 . . . . [for spatial active dimming]
1/133602 . . . . [Direct backlight]
1/133603 . . . . [with LEDs]
1/133604 . . . . [with lamps]
1/133605 . . . . [including specially adapted reflectors]
1/133606 . . . . [including a specially adapted diffusing, scattering or light controlling members]
2001/133607 . . . . [the light controlling member including light directing or refracting elements, e.g. prisms or lenses]
1/133608 . . . . [including particular frames or supporting means]
1/133609 . . . . [including means for improving the color mixing, e.g. white]
1/133611 . . . . [including means for improving the brightness uniformity]
2001/133612 . . . . [Electrical details]
2001/133613 . . . . [including a particular sequence of light sources]
2001/133614 . . . . [the light is generated by photoluminescence, e.g. a phosphor is illuminated by UV or blue light]
1/133615 . . . . [Edge-illuminating devices, i.e. illuminating from the side (G02B 6/0001 takes precedence)]
2001/133616 . . . . [Front illuminating devices]
1/133617 . . . . [Illumination with ultra-violet light; Luminescent elements or materials associated to the cell]
2001/133618 . . . . [for ambient light]
1/13362 . . . . [providing polarised light, e.g. by converting a polarisation component into another one (optical systems for polarising G02B 27/28)]
1/133621 . . . . [providing coloured light (G02F 1/133617; G02F 1/133533 take precedence)]
2001/133622 . . . . [colour sequential illumination]
2001/133623 . . . . [Inclined coloured light beams]
2001/133624 . . . . [having a particular spectral emission]
2001/133625 . . . . [Electron stream lamps]
2001/133626 . . . . [providing two modes of illumination, e.g. day-night]
2001/133627 . . . . [Projection-direct viewing]
2001/133628 . . . . [with cooling means]
1/13363 . . . . [Birefringent elements, e.g. for optical compensation]
2001/133631 . . . . [with a spatial distribution of the retardation value]
1/133632 . . . . [with refractive index ellipsoid inclined relative to the LC-layer surface]
2001/133633 . . . . [using mesogenic materials]
1/133634 . . . . [the refractive index Nz perpendicular to the element surface being different from in-plane refractive indices Nx and Ny, e.g. biaxial or with normal optical axis]
2001/133635 . . . . [Multifunctional compensators]
1/133636 . . . . [with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers]
2001/133637 . . . . [characterized by the wavelength dispersion]
2001/133638 . . . . [Waveplates, i.e. plates with a retardation value of lambda/n]
1/1337 . . . . [Surface-induced orientation of the liquid crystal molecules, e.g. by alignment layers]
1/133703 . . . . [by introducing organic surfactant additives into the liquid crystal material (C09K 19/56 takes precedence)]
1/133707 . . . . [Structures for producing distorted electric fields, e.g. bumps, protrusions, recesses, slits in pixel electrodes]
1/133711 . . . . [by organic films, e.g. polymeric films]
2001/133715 . . . . [by first depositing a monomer]
1/133719 . . . . [with coupling agent molecules, e.g. silane]
1/133723 . . . . [Polyimide, polyamide-imide]
2001/133726 . . . . [made of a mesogenic material]
2001/13373 . . . . [Disclination line; Reverse tilt]
1/133734 . . . . [by obliquely evaporated films, e.g. Si or SiO₂ films]
2001/133738 . . . . [for homogeneous alignment]
2001/133742 . . . . [for homeotropic alignment]
2001/133746 . . . . [for high pretilt angle, i.e. > 15 degrees]
2001/133749 . . . . [for low pretilt angle, i.e. < 15 degrees]
1/133753 . . . . [with different alignment orientations or pretilt angles on a same surface, e.g. for grey scale or improved viewing angle]
2001/133757 . . . . [with different alignment orientations]
2001/133761 . . . . [with different pretilt angles]
2001/133765 . . . . [without a surface treatment]
2001/133769 . . . . [comprising an active, e.g. switchable alignment layer]
2001/133773 . . . . [The alignment material or treatment is different for the two opposite substrates]
2001/133776 . . . . [having structures, i.e. unevenness locally influencing the alignment]
1/13378 . . . . [by treatment of the surface, e.g. embossing, rubbing, light irradiation (G02F 1/133711; G02F 1/133734; G02F 1/133753 (take precedence))]
1/133784 . . . . [by rubbing]
1/133788 . . . . [by light irradiation, e.g. linearly polarised light photo-polymerisation (by etching)]
2001/133792 . . . . [having conducting property]
G02F 1/1335  . . . . . . Gaskets; Spacers; Sealing of cells
1/1339  . . . . . . { spacers dispersed on the cell substrate, e.g. spherical particles, microfibres}
1/13392  . . . . . . { spacers regularly patterned on the cell substrate, e.g. walls, pillars (G02F 1/13377 takes precedence)}
2001/13396  . . . . . . { Spacers having different sizes}
2001/13398  . . . . . . { Materials and properties of the spacer}
1/1341  . . . . . . Filling or closing of cells
2001/13415  . . . . . . { Drop filling process}
1/1343  . . . . . . Electrodes ((reflective electrodes G02F 1/133553))
1/134309  . . . . . . { characterised by their geometrical arrangement (G09F 9/302 takes precedence)}
2001/134318  . . . . . . { having a patterned common electrode}
1/134327  . . . . . . { Segmented, e.g. alpha numeric display}
1/134336  . . . . . . { Matrix}
2001/134345  . . . . . . { Subdivided pixels, e.g. grey scale, redundancy}
2001/134354  . . . . . . { the sub-pixels being capacitively coupled}
1/134363  . . . . . . { for applying an electric field parallel to the substrate, i.e. in-plane switching [IPS]}
2001/134372  . . . . . . { for fringe field switching [FFS] where the common electrode is not patterned, e.g. planar}
2001/134381  . . . . . . { Hybrid switching mode, i.e. for applying an electric field both parallel and orthogonal to the substrates}
1/13439  . . . . . . { characterised by their electrical, optical, physical properties; materials therefor; method of making}
1/1345  . . . . . . Conductors connecting electrodes to cell terminals
1/13452  . . . . . . { Conductors connecting driver circuitry and terminals of panels (H01L 21/00 takes precedence; electrical details inside the cell G02F 1/133-3))
1/13454  . . . . . . { Drivers integrated on the active matrix substrate (G02F 1/136277 takes precedence)}
2001/13456  . . . . . . { cell terminals on one side of the display only}
1/13458  . . . . . . { Terminal pads}
1/1347  . . . . . . Arrangement of liquid crystal layers or cells in which the final condition of one light beam is achieved by the addition of the effects of two or more layers or cells (colour projection displays with liquid crystal valves H04N 9/3197)
1/13471  . . . . . . { in which all the liquid crystal cells or layers remain transparent, e.g. FLC, ECB, DAP, HAN, TN, STN, SBE-LC cells (G02F 1/13475 takes precedence)}
1/13473  . . . . . . { for wavelength filtering or for colour display without the use of colour mosaic filters}
1/13475  . . . . . . { in which at least one liquid crystal cell or layer is doped with a pleochroic dye, e.g. GH-LC cell (G02F 1/13476 takes precedence)}
1/13476  . . . . . . { in which at least one liquid crystal cell or layer assumes a scattering state}
2001/13478  . . . . . . { based on selective reflection}
1/135  . . . . . . Liquid crystal cells structurally associated with a photoconducting or a ferroelectric layer, the properties of which can be optically or electrically varied (G02F 1/13348 takes precedence)
2001/1351  . . . . . . { light-absorbing or blocking layer}
2001/1352  . . . . . . { light-reflecting layer}
1/1354  . . . . . . { having a particular photoconducting structure or material}
2001/1355  . . . . . . { material or manufacturing process thereof}
2001/1357  . . . . . . { electrode structure}
1/1358  . . . . . . { the supplementary layer being a ferroelectric layer}
1/136  . . . . . . Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit (G02F 1/135 takes precedence)
2001/13606  . . . . . . { having means for reducing parasitic capacitance}
2001/13613  . . . . . . { the semiconductor element is formed on a first substrate and thereafter transferred to the final cell substrate}
1/1362  . . . . . . Active matrix addressed cells ((G02F 1/13336, G02F 1/13436 takes precedence))
1/136204  . . . . . . { Arrangements to prevent high voltage or static electricity failures}
1/136209  . . . . . . { Light shielding layers, e.g. black matrix, incorporated in the active matrix substrate, e.g. structurally associated with the switching element}
1/136213  . . . . . . { Storage capacitors associated with the pixel electrode}
2001/136218  . . . . . . { Shield electrode}
2001/136222  . . . . . . { Color filter incorporated in the active matrix substrate}
1/136227  . . . . . . { Through-hole connection of the pixel electrode to the active element through an insulation layer}
2001/136231  . . . . . . { for reducing the number of lithographic steps}
2001/136236  . . . . . . { using a gray or half tone lithographic process}
1/13624  . . . . . . { having more than one switching element per pixel}
2001/136245  . . . . . . { having complementary transistors}
2001/13625  . . . . . . { Patterning using a multi-mask exposure}
2001/136254  . . . . . . { Checking; Testing}
1/136259  . . . . . . { Repairing; Defects}
2001/136263  . . . . . . { Line defect}
2001/136268  . . . . . . { Switch defect}
2001/136272  . . . . . . { Auxiliary line}
1/136277  . . . . . . { formed on a semiconductor substrate, e.g. silicon}
interaction or dynamic scattering
phase transition, orientation effect, guest-host
magneto-optical effect, e.g. field-induced
characterised by the electro-optical or
liquid crystal remains transparent
based on orientation effects in which the
{ Blue phases }{ Hybrid alignment cells } { G02F 1/1393
takes precedence }
{ using smectic liquid crystals } { based on magneto-optical effects }
electroluminescent light sources
additives { containing luminescent or
electroluminescent additives (luminescent
materials in general ) }
characterised by the electro-optical or
orientational effect, guest-host
interaction or dynamic scattering
{ the LC having positive dielectric
anisotropy }
{ the LC having negative dielectric
anisotropy }
{ based on a change of the texture state of a
cholesteric liquid crystal }
{ based on guest-host interaction
(G02F 1/1376, G02F 1/13737, take precedence) }
{ based on a field-induced phase transition
(G02F 1/13781, take precedence) }
{ in liquid crystals doped with a plechroic
dye }
{ based on electrohydrodynamic instabilities
or domain formation in liquid crystals }
{ using dynamic scattering }
{ the liquid crystal selectively assuming
a light-scattering state (G02F 1/1334,
G02F 1/13718 take precedence) }
{ containing luminescent or
electroluminescent additives (luminescent
materials in general )
compositions of liquid crystals comprising
additives { C09K 19/52 - C09K 19/603;
electroluminescent light sources
H05B 33/00) }
{ based on magneto-optical effects }
{ Polymer stabilized liquid crystal layers }
{ using smectic liquid crystals
(G02F 1/141 takes precedence) }
{ Hybrid alignment cells
(G02F 1/1393 takes precedence) }
{ Blue phases }
based on orientation effects in which the
liquid crystal remains transparent
{ Bistable or multi-stable liquid crystal
cells (G02F 1/141 takes precedence) }
{ using a field-induced sign-reversal of the
dielectric anisotropy }
{ the birefringence of the liquid crystal
being electrically controlled, e.g. ECB-,
DAP-, HAN-, PI-LC cells
(G02F 1/1396,
G02F 1/141 take precedence) }
{ Optically compensated birefringence
[OCB]- cells or PI- cells }
{ the liquid crystal being selectively
controlled between a twisted state and
a non-twisted state, e.g. TN-LC cell
(G02F 1/141 takes precedence) }
{ the twist being substantially higher
than 90°, e.g. STN-, SBE-, OMI-LC cells
(G02F 1/1397 takes precedence) }
{ the twist being below 90°C }
using ferroelectric liquid crystals
Antiferroelectric liquid crystals
Deformed helix ferroelectric [DHL]
{ Details of the smectic layer structure,
e.g. bookshelf, chevron, C1 and C2 }
{ using smectic liquid crystals, e.g. based
on the electroclinic effect }
based on an electrochromic effect

WARNING
Group G02F 1/15 is impacted by
reclassification into groups G02F 1/1514 and
G02F 1/1516.
All groups listed in this Warning should be
considered in order to perform a complete
search.

WARNING
Group G02F 1/1514 is incomplete pending
reclassification of documents from group
G02F 1/15.
Groups G02F 1/15 and G02F 1/1514
should be considered in order to perform a
complete search.

WARNING
Group G02F 1/1516 is incomplete pending
reclassification of documents from group
G02F 1/15.
Groups G02F 1/15 and G02F 1/1516
should be considered in order to perform a
complete search.

WARNING
Group G02F 1/1517 is incomplete pending
reclassification of documents from group
G02F 1/15.
Groups G02F 1/15 and G02F 1/1517
should be considered in order to perform a
complete search.

WARNING
Group G02F 1/1518 is incomplete pending
reclassification of documents from group
G02F 1/15.
Groups G02F 1/15 and G02F 1/1518
should be considered in order to perform a
complete search.
comprising inorganic material

**WARNING**

Group G02F 1/1523 is impacted by reclassification into group G02F 1/1524.

Groups G02F 1/1523 and G02F 1/1524 should be considered in order to perform a complete search.

**Transition metal compounds**

**WARNING**

Group G02F 1/1524 is incomplete pending reclassification of documents from group G02F 1/01, G02F 1/17, and G02F 1/19.

All groups listed above should be considered in order to perform a complete search.

**CPC - 2019.05**
Substrates

**WARNING**

Group **G02F 1/16755** is incomplete pending reclassification of documents from group **G02F 1/167**, **G02F 1/17**, and **G02F 1/19**.

All groups listed above should be considered in order to perform a complete search.

Insulating layers

**WARNING**

Group **G02F 1/16756** is incomplete pending reclassification of documents from group **G02F 1/167**, **G02F 1/17**, and **G02F 1/19**.

All groups listed above should be considered in order to perform a complete search.

Microcapsules

**WARNING**

Group **G02F 1/16757** is incomplete pending reclassification of documents from group **G02F 1/167**, **G02F 1/17**, and **G02F 1/19**.

All groups listed above should be considered in order to perform a complete search.

Electrodes

**WARNING**

Group **G02F 1/16761** is impacted by reclassification into groups **G02F 1/16761**, **G02F 1/16762**, and **G02F 1/16766**.

All groups listed in this Warning should be considered in order to perform a complete search.

Side-by-side arrangement of working electrodes and counter-electrodes

**WARNING**

Group **G02F 1/16761** is incomplete pending reclassification of documents from group **G02F 1/1676**.

All groups listed above should be considered in order to perform a complete search.

Gaskets; Spacers; Sealing of cells; Filling or closing of cells

**WARNING**

Group **G02F 1/1679** is incomplete pending reclassification of documents from group **G02F 1/167**.

All groups listed above should be considered in order to perform a complete search.

having two or more microcells partitioned by walls, e.g. of microcup type

**WARNING**

Group **G02F 1/1685** is incomplete pending reclassification of documents from group **G02F 1/167**.

All groups listed above should be considered in order to perform a complete search.

having three or more electrodes per pixel

**WARNING**

Group **G02F 1/16762** is incomplete pending reclassification of documents from group **G02F 1/1676**.

All groups listed above should be considered in order to perform a complete search.

for active matrices

**WARNING**

Group **G02F 1/16766** is incomplete pending reclassification of documents from group **G02F 1/1676**.

All groups listed above should be considered in order to perform a complete search.

Structural association of cells with optical devices, e.g. reflectors or illuminating devices

**WARNING**

Group **G02F 1/1677** is incomplete pending reclassification of documents from group **G02F 1/167**, **G02F 1/17**, and **G02F 1/19**.

All groups listed above should be considered in order to perform a complete search.

{characterised by the composition or particle type}

Gaskets; Spacers; Sealing of cells; Filling or closing of cells

**WARNING**

Group **G02F 1/1679** is incomplete pending reclassification of documents from group **G02F 1/167**.

All groups listed above should be considered in order to perform a complete search.

having two or more microcells partitioned by walls, e.g. of microcup type

**WARNING**

Group **G02F 1/1685** is incomplete pending reclassification of documents from group **G02F 1/167**.

All groups listed above should be considered in order to perform a complete search.

Operation of cells; Circuit arrangements affecting the entire cell

**WARNING**

Group **G02F 1/1685** is incomplete pending reclassification of documents from group **G02F 1/167**.

All groups listed above should be considered in order to perform a complete search.

based on orientable non-spherical particles having a common optical characteristic, e.g. suspended particles of reflective metal flakes

**WARNING**

Group **G02F 1/169** is incomplete pending reclassification of documents from groups **G02F 1/17** and **G02F 1/19**.

All groups listed above should be considered in order to perform a complete search.
WARNING

Group G02F 1/17 is impacted by reclassification into group G02F 1/165, G02F 1/166, G02F 1/1673, G02F 1/1675, G02F 1/16753, G02F 1/16755, G02F 1/16756, G02F 1/16757, G02F 1/1677, G02F 1/1679, G02F 1/1685, G02F 1/169

All listed groups above should be considered in order to perform a complete search.

1/172 . . . [based on a suspension of orientable dipolar particles, e.g. suspended particles displays]
1/174 . . . [based on absorption band-shift, e.g. Stark - or Franz-Keldysh effect (G02F 1/015, G02F 1/178 takes precedence)]
1/176 . . . [using acid- based indicators]
1/178 . . . [based on pressure effects (G02F 1/195 takes precedence)]
1/19 . . . based on variable-reflection or variable-refraction elements not provided for in groups G02F 1/015 - G02F 1/169

WARNING

Group G02F 1/19 is impacted by reclassification into group G02F 1/165, G02F 1/166, G02F 1/1673, G02F 1/1675, G02F 1/16753, G02F 1/16755, G02F 1/16756, G02F 1/16757, G02F 1/1677, G02F 1/1679, G02F 1/1685, G02F 1/169

All listed groups above should be considered in order to perform a complete search.

1/195 . . . [by using frustrated reflection (digital reflection using controlled total internal reflection G02F 1/315)]
1/21 . . . by interference
2001/211 . . . [Sagnac type]
2001/212 . . . [Mach-Zehnder type]
2001/213 . . . [Fabry-Perot type]
2001/215 . . . [Michelson type]
1/216 . . . [using liquid crystals, e.g. liquid crystal Fabry-Perot filters]
2001/217 . . . [Multi mode interference type]
1/218 . . . [using semi-conducting materials]
1/225 . . . in an optical waveguide structure
1/2252 . . . [in optical fibres]
1/2255 . . . [controlled by a high-frequency electromagnetic component in an electric waveguide structure]
1/2257 . . . [the optical waveguides being made of semiconducting material]
1/23 . . . for the control of the colour (G02F 1/013, G02F 1/121 take precedence)
1/25 . . . as to hue or predominant wavelength
1/29 for the control of the position or the direction of light beams, i.e. deflection ([optical coupling means G02B 62/26; optical-mechanical scanning in general G02B 26/10]; static stores with electric or magnetic read-in and optical read-out G11C; lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted H01S 3/101)
2001/291 . . . [Two-dimensional analog deflection]
1/292 . . . [by controlled diffraction or phased-array beam steering (controlled diffraction for optical switching G02F 1/31)]
1/293 . . . [by another light beam, i.e. opto-optical deflection]
2001/294 . . . [Variable focal length device]
1/295 . . . [Analog deflection from or] in an optical waveguide structure
1/2955 . . . [by controlled diffraction or phased-array beam steering (controlled diffraction for optical waveguide switching G02F 1/313)]
1/31 . . . Digital deflection, [i.e. optical switching] (G02F 1/33 takes precedence)
2001/311 . . . [Cascade arrangement of plural switches]
1/313 . . . in an optical waveguide structure
1/3131 . . . [in optical fibres]
1/3132 . . . [of directional coupler type (all-optical modulation, gating or switching using a non-linear directional coupler G02F 1/3521)]
1/3133 . . . [the optical waveguides being made of semiconducting materials]
1/3134 . . . [controlled by a high-frequency electromagnetic wave component in an electric waveguide structure]
2001/3135 . . . . . . . . [vertical structure]
1/3136 . . . . . . . . [of interferometric switch type]
1/3137 . . . . . . . . [with intersecting or branching waveguides, e.g. X-switches and Y-junctions]
1/3138 . . . . . . . . [the optical waveguides being made of semiconducting materials]
1/315 . . . [based on the use of controlled internal reflection]
1/33 . . . Acousto-optical deflection devices [circuit or control arrangements therefor G02F 1/113]
1/332 . . . [comprising a plurality of transducers on the same crystal surface, e.g. multi-channel Bragg cell]
1/335 . . . [having an optical waveguide structure]
1/35 . . . Non-linear optics [optical bistable devices G02F 3/02; lasers using stimulated Brillouin or Raman effect H01S 3/30]
1/3501 . . . . . . . . [Constructional arrangements of non-linear optical devices, e.g. shape of non-linear crystals (constructional arrangements of electro-optic devices G02F 1/305)]
2001/3503 . . . . . . . . [Structural association of optical elements, e.g. lenses, with the nonlinear optical device]
2001/3505 . . . . . . . . [Coatings; Housings; Supports]
2001/3507 . . . . . . . . [Arrangements comprising two or more nonlinear optical devices]
2001/3509 . . . . . . . . [Shape, e.g. shape of end face]
1/3511 . . . . . . . . [Self-focusing or self-trapping of light; Light-induced birefringence; Induced optical Kerr-effect (photorefractive effects of electro-optic crystals G02F 1/0338, G02F 1/0541, of ceramics G02F 1/0558; opto-optical modulation G02F 1/0126; opto-optical deflection G02F 1/293)]
1/3513 . . . . . . . . [Soliton propagation]
1/3515 . . . . . . . . [All-optical modulation, gating, switching, e.g. control of a light beam by another light beam (G02F 1/353, G02F 1/37, G02F 1/39 take precedence)]
in an optical waveguide structure (G02F 1/377) take precedence

characterised by the materials used

[using an interferometer]
[using a directional coupler]
[Non-linear absorption changing by light, e.g. bleaching (laser Q-switching using bleachable media H01S 3/113)]
[Optical damage]
[using two-photon emission or absorption processes (Raman effect H01S 3/30)]

2001/3528 . . . . for producing a supercontinuum

2001/353 . . . . (Frequency conversion, i.e. wherein a light beam with frequency components different from those of the incident light beams is generated (second harmonic generation G02F 1/37; optical parametric generation or amplification G02F 1/39; transferring the modulation of modulated light G02F 2/004; optical pumping of a laser by another laser H01S 3/094; nonlinear optical devices inside a laser cavity H01S 3/108))

2001/3532 . . . . [Arrangements of plural nonlinear devices for generating multi-colour light beams, e.g. arrangements of SHG, SFG, OPO devices for generating RGB light beams]

2001/3534 . . . . [Three-wave interaction, e.g. sum-difference frequency generation (G02F 1/3532 takes precedence)]

2001/3536 . . . . [Four-wave interaction]

2001/3538 . . . . (for optical phase conjugation (H01S 3/10076 takes precedence))

2001/354 . . . . [Third or higher harmonic generation]

2001/3542 . . . . [Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity]

2001/3544 . . . . [Particular phase matching techniques]

2001/3546 . . . . [Active phase matching, e.g. by electro- or thermo-optic tuning]

2001/3548 . . . . [Quasi-phase-matching [QPM], e.g. using a periodic domain inverted structure]

2001/355 . . . . characterised by the materials used

2001/3551 . . . . [Crystals]

2001/3553 . . . . [having the formula MTiOYO4, where M=K, Rb, TI, NH4 or Cs and Y=P or As, e.g. KTP]

2001/3555 . . . . [Glasses]

2001/3556 . . . . [Semiconductor materials, e.g. quantum wells]

2001/3558 . . . . [Poled materials, e.g. with periodic poling; Fabrication of domain inverted structures, e.g. for quasi-phase-matching [QPM]]

2001/361 . . . . [Organic materials]

2001/3611 . . . . [containing Nitrogen]

2001/3612 . . . . [Heterocycles having N as heteroatom]

2001/3613 . . . . [containing Sulfur]

2001/3614 . . . . [Heterocycles having S as heteroatom]

2001/3615 . . . . [containing polymers]

2001/3616 . . . . [having the non-linear optical group in the main chain]

2001/3617 . . . . [having the non-linear optical group in a side chain]

2001/3618 . . . . [Langmuir Blodgett Films]

2001/3619 . . . . [Organometalic compounds]

2001/365 . . . . [in an optical waveguide structure (G02F 1/377; G02F 1/395) take precedence]

1/37 . . . . for second-harmonic generation ((G02F 1/3532 takes precedence))

2001/372 . . . . [means for homogenizing the output beam]

2001/374 . . . . [Cerenkov radiation]

1/377 . . . . in an optical waveguide structure

1/3775 . . . . [with a periodic structure, e.g. domain inversion, for quasi-phase-matching [QPM] (G02F 1/383 takes precedence)]

1/383 . . . . of the optical fibre type

1/39 . . . . for parametric generation or amplification of light, infra-red or ultra-violet waves ((G02F 1/3532 takes precedence; ) electrical parametric amplifiers H03F 7/00)

2001/392 . . . . [Parametric amplification]

1/395 . . . . [in optical waveguides]

1/397 . . . . [Amplification of light by wave mixing involving an interference pattern, e.g. using photorefractive material]

2/00 . . . Demodulating light; Transferring the modulation of modulated light; Frequency-changing of light (G02F 1/35 takes precedence; photoelectric detecting or measuring devices G01J, H01L 40/00, H01L 31/00; demodulating laser arrangements {, e.g. switching, gating} H01S 3/10; demodulation or transference of modulation of modulated electro-magnetic waves in general H03D 9/00)

2002/1002 . . . . [using optical mixing (homodyne, heterodyne systems H04B 10/142)]

2004/1 . . . . (Transferring the modulation of modulated light, i.e. transferring the information from one optical carrier of a first wavelength to a second optical carrier of a second wavelength, e.g. all-optical wavelength converter)

2002/0006 . . . . [All-optical wavelength conversion]

2002/0008 . . . . [Opto-electronic wavelength conversion, i.e. involving photo-detection of the first optical carrier]

2/02 . . . Frequency-changing of light, e.g. by quantum counters (luminescent materials C09K 11/00)

3/00 . . . Optical logic elements (optical computing G06E) ; electric pulse generators using opto-electronic devices as active elements H03K 3/42; logic circuits using opto-electronic devices H03K 19/14); Optical bistable devices

3/02 . . . Optical bistable devices

3/022 . . . . (based on electro-, magneto- or acousto-optical elements (G02F 3/028 takes precedence))

3/024 . . . . (based on non-linear elements, e.g. non-linear Fabry-Perot cavity (G02F 3/028 takes precedence))

3/026 . . . . (based on laser effects)

3/028 . . . . (based on self electro-optic effect devices [SEED])

7/00 . . . Optical analogue/digital converters

NOTE
This group covers only converters based in substantial manner on elements which are provided for in group G02F 1/00.

2201/00 . . . . Constructional arrangements not provided for in groups G02F 1/00 - G02F 7/00

2201/02 . . . fibre
Arrangements comprising a monitoring photodetector

Arrangements for reducing warping-twist

Arrangements for improving the aperture ratio

Anti-reflection arrangements

Airflow channels, e.g. constructional arrangements facilitating the flow of air

Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity

Parallel

Delay line

of fibre type

grating

grating coupler

diffraction grating

Reflective grating, i.e. Bragg grating

reflector

cholesteric liquid crystal reflector

distributed (Bragg) reflector

Airflow channels, e.g. constructional arrangements facilitating the flow of air

Anti-reflection arrangements

Arrangements for improving the aperture ratio

Arrangements for providing conduction through an insulating substrate

Arrangements combining different electro-active layers, e.g. electrochromic, liquid crystal or electroluminescent layers

Fixing elements

Snap-fit

Flattening arrangements

Protective arrangements

Blocking layers, e.g. against migration of ions

Arrangements improving the resistance to shock

Arrangements improving the resistance to acoustic resonance like noise

Repairing, e.g. with redundant arrangement against defective part

Pseudo repairing, e.g. a defective part is brought into a condition in which it does not disturb the functioning of the device

RGB geometrical arrangements

Arrangements for reducing warping-twist

Substrates having a particular shape, e.g. non-rectangular

Arrangements comprising a monitoring photodetector

Materials and properties

dipole

organic material

low molecular weight

polymeric

curable

thermocurable

charge transfer complex

Langmuir-Blodgett film

photo bleached

dye

pleochroic

fluorescent

dopant

paled

glass transition temperature

inorganic glass

semiconductor

GaAs and alloy

InP and alloy

a-Si

dep-Si

single crystal Si

CdsSe or CdTe and alloys

ZnS or ZnSe and alloys

quantum wells

photo conductor

photorefractive

photo chromic

conductive

LiNbO3, LiTaO3

Antistatic materials or arrangements

Adhesive materials or arrangements

Metamaterials

Photonic crystals

Metal hydrides materials

Micro- or nanomaterials

Sol-gel materials

Materials having a particular birefringence, retardation

Materials having a particular dielectric constant

Test HW

Function characteristic

transmissive

reflective

total internal reflection

attenuated or frustrated internal reflection

scattering

wavelength independent

wavelength dependent

wavelength filtering

Polarisation independent

Polarisation dependent

transreflective

plasmon

involving infrared radiation

spatial light modulator

involving THZ radiation

involving resonance effects, e.g. resonantly enhanced interaction

involving spin polarization effects
<table>
<thead>
<tr>
<th>2203/17</th>
<th>involving soliton waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>2203/18</td>
<td>adaptive optics, e.g. wavefront correction</td>
</tr>
<tr>
<td>2203/19</td>
<td>linearised modulation; reduction of harmonic distortions</td>
</tr>
<tr>
<td>2203/20</td>
<td>Intrinsic phase difference, i.e. optical bias, of an optical modulator; Methods for the pre-set thereof</td>
</tr>
<tr>
<td>2203/21</td>
<td>Thermal instability, i.e. DC drift, of an optical modulator; Arrangements or methods for the reduction thereof</td>
</tr>
<tr>
<td>2203/22</td>
<td>diffractive</td>
</tr>
<tr>
<td>2203/24</td>
<td>beam steering</td>
</tr>
<tr>
<td>2203/25</td>
<td>Frequency chirping of an optical modulator; Arrangements or methods for the pre-set or tuning thereof</td>
</tr>
<tr>
<td>2203/255</td>
<td>. . Negative chirp</td>
</tr>
<tr>
<td>2203/26</td>
<td>Pulse shaping; Apparatus or methods therefor</td>
</tr>
<tr>
<td>2203/28</td>
<td>focussing or defocussing</td>
</tr>
<tr>
<td>2203/30</td>
<td>Gray scale</td>
</tr>
<tr>
<td>2203/34</td>
<td>Colour display without the use of colour mosaic filters</td>
</tr>
<tr>
<td>2203/48</td>
<td>Variable attenuator</td>
</tr>
<tr>
<td>2203/50</td>
<td>Phase-only modulation</td>
</tr>
<tr>
<td>2203/52</td>
<td>Optical limiters</td>
</tr>
<tr>
<td>2203/54</td>
<td>Optical pulse train (comb) synthesizer</td>
</tr>
<tr>
<td>2203/56</td>
<td>Frequency comb synthesizer</td>
</tr>
<tr>
<td>2203/58</td>
<td>Multi-wavelength, e.g. operation of the device at a plurality of wavelengths</td>
</tr>
<tr>
<td>2203/585</td>
<td>. . Add/drop devices</td>
</tr>
<tr>
<td>2203/60</td>
<td>Temperature independent</td>
</tr>
<tr>
<td>2203/62</td>
<td>Switchable arrangements whereby the element being usually not switchable</td>
</tr>
<tr>
<td>2203/64</td>
<td>Normally black display, i.e. the off state being black</td>
</tr>
<tr>
<td>2203/64</td>
<td>Normally white display, i.e. the off state being white</td>
</tr>
<tr>
<td>2203/68</td>
<td>Green display, e.g. recycling, reduction of harmful substances</td>
</tr>
<tr>
<td>2203/69</td>
<td>Arrangements or methods for testing or calibrating a device</td>
</tr>
<tr>
<td>2203/70</td>
<td>Semiconductor optical amplifier [SOA] used in a device covered by G02F</td>
</tr>
</tbody>
</table>

2413/00 **Indexing scheme related to G02F 1/13363**, i.e. to birefringent elements, e.g. for optical compensation, characterised by the number, position, orientation or value of the compensation plates

| 2413/01 | Number of plates being 1 |
| 2413/02 | Number of plates being 2 |
| 2413/03 | Number of plates being 3 |
| 2413/04 | Number of plates greater than or equal to 4 |
| 2413/05 | Single plate on one side of the LC cell |
| 2413/06 | Two plates on one side of the LC cell |
| 2413/07 | All plates on one side of the LC cell |
| 2413/08 | with a particular optical axis orientation |
| 2413/09 | with a spatial distribution of the retardation value |
| 2413/10 | with refractive index ellipsoid inclined, or tilted, relative to the LC-layer surface O plate |
| 2413/105 | . . with varying inclination in thickness direction, e.g. hybrid oriented discotic LC |
| 2413/11 | The refractive index Nz perpendicular to the element surface being different from in-plane refractive indices Nn an Ny, e.g. C plate |
| 2413/12 | Biaxial compensators |
| 2413/13 | Positive birefringence |