1. **Ground 1: Claims 1, 29, 60, 63, 66, 71-73, 76 are rendered obvious by the combination of Parker Thesis and Warr Thesis and Tan Thesis**

**’033 Claim Language**

Followed by corresponding features in the reference.[1]

**[1pre.] An optical processor having a reflective SLM, a dispersion device and a focussing device,**

Parker Thesis discloses a space-wavelength switch that includes a reflective SLM, a dispersion device and a focussing device.

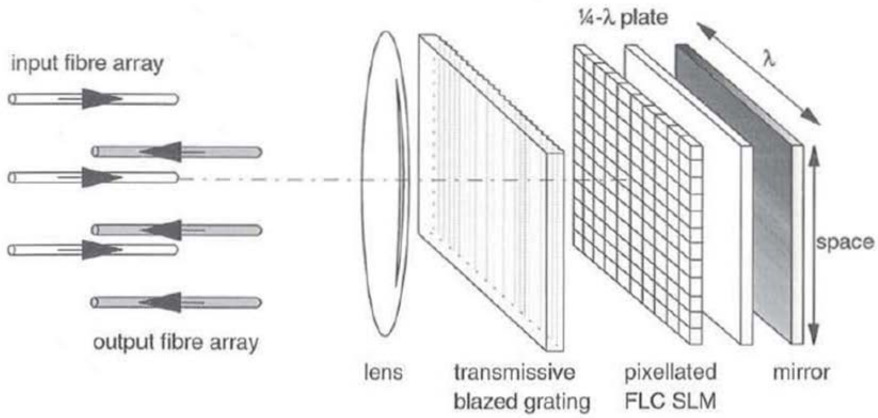



Figure 6.1: Exploded $2f$ compact $3 \times 3$ space-wavelength switch

Parker Thesis at 96. A PHOSITA would recognize that this device is reflective because of the inclusion of a mirror and the arrows indicating the directions of the input and output light beams. The device in Figure 2.6 provides further support for the satisfaction of this claim element. Parker Thesis discloses “a dispersion device,” described as a “transmissive blazed grating” in Figure 6.1. Parker Thesis also discloses “a focussing device,” described as a lens” in Figure 6.1.

“The currently unused extra dimension of the SLM can also be used to add functionality to the switch, such as to make it into ***a space-wavelength switch***. This would serve a very important function in dynamic wavelength-routed optical networks as an add-drop node. Figure (6.1) shows an ‘exploded’ concept for a polarisation-insensitive, optically transparent, compact, low-loss space-wavelength switch, ***utilising all the ideas developed in chapters 2 and 4.*** The switch acts as a 3 x 3 fibre cross-connect, but can also perfectly shuffle wavelengths between the various fibres.” Parker Thesis at 97.

---

[1] Bold and italicized text are for emphasis in the claim charts in this petition, unless stated otherwise.

Warr Thesis discloses a double-pass holographic crossbar that includes an SLM and a focussing device: "Figure 5.4 shows the author's suggestion of a new scalable architecture for holographically interconnecting single-mode fibres. The operation of this compact folded crossbar structure is as follows. In plane Pl, light enters the system as multiple divergent Gaussian beams emerging from cleaved single-mode fibres which have been aligned parallel to the system axis. Each fibre is also positioned so that it lies along the central axis of one of the lenses within a collimation lens array. ***The collimation array in plane P2 is arranged exactly one focal distance in front of the fibre ends so that the Gaussian signal beams are individually collimated through the FLC-SLM***."

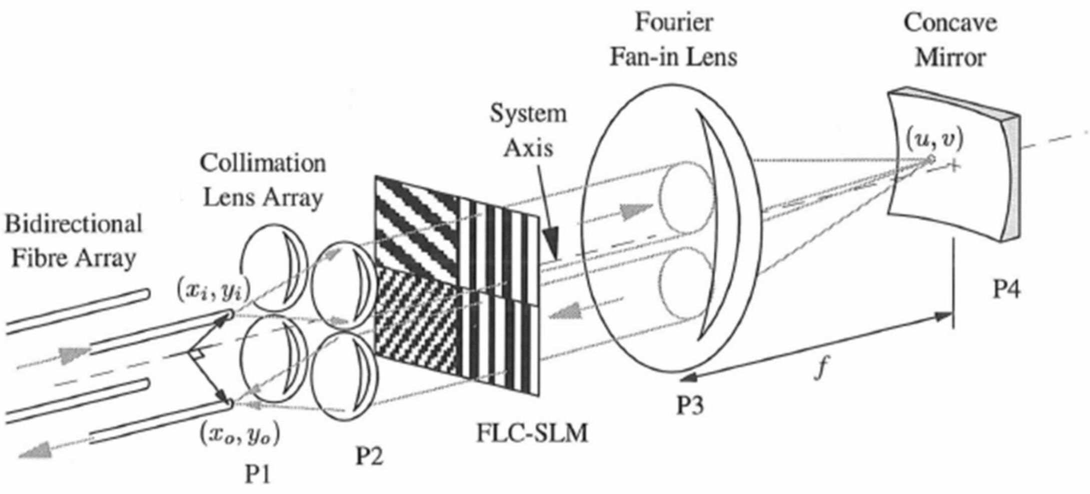
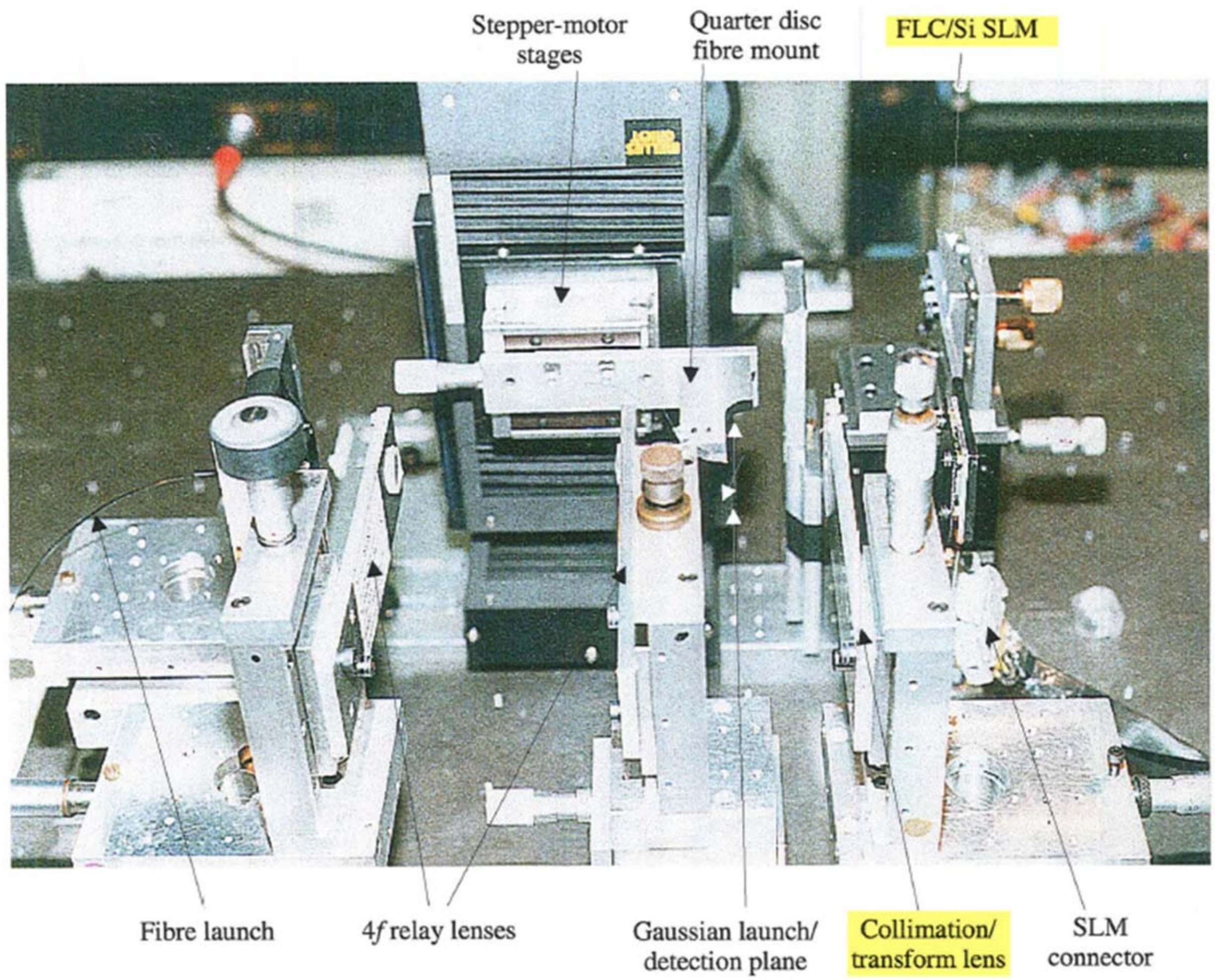



**Figure 5.4**: A double-pass holographic crossbar structure for single-mode fibres.

Warr Thesis at 89.

Warr Thesis further discloses the use of a reflective SLM: "A promising innovation in the development of miniature FLC devices is to construct SLMs directly on the top of CMOS VLSI silicon chips [15]. ***These devices operate in reflection*** and each pixel is addressed by a signal applied to an aluminium pad which doubles as the pixel mirror, figure 2.6. The use of CMOS circuitry at each pixel also removes the reliance on full FLC material bistability and enables pixel pitches down to about 25μm to be addressed relatively easily." Warr Thesis at 17.

Tan Thesis discloses a reflective SLM and a focussing device: " The challenge was to measure the far field replay of holograms encoded using a FLC on silicon backplane SLM, in a way that would ensure normal incidence on the electro-optic medium and without the use of a non-polarising beam splitter cube. ***As the SLM has to be used in reflection mode, a single lens to collimate the fibre launch*** and perform the far-field transform of the hologram ***will suffice.***" Tan Thesis at 151.




Tan Thesis at 152 ("Figure 8.19: Photograph of the experimental set-up for measuring ***reflective hologram replays***.")
*See* Hall Decl. at ¶¶ 46-50, 52-58, 61-65.

**[1a.] wherein the SLM has an array of controllable elements,**

Parker Thesis discloses a SLM having a pixelated FLC SLM containing an array of controllable elements:

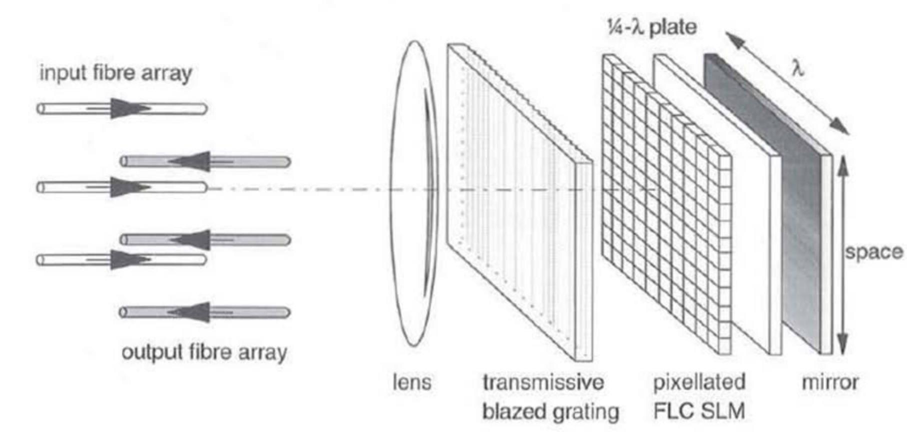



Figure 6.1: Exploded $2f$ compact $3 \times 3$ space-wavelength switch

Parker Thesis at 96.

Warr Thesis also discloses an SLM with an array of controllable elements: "SLMs typically consist of ***an array of individually controllable pixels***…Ferroelectric liquid crystal SLMs…can also be readily configured as ***phase-*** or as intensity-***modulators***." Warr Thesis at 7. "To obtain maximum light efficiency, the SLM pixels ***should only modulate the phase of the incident Gaussian beam*** and not the intensity." Warr Thesis at 13. "Because each pixel now acts as a ***perfect (0, π) binary phase modulator***, the input polariser may also be removed." Warr Thesis at 25.

Tan Thesis discloses an SLM with an array of controllable elements: "Typically, a large number of holograms for dynamically reconfigurable routing applications are generated with a small number of phase levels. These are then written onto ***2-D pixellated SLMs*** with a limited spatial bandwidth product (SBWP or equivalently number of pixels) and other processing limitations such as dead-space and phase uniformity of each modulating element." Tan Thesis at 44.

*See* Hall Decl. at ¶¶ 46-50, 52-58, 66-68

**[1b.] wherein the processor is configured such that light from a common point on the dispersion device is spatially distributed over at least part of the SLM, and**

Parker Thesis discloses spatial distribution of light from the dispersion device over at least part of the SLM:

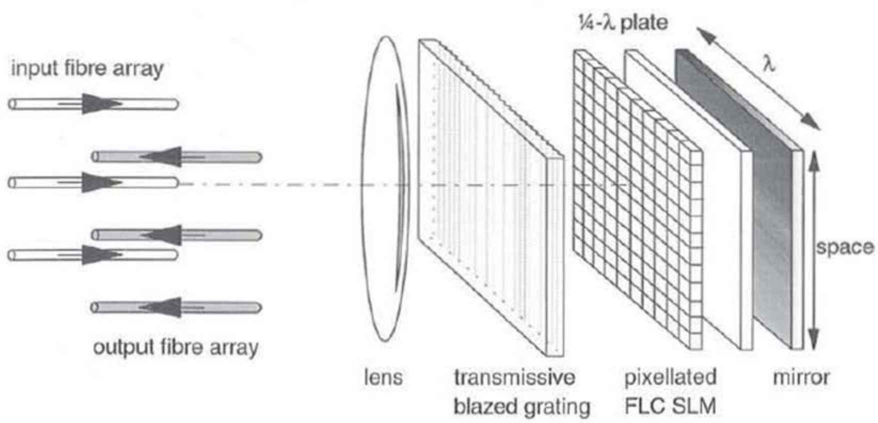



Figure 6.1: Exploded $2f$ compact $3 \times 3$ space-wavelength switch

| | |
|---|---|
| Parker Thesis at 96. The use of a grating disperses the light into its component frequencies, providing spatial distribution of the light as it impacts the SLM: "The principle of operation of the tunable holographic wavelength filter is based on the wavelength-dispersive nature of gratings. ***Polychromatic light is angularly dispersed by a grating***, since the different wavelengths are diffracted through different angles." Parker Thesis at 47.<br><br>"The currently unused extra dimension of the SLM can also be used to add functionality to the switch, such as to make it into ***a space-wavelength switch***. This would serve a very important function in dynamic wavelength-routed optical networks as ***an add-drop node***. Figure (6.1) shows an 'exploded' concept for a polarisation-insensitive, optically transparent, compact, low-loss space-wavelength switch, utilising all the ideas developed in chapters 2 and 4. The switch acts as a 3 x 3 fibre cross-connect, but can also ***perfectly shuffle wavelengths between the various fibres***." Parker Thesis at 97.<br>*See* Hall Decl. at ¶¶ 46-50, 52-58, 69-71 |
| **[1c.] wherein the processor is configured such that the controllable elements display different holograms at chosen locations of the SLM where said light is incident, for controlling directions at which light from respective said locations emerges.** |
| The Parker Thesis discloses that controllable elements display different holograms at chosen locations of the SLM where said light is incident, for controlling directions at which light from respective said locations emerges:<br>Parker Thesis describes the use of circuitry to display holograms on the SLM. |

DOCKET ALARM

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

**LAW FIRMS**

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

**FINANCIAL INSTITUTIONS**

Litigation and bankruptcy checks for companies and debtors.

**E-DISCOVERY AND LEGAL VENDORS**

Sync your system to PACER to automate legal marketing.

**WHAT WILL YOU BUILD?** | **sales@docketalarm.com** | **1-866-77-FASTCASE**

fastcase® Smarter legal research.