Sparks describes an optical switch comprising arrays of MEMS mirrors capable of two axis movement. *Id*. at 4:43–45. Sparks also explains that each of the channels "may be attenuated to whatever degree necessary to achieve the desired effect." *Id*. at 2:33–35. Sparks further discloses that the optical switch includes a closed-loop servo control system in which the input and/or output optical signals are measured and a control means receives a signal indicative of the power of the optical signal. *Id*. at 2:49–65; 4:39–42; 4:59–67. Sparks explains that the control means controls the operation of the MEMS mirrors to misalign the paths of the reflected beams, and thus to effect a predetermined output power for each of the channels passing through the switch. *Id*. at 2:45–48; 6:2–10.

155. A PHOSITA would have been motivated to combine Bouevitch with Sparks for a number of independent reasons. A PHOSITA would have been motivated to combine Bouevitch with Sparks for many of the same reasons discussed above with respect to the combination of Bouevitch and Carr. Fundamentally, the two references cover highly related subject matter. Each reference discusses devices in the same field of fiber optic communications. *Id*. at 2:20-25; Ex. 1002 at 1:10–19. Each reference is directed at the same application in that field—optical switching for wavelength-division-multiplexed (WDM) communications. Each reference discloses an optical add/drop switch using a MEMS-based WSS for switching. As a result, using the known 2-axis mirrors

from Sparks in the Bouevitch COADM would have been nothing more than using known techniques to improve similar devices. Because of the similarity between the devices disclosed in each reference, a PHOSITA would expect that each of these well-known techniques could be applied to the devices of the other patent. A PHOSITA would find it natural and obvious to combine teachings of Sparks with the disclosure of Bouevitch, e.g., in light of my discussion in Sec. XI.C.1 above of the functional schema of Bouevitch. Namely, providing the MEMS mirrors of Bouevitch with two-axis tilt capability enables the spatial positioning of returning beams in both transverse directions at the face of microlens array 12. Thus, errors in system alignment arising, e.g., from imperfect assembly or temperature changes—well known problems in free space optical systems—could be better compensated.

156. For example, a PHOSITA would have been motivated to combine the two-axis movable MEMS mirrors of Sparks with the COADM of Bouevitch based on the teachings of the references, common sense and knowledge generally available to a PHOSITA, as the proposed combination would merely entail substituting known elements to yield predictable results. Bouevitch discloses a COADM where multi-wavelength light is spatially dispersed into channels by a diffraction grating and each channel is reflected by a different mirror in an array of MEMS mirrors along a different path for adding and dropping optical signals. Ex.