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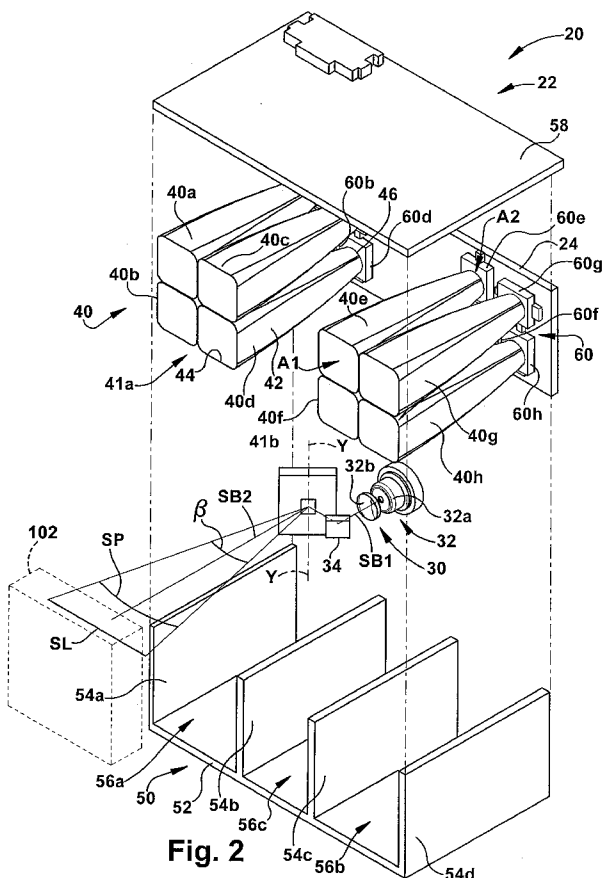
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(54) Title: NON-IMAGING LIGHT COLLECTOR FOR ELECTRO-OPTICAL SCANNER



(57) Abstract: An extended working range electro-optical scanner for reading a barcode is described. The scanner includes a scan engine including a beam assembly for repetitively directing a beam of light at a scan angle across the barcode and an array of non-imaging light collectors for collecting and concentrating reflected light from the barcode. Each light collector of the array of light collectors includes entrance and exit apertures. A total area of the entrance apertures of the array of light collectors is greater than 50% of a total area of a target-facing surface of the scan engine. Each of a corresponding array of photodetectors is positioned at an exit aperture of a respective light collector of the array of light collectors to receive concentrated light from its respective collector and generates an output electrical signal corresponding to an intensity of the concentrated light received by the photodetector.

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**Declarations under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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**AMENDED CLAIMS**

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22. A method of scanning a target bar code, the steps of the method comprising:

- providing a scan engine for repetitively directing a beam of light at a scan angle across the target bar code;
- providing a non-imaging light collector array for collecting and concentrating reflected light from the target bar code, wherein each light collector of the array of light collectors has an entrance aperture and an exit aperture and wherein a total area of the entrance apertures of the array of light collectors is greater than 50 percent of a total area of a target-facing surface of the scan engine;
- providing a photodetector array positioned at an exit aperture of a respective light collector of the array of light collectors for receiving concentrated light from its respective light collector and generating an output electrical signal corresponding to an intensity of the concentrated light received by the photodetector engine; and
- scanning the target bar code by actuating the scan engine.

23. An extended working range electro-optical scanner for reading a target bar code, the scanner comprising:

- a scan engine including a beam assembly for repetitively directing a beam of light at a scan angle across the target bar code;
- an array of non-imaging light collectors for collecting and concentrating reflected light from the target bar code, each light collector of the array of light collectors having an entrance aperture and an exit aperture with a collection angle that is substantially equally to the scan angle; and

a corresponding array of photodetectors, each photodetector in the array of photodetectors positioned adjacent the exit aperture of a respective light collector of the array of light collectors to receive concentrated light from its respective light collector and generate an output electrical signal corresponding to an intensity of the concentrated light received by the photodetector.

24. An extended working range electro-optical scanner for reading a target bar code, the scanner comprising:

a scan engine including a beam assembly for repetitively directing a beam of light at a scan angle across the target bar code;

an array of non-imaging light collectors for collecting and concentrating reflected light from the target bar code, the array of non-imaging light collectors including at least two non-imaging light collectors each having an entrance aperture and an exit aperture and wherein a total area of the entrance apertures of the array of light collectors is greater than 50 percent of a total area of a target-facing surface of the scan engine; and

a corresponding array of photodetectors including at least two photodetectors each positioned adjacent the exit aperture of a respective light collector of the array of light collectors to receive concentrated light from its respective light collector and generate an output electrical signal corresponding to an intensity of the concentrated light received by the photodetector.