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Kajiyama et al.

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(54) **OPTICAL HEAD FOR TWO DIFFERENT DISK THICKNESSES WITH A LIGHT BEAM DIAMETER CONTROL DEVICE**

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(51) **Int. Cl.**⁷ **G11B 7/00**

(52) **U.S. Cl.** **369/112.06; 369/44.14; 369/94; 369/44.37**

(58) **Field of Search** 369/44.23, 44.37, 369/112, 118, 103, 109, 94, 44.14, 53.2, 112.06, 112.01, 44.15, 44.24, 44.16, 112.08, 112.24

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Primary Examiner—William Korzuch

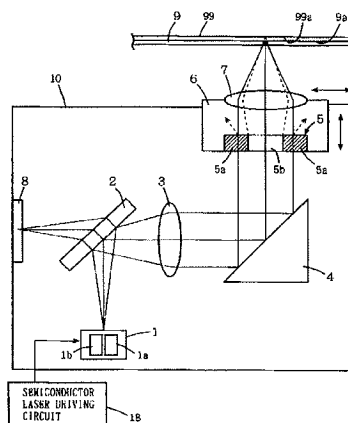
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(57) **ABSTRACT**

An optical pickup device which includes a semiconductor laser selectively generating a laser beam with a wavelength of 635 nm, a laser beam with a wavelength of 780 nm, and an optical device having a central region in which a hologram is formed and a peripheral region in which a diffraction grating is formed. In particular, the optical device is arranged immediately below an objective lens, and the central region allows transmission of the laser beam with the wavelength of 635 nm without any diffraction but increases the diameter of the laser beam to the wavelength of 780 nm by diffraction. On the other hand, peripheral region allows transmission of the laser beam with the wavelength of 635 nm without any diffraction, but substantially shields the laser beam with the wavelength of 780 nm by diffraction. Thus, each laser beam with the wavelength 635 nm is transmitted through objective lens and focused on a signal recording surface of a DVD. The periphery of the laser beam with the wavelength of 780 nm is significantly diffracted by peripheral region of optical device and only the central portion of the laser beam enters objective lens while increasing its diameter. Thus, the laser beam with the wavelength of 780 nm is focused on a signal recording surface of a CD-R or a CD-ROM. Therefore, the optical pickup device is capable of compatibly reproducing the DVD, CD-R and CD-ROM.

1 Claim, 36 Drawing Sheets



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EXHIBIT 1020

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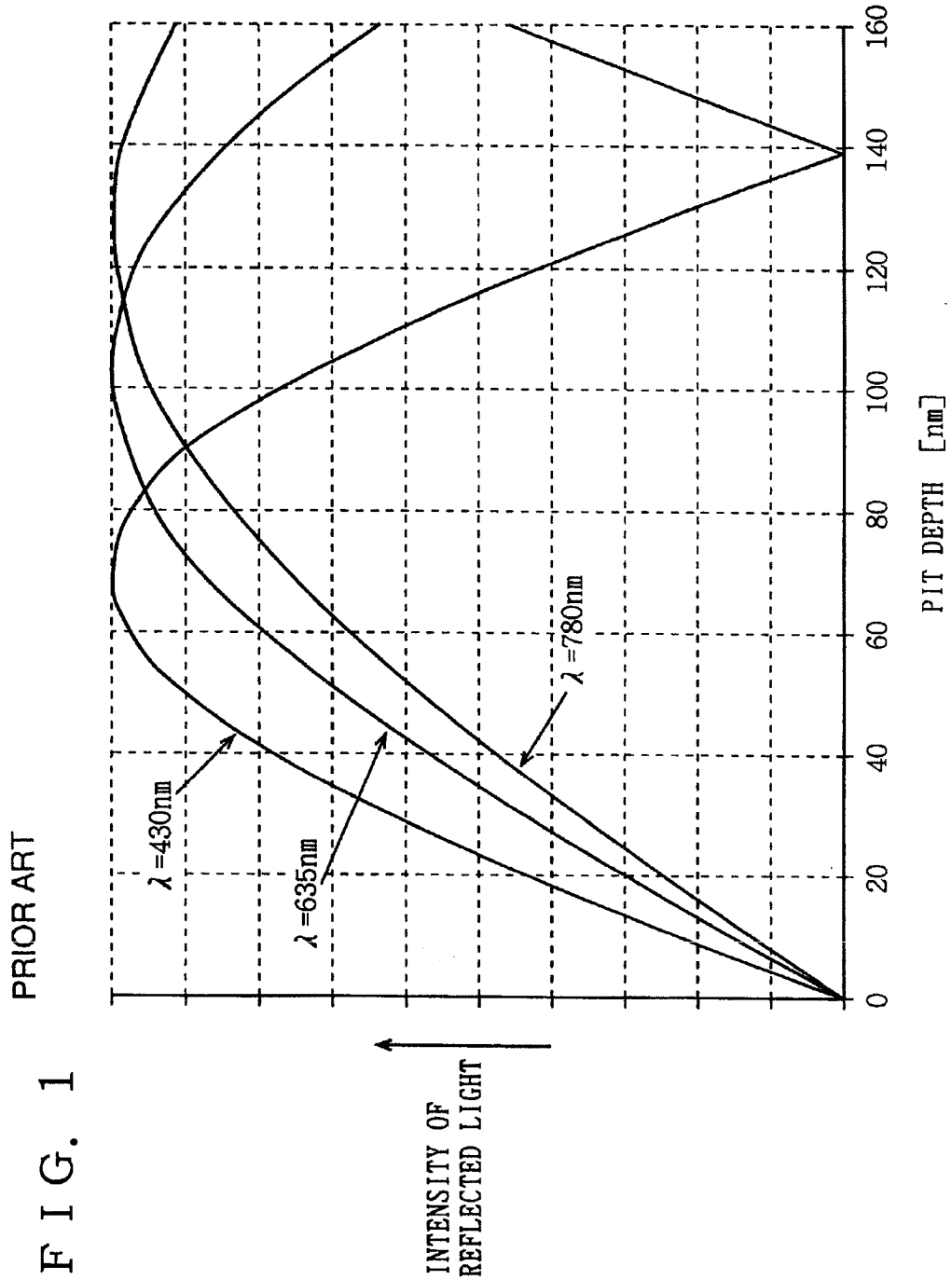


FIG. 2

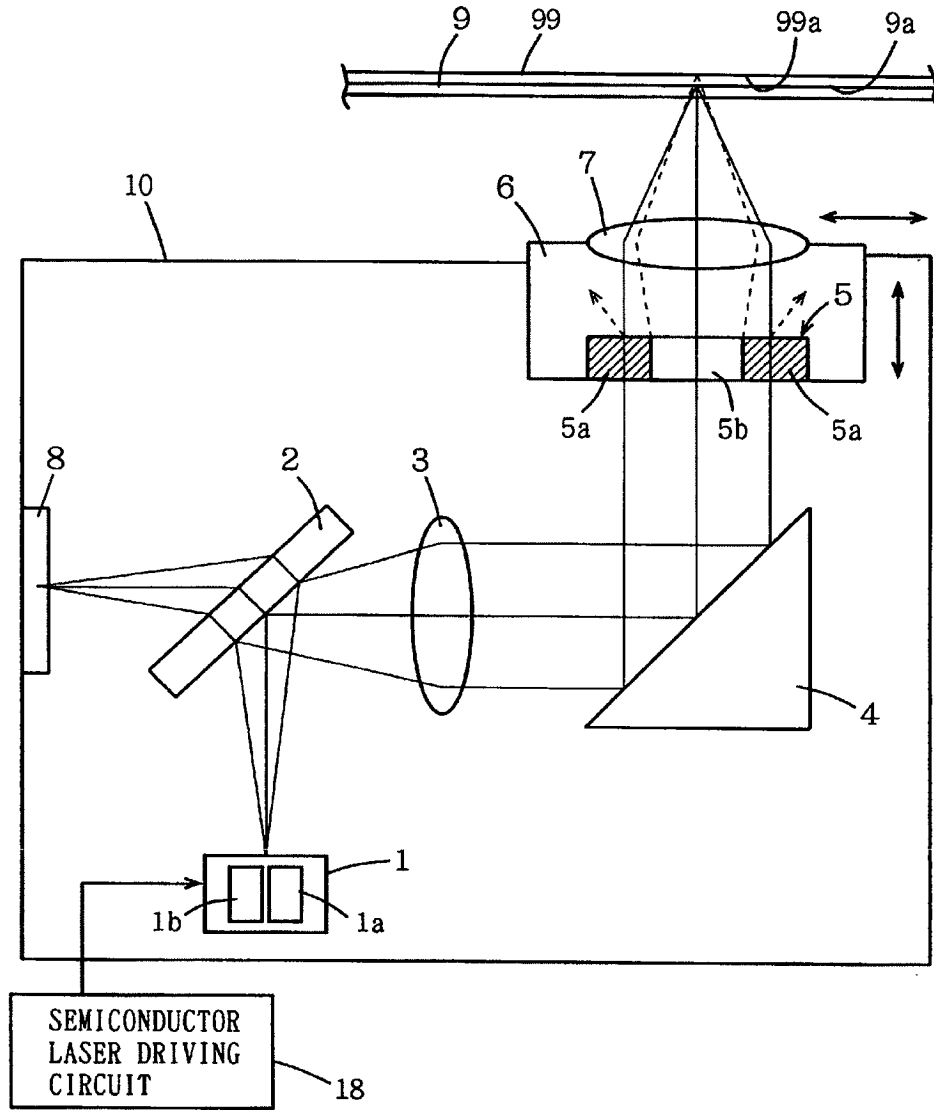
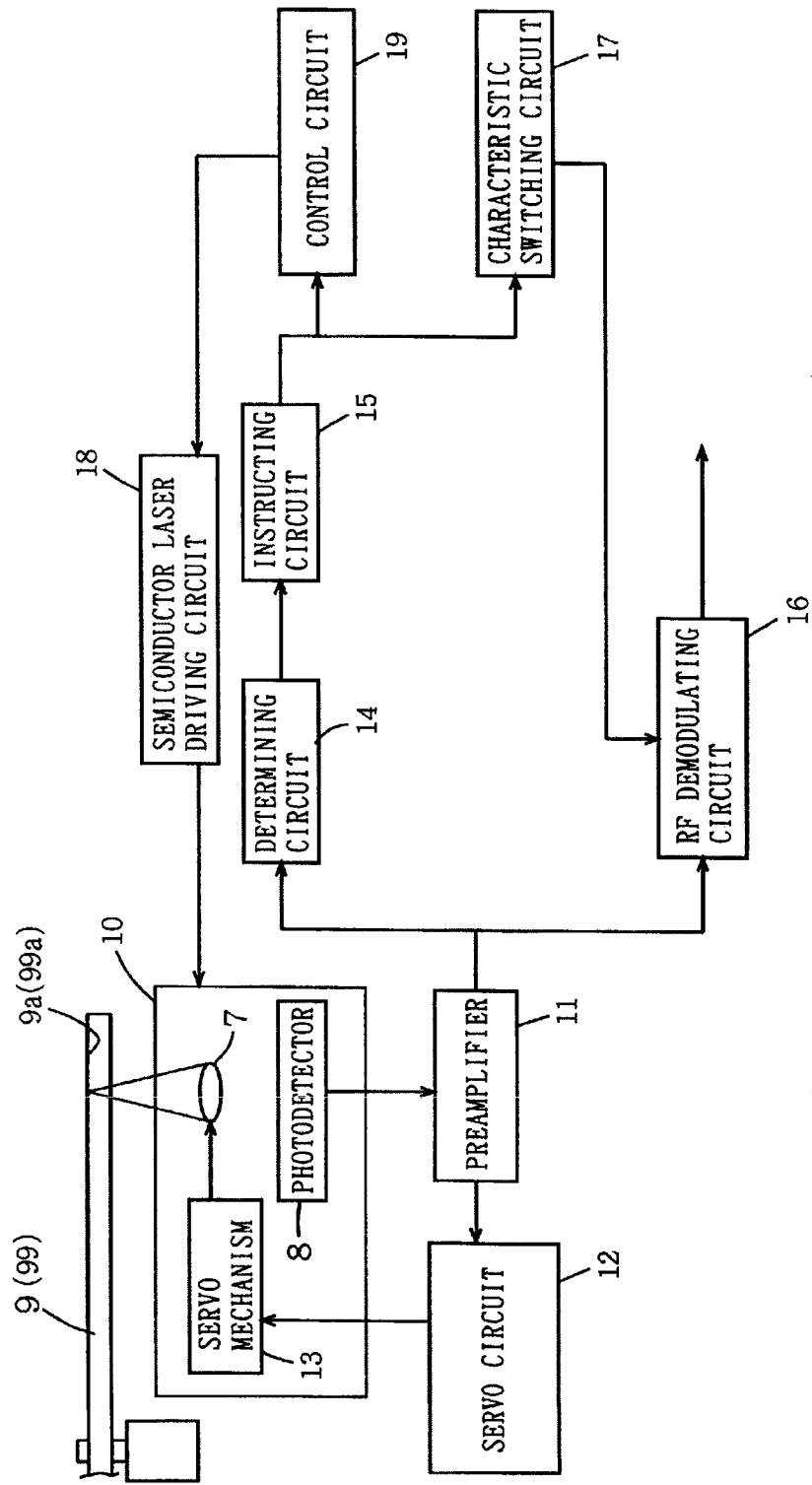


FIG. 3



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