

**United States Patent and Trademark Office
Before the Patent Trial and Appeal Board**

**LG ELECTRONICS, INC. AND LG
ELECTRONICS U.S.A., INC.,**
Petitioner

v.

**TOSHIBA SAMSUNG STORAGE TECHNOLOGY
KOREA CORPORATION,**
Patent Owner

Case IPR2015-01653
Patent RE43,106

**Petitioner's Demonstrative Exhibits for October 6, 2016 Oral
Argument**

Instituted Ground

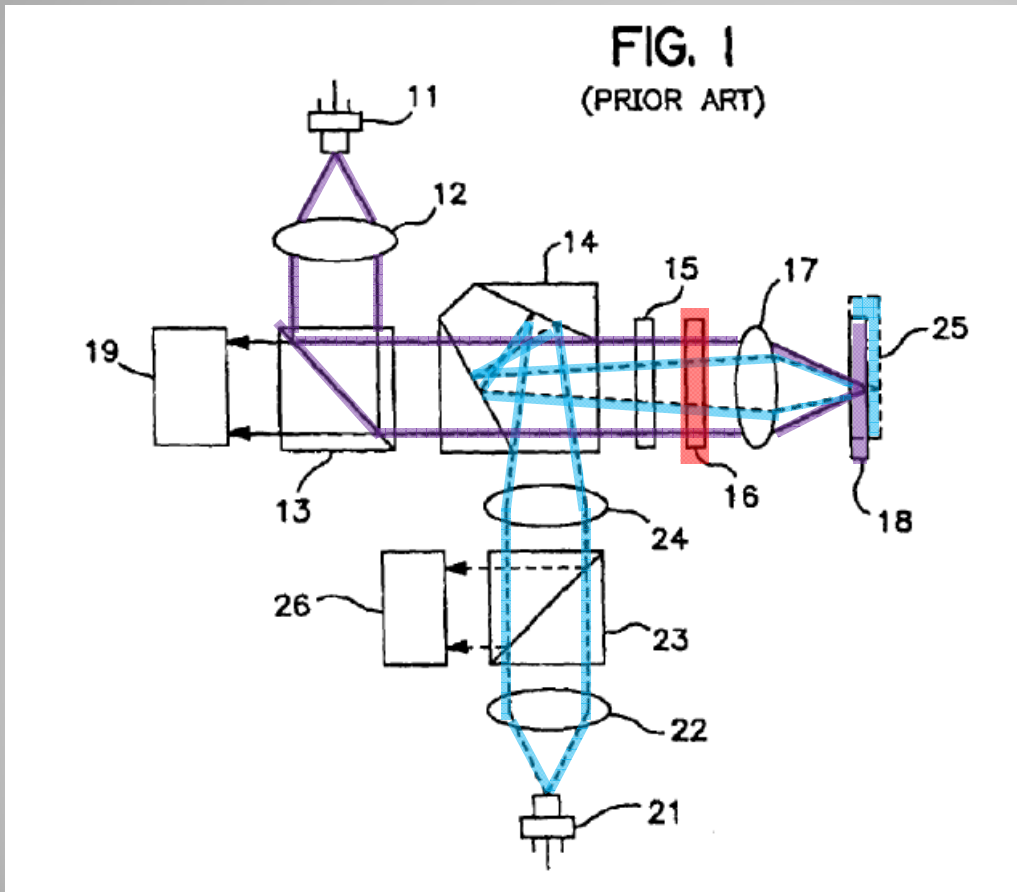
III. ORDER

Accordingly, it is

ORDERED that pursuant to 35 U.S.C. § 314 and 37 C.F.R. § 42.4, an *inter partes* review hereby is instituted as to the proposed ground of obviousness of claims 7–19 over APA and Katayama;

Background (Admitted Prior Art) of the '106 patent

Conventional Optical Pickup Apparatus



- 11, 21 - laser light source
- 12, 22 - collimating lens
- 13, 23 - beam splitter
- 14 - interference filter prism
- 15 - quarter-wave plate
- 16 - variable aperture
- 17 - objective lens
- 18 - DVD
- 24 - converging lens
- 25 - CD - R
- 26 - photodetector

(Ex. 1001 at 1:62-2:50)

Conventional Optical Pickup Apparatus

US RE43,106 E

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OPTICAL PICKUP COMPATIBLE WITH A DIGITAL VERSATILE DISK AND A RECORDABLE COMPACT DISK USING A HOLOGRAPHIC RING LENS

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of Korean Application No. 97-11297, filed Mar. 28, 1997, and is a continuation of U.S. patent application Ser. No. 09/419,792 filed in the U.S. Patent and Trademark Office on Oct. 18, 1999 and which issued as U.S. Pat. No. 6,304,540 which is a continuation of U.S. patent application Ser. No. 09/049,988 filed Mar. 30, 1998, which issued as U.S. Pat. No. 6,043,912, the disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an optical pickup apparatus compatible with a digital video disk (DVD) and a recordable compact disk (CD-R), and more particularly, to an optical pickup apparatus which can compatibly record information on and read information from a digital video disk (DVD) and a recordable compact disk (CD-R), respectively, using a holographic lens.

2. Description of the Related Art

An optical pickup apparatus records and reads the information such as video, audio or data at a high density, and various types of recording media are a disk, a card and a tape. Among them, the disk type is primarily used. Recently, in the field of the optical disk apparatus, a laser disk (LD), a compact disk (CD) and a digital video disk (DVD) have been developed. Such an optical disk includes a plastic or glass medium having a certain thickness along an axial direction to which light is incident, and a signal recording surface on which information is recorded and located on the plastic or glass medium.

So far, a high-density optical disk system enlarges a numerical aperture of an objective lens to increase a recording density, and uses a short wavelength light source of 635 nm or 650 nm. Accordingly, the high-density optical disk system can record or read signals on or from a digital video disk, and can also read signals from a CD. However, to be compatible with a recent type of a CD, that is, a recordable CD (CD-R), light having a wavelength of 780 nm should be used, due to the recording characteristic of the CD-R recording medium. As a result, using the light beam wavelengths of 780 nm and 635 (or 650) nm in a single optical pickup becomes very important for compatibility of the DVD and the CD-R. A conventional optical pickup which is compatible with the DVD and the CD-R will be described below with reference to FIG. 1.

FIG. 1 shows an optical pickup using two laser light diodes as light sources for a DVD and a CD-R and a single objective lens. The FIG. 1 optical pickup uses laser light having a wavelength of 635 nm when reproducing a DVD, and uses laser light having a wavelength of 780 nm when recording and reproducing a CD-R.

Light having the 635 nm wavelength of laser light source 11 is incident to a first lens 12 in which the light is shown in a solid line. Lens 12 collimates the incident light beam into a light beam. The light beam passing through lens 12 is reflected by a beam splitter 13, and totally reflects the light beam of the 635 nm wavelength on the interference filter prism 14. Light having the 780 nm wavelength from laser light source 21 passes through a second lens 22, a beam splitter 23 and a converging lens 24 to the interference filter prism 14, in which the light beam of the 780 nm wavelength is converged by the interference filter prism 14. Here, the light beam of the 780 nm wavelength is converged by the interference filter prism 14, and totally reflects the light beam of the 635 nm wavelength on the beam splitter 13, and totally reflects the 780 nm wavelength converged by the converging lens 24 and the interference filter prism 14 transmitted through the quarter-wave plate 15 to a parallel beam by the collimating lens 16. The light beam of the 635 nm wavelength from the first laser light source 11 is focused on an information recording surface having a thickness of 0.6 mm. Therefore, the information recording surface on the DVD is recorded on the DVD. The reflected light is transmitted to a photodetector 26.

If the finite optical system is used when the light beam of the 780 nm wavelength is incident to the objective lens 17, the second lens 22, the beam splitter 23, the converging lens 24 and the interference filter prism 14, the objective lens 17 has a spherical aberration. To reduce such a spherical aberration, a construction of a finite optical system including the converging lens 24 is required. By using the variable aperture 16 to be described later with reference to FIG. 2, the light beam of the 780 nm wavelength forms an optimized beam spot on the information recording surface of the CD-R 25. The light beam of the 780 nm wavelength reflected from the CD-R 25 is reflected by the beam splitter 23, and then detected in a photodetector 26.

The thin-film type objective lens 17 in FIG. 2, has a spherical aberration (NA) is less than that of the objective lens 17. The objective lens 16 is partially used. The region I is a region in which the light beam of the 635 nm wavelength is incident to the objective lens 17, and the region II is a region in which the light beam of the 780 nm wavelength is incident to the objective lens 17.

So far, a high-density optical disk system enlarges a numerical aperture of an objective lens to increase a recording density, and uses a short wavelength light source of 635 nm or 650 nm. Accordingly, the high-density optical disk system can record or read signals on or from a digital video disk, and can also read signals from a CD. However, to be compatible with a recent type of a CD, that is, a recordable CD (CD-R), light having a wavelength of 780 nm should be used, due to the recording characteristic of the CD-R recording medium. As a result, using the light beam wavelengths of 780 nm and 635 (or 650) nm in a single optical pickup becomes very important for compatibility of the DVD and the CD-R. A conventional optical pickup which is compatible with the DVD and the CD-R will be described below with reference to FIG. 1.

(Ex. 1001 at 1:47-61, emphasis added)

FIG. 1 shows an optical pickup using two laser light diodes as light sources for a DVD and a CD-R and a single objective lens. The FIG. 1 optical pickup uses laser light having a wavelength of 635 nm when reproducing a DVD, and uses laser light having a wavelength of 780 nm when recording and reproducing a CD-R.

(See also Petition at 4-5)

(Ex. 1001 at 1:62-67, emphasis added)

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