

Teaser Memorandum

Wasol Company Limited

Title (Name of Technology):

A novel 3D Endoscope & Microscope with single channel system

Executive Summar

Young Wha Lee, a president of Wasol co., Ltd, has developed a novel 3D Endoscope & Microscope with single channel system which can photograph the 3-Dimensional moving image of neighboring object. Wasol has created a state-of-art 3-Dimensional video solution applicable to medical operation as well as making motion pictures.

Wasol is seeking for technology transfer or out-licensing partners for its 3D Endoscope & Microscope with single channel system. Terms of the licensing are not set, and interested parties may further discuss the parameters should they wish to enter into an agreement.

Key Technology Highlight

□ Different viewpoints by a refractive index of a transparent panel

If left and right images of the object are acquired from the different viewpoints, the images can be alternately captured via the transparent panel, so as to produce a three-dimensional image of the object.

□ Changing the refractive index or the installation angle of the transparent panel

The three-dimensional moving image producing device can freely change the positions of the viewpoints. As a result, it is possible to guarantee an optimal distance between an object to be photographed and the viewpoints. This has the effect of producing a three-dimensional image without causing any fatigue to the user's eyes.

□ Change in the positions of the viewpoints

The change in the positions of the viewpoints can be accomplished by the transparent panel, differently from the prior art wherein two lenses should be located at left and right sides of the object for acquiring two left and right images of the object. This has the effect of reducing the diameter of a probe.

□ Adjusting the positions of the viewpoints

The three-dimensional moving image producing device is adapted to adjust the positions of the viewpoints via a conversion in a single bundle of incident light rather than separation of the bundle of light, for the purpose of acquiring left and right images from the single bundle of light. Further, as a result of using a single magnifying lens with respect to both the left and right images, the regulation of magnification can be simplified.

□ Transparent panel having a plurality of refracting parts

When using a transparent panel having a plurality of refracting parts having different refractive indices from one another, a plurality of images viewed from various viewpoints can be acquired, and a more actual image of the object can be acquired by combining the plurality of images with one another.

■ IP Owner Summary

□ Young Wha Lee,
a president of Wasol co., Ltd

□ Address
room 910,
Whang Wha B/D, 832-7,
Yoksam-dong, Gannam-gu,
Seoul, Korea (135-080)

■ Company History

1999 ~2001	<ul style="list-style-type: none"> ▶Established Wasol.co.,Ltd. ▶Award Korean Millennium Prize ▶Selected as a "Venture Business with Excellent Technology"
2002 ~2004	<ul style="list-style-type: none"> ▶Selected Inno-Biz by SMBA ▶Manufacturing 3D broadcasting cameras ▶Invited Demonstration at the annual board meeting of the business firms of the NHK group ▶Produce the making film of a saga TV show "Yoshitzne" for NHK
2005 ~2006	<ul style="list-style-type: none"> ▶Produce 3D horror drama of Fuji TV ▶Award 45th IR52 (Jang Young-Shil award) ▶Produce 3D public relations movie for Japan Self Defence Forces with Asahi TV ▶Produce 3D public relations movie for the Government Information Agency
2007 ~2008	<ul style="list-style-type: none"> ▶The Puchon International Fantastic Film Festival - Opening film ▶Award a Patent Technology prize (Ji Suk-young) by KIPO ▶Clinical Trial (Seoul National Hospital, Oita Hospital, Keio Hospital) ▶11th WCES Special Session presentation

Technology Overview

Technology Platform

The core technology of Wasol co., Ltd is to provide a three-dimensional moving image producing device suitable for the close-up photographing of a neighboring object or for high-precision photographing of the neighboring object, comprising a probe including a group of object lenses, a group of relay lenses, and a group of eye lenses arranged in sequence, a camera body located at the rear side of the probe and including a group of magnifying lenses for enlarging an image introduced into the camera body through the probe, and a transparent panel provided in a space defining an entrance pupil of the group of camera lenses between the probe and the camera body, the transparent panel being tilted by a predetermined inclination angle with respect to an optical axis of the group of camera lenses and having a predetermined refractive index.

Background and unmet needs:

Recently, the close-up photographing of an object has been widely used in a variety of industrial fields. For example, an optical microscope is used to inspect micro-tissues of plants and animals or damaged parts of mechanical materials, and also is used to inspect high-density integrated semiconductor chips or semiconductor circuits and couplings between the semiconductor chips or circuits and electronic micro-elements. Other examples include a laparoscope used to perform a surgery on an inner injured part of the human body through a small incision in the abdominal wall, and an endoscope used to examine an inner part of the human body that is invisible by the naked eyes.

Meanwhile, for the understanding of the accurate structure and shape of an object to be photographed, it is necessary to acquire a three-dimensional moving image of the object suitable for providing a viewer with near-far and large-small senses, rather than a two-dimensional planar moving image. For example, in the case of a precise and delicate surgery using a laparoscope, there is a limit to understand the structure or position of an inner injured part of the human body because the laparoscope provides only a planar moving image having no near-far and large-small senses. It is difficult to perform a precise surgery while viewing the planar moving image.

Discovery and Achievements:

The three-dimensional moving image producing device of Wasol co., Ltd can reduce the diameter of a probe by arranging only a single group of lenses inside the probe, and has the function of periodically converting an optical axis of incident light and capturing left and right images viewed from two viewpoints caused by the converted optical axis, thereby enabling the close-up photographing of a neighboring object.

Furthermore, the The three-dimensional moving image producing device of Wasol co., Ltd can adjust the position of a viewpoint by converting an optical axis of a single bundle of incident light without separation, thereby acquiring left and right images from the single bundle of incident light, and in which a single magnifying lens is used for both the left and right images, thus resulting in an easy adjustment in the magnification of the images.

FIG 1. a three-dimensional moving image producing device

The three-dimensional moving image producing device of Wasol co., Ltd comprises a probe 20 located close to an object 1 and adapted to take an image of the object 1, a camera body 40 to enlarge and capture the image taken by the probe 20, and a transparent panel 30 installed in a space between the probe 20 and the camera body 40.

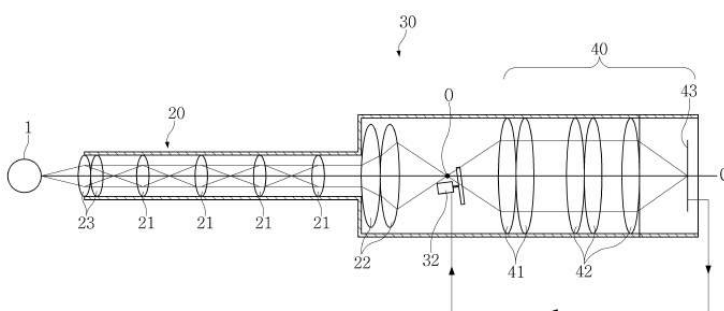
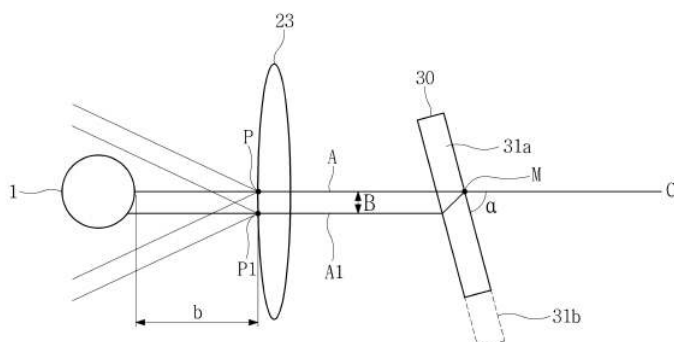


FIG 2. a view illustrating the operation of the three-dimensional moving image producing device



when an image is introduced into the transparent panel 30 so as to pass through the passage part 31b of the transparent panel 30, the image is introduced directly into the camera body 40 without refraction, and it will be appreciated that the image is introduced along an axis A coinciding with the optical axis C in the region of the probe 20.

On the other hand, when an image is introduced into the transparent panel 30 so as to pass through the refracting part 31a of the transparent panel 30, the image is introduced into the camera body 40 after being refracted by the refracting part 31a, and it will be appreciated that the image is introduced along an axis A1 having a different position from that of the optical axis C in the region of the probe 20.

Accordingly, the axis A is spaced apart from the refracting axis A1 by a distance B. As a result, two viewpoints P and P1, having different positions from each other, are formed on the group of object lenses 23 located in the foremost region of the probe 20. When watching the object 1 from the viewpoints P and P1 spaced apart from each other by a distance B, left and right images of the object 1 can be acquired, and the left and right images of the object 1 are introduced through the axes A and A1, respectively.

Patents and Publications

Young Wha Lee, a president of Wasol co., Ltd have patents issued or filed for application in many countries such as U.S., Japan, Europe, China and Korea with regard to a three-dimensional moving image producing device.

TABLE. List of Patents for Novel Three-Dimensional Moving Image Producing Device

Country	Status	Application No.
KR	Registered	10-2006-0018658
PCT	Application	PCT/KR2007/000782
US	Application	12/162,482
JP	Application	2008-556236
EP	Application	07708932.4
CN	Application	200780004917.7