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Virtual Reality HMD with a Video Display and a Wave Guided Video Display

punarjeewa abeysekera

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Virtual Reality HMD with a Video Display and a Wave Guided Video Display.

ABSTRACT

This paper describes a method to combine a waveguided video display with a video display into providing an effectively larger field of view. The wave guided display which has a smaller field of view is positioned in the center of the viewing device. This wave guided display will occupy the central region of the field of view. The video display which is positioned after the wave guided display will provide the surrounding peripheral regions of the field of view. In addition to these two types of fields of view regions, two video displays that are positioned from the two sides will provide the user with the far peripheral field of view regions. In effect this configuration allows the user of this head mounted device to experience a center focused field of view with the perceptions of the surrounding peripheral and far peripheral fields of views.

KEYWORDS

- Virtual reality
- Waveguided display
- video display

BACKGROUND

Virtual reality is an exciting field with many possibilities. Nowadays, virtual reality head mounted devices come in many different form factors. Generally, the smaller form factor devices tend to have a smaller field of view and the larger form factor devices tend to have a larger field of view. It is challenging yet highly desirable to have smaller form factor head mounted devices with a larger field of view.

DESCRIPTION

This paper describes a method to combine a waveguided video display with a video display into providing an effectively larger field of view. The components of the head mounted device is given by the diagrams below. The core mechanism utilized to provide the peripheral regions of the field of view is demonstrated in the small form factor wide field of view augmented reality head mounted display (Abeysekera 2020). And the core mechanism utilized to provide the central field of view with the peripheral field of view regions is demonstrated in the augmented Reality HMD with a transparent Video Display and a Wave Guided Video Display (Abeysekera 2021).

Diagram one: the top view

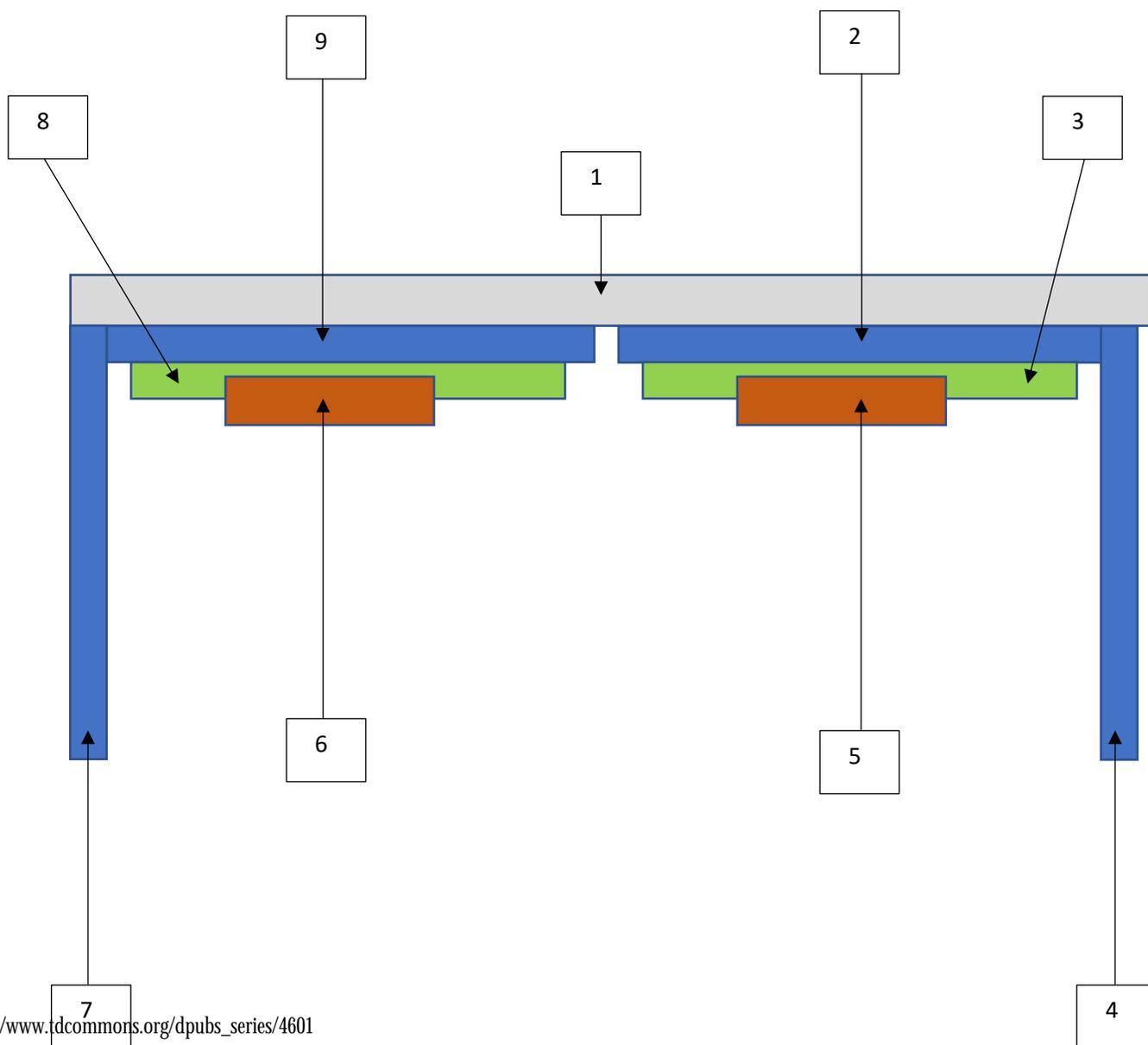
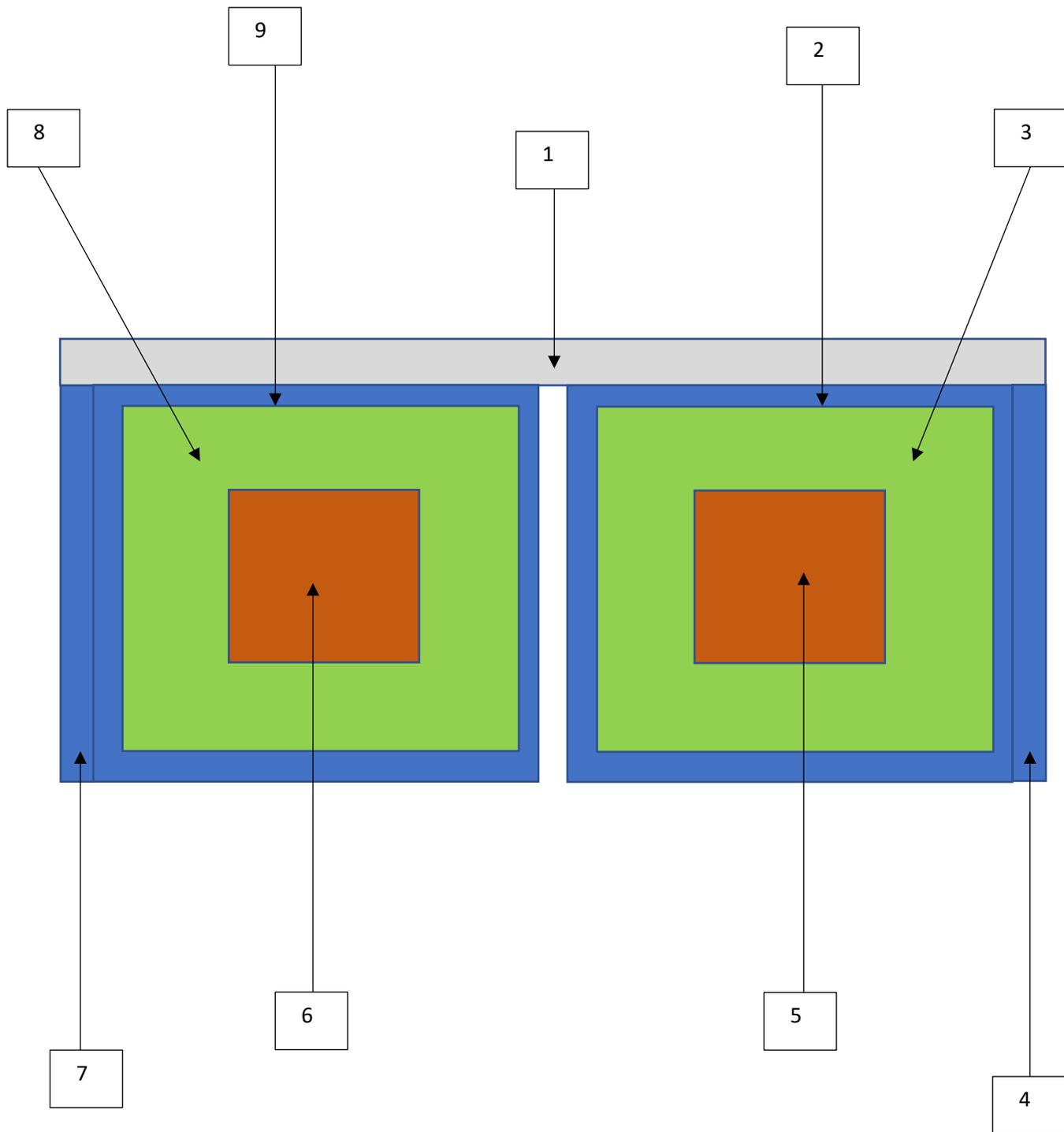


Diagram two: the rear view



The labelled components are given below.

Component one:

- The structure which holds all the components together

Component two:

- The right video display

Component three:

- The right transparent structure

Component four:

- The right far peripheral covering video display

Component five:

- The right waveguided video display

Component six:

- The left waveguided video display

Component seven:

- The left far peripheral covering video display

Component eight:

- The left transparent structure

Component nine:

- The left video display

Structure and function of the head mounted device

- As given by the two diagrams, the two wave guided displays (labelled as component five and six) which has smaller fields of views are positioned at the center of the viewing device.
- Also, the two wave guided displays (labelled as component five and six) are fixed to the two transparent structures. (Labelled as component three and eight)
- The two video displays (labelled as component two and nine) are positioned in front of the two wave guided displays (labelled as component five and six) that are fixed to the two transparent structures (labelled as component three and eight) as given by the diagrams.
- In addition to these structures, two video displays (labelled as component four and seven) that are positioned from the two sides will provide the user of the head mounted device with the two far peripheral field of view regions.
- The structure labelled as component one will hold all the other components together.
- The central areas of the two video displays (labelled as component two and nine) which equivalent to the areas occupied by the two wave guided displays (labelled as component five and six), are configured to be of black color by not lighting on the pixels in those central areas.
- This configuration effectively will provide the viewer of this virtual reality head mounted device with a focused central field of view and the perceptions of the surrounding peripheral regions which includes the far peripheral regions from the two sides.

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