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54	TITLE OF INVENTION

Stereoscopic video capturing device and dual receiver with a three-dimensional viewer

57	ABSTRACT (NOT MORE THAN 150 WORDS)

NUMBER OF SHEETS	18

The sheet(s) containing the abstract is/are attached.

If no classification is furnished, Form P.9 should accompany this form.
The figure of the drawing to which the abstract refers is attached.

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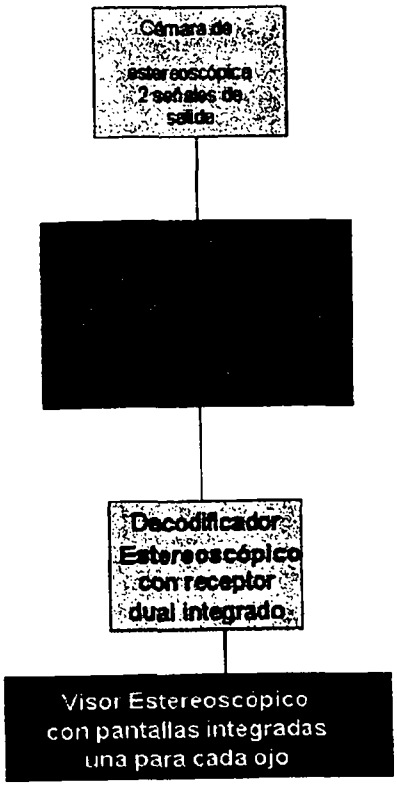
[Continúa en la página siguiente]

(54) Title: STEREOSCOPIC VIDEO CAPTURING DEVICE AND DUAL RECEIVER WITH A THREE-DIMENSIONAL VIEWER

(54) Título: DISPOSITIVO DE CAPTURA DE VIDEO ESTEREOSCOPICO Y RECEPTOR DUAL CON VISOR PARA TERCERA DIMENSION



Abstract: The technological invention relates to a video camera system, coding, transmission, decoding and display of three-dimensional images, which can be used for any give purpose and rely on stereoscopic technology implemented by two novel electronic devices, one being a three-dimensional video camera and the other being a device that decodes said signals and displays them on two color liquid crystal screens for the final user while providing depth and real distance effect between the objects being transmitted remotely in relation to the final user. The invention has the aim of generating a new type of three-dimensional transmission which differs totally from currently available means and which is the result of stereoscopic integration of technology, technological know-how and optics know-how amongst other while using current television and broadcasting infrastructure. The innovative design of this product will radically change the way in which human beings receive images and communicate currently.

(57) Resumen: Este invento tecnológico, se refiere a un sistema de cámara de video, codificación, transmisión, decodificación y presentación de imágenes en tercera dimensión utilizados con cualquier fin mediante tecnología estereoscópica implementados mediante 2 dispositivos electrónicos nuevos uno de cámara de video en tercera dimensión y otro dispositivo que decodifica estas señales y las presenta al usuario final en dos pantallas de cristal líquido a color, otorgando el efecto de profundidad y distancia real entre objetos que se están transmitiendo en forma remota con respecto al usuario final. El objetivo de este invento es el de generar un nuevo tipo de transmisión en tercera dimensión totalmente diferente a los medios que existen actualmente que es el resultado de la integración estereoscópica de tecnología, conocimientos de tecnología, conocimientos de óptica y otros, utilizando la infraestructura actual de las televisoras y difusoras. El diseño innovador de este producto hará que el ser humano cambie en forma radical la forma en la que recibe imágenes y en la manera en la que se comunica actualmente.

WO 02/19727 A1

(STEREOSCOPIC VIDEO CAPTURING DEVICE, AND DUAL RECEIVER WITH THREE-DIMENSION VIEWER)

BACKGROUND OF THE INVENTION

Currently, there exists an image television system which transmits images through different already known means, such as cables, optic fiber, or electromagnetic waves within a pre-set frequency band, from a central source or television broadcasting station. Depending on the transmission means, the television channel and its allocated frequency is received by a television set through cable or electromagnetic waves.

Up to this date, a television show is created by focusing the television camera into certain scene, and transforming the light into electronic video signals, combined with the audio, and thereafter transmitted as mentioned above.

Currently, the television cameras are comprised of three basic components, i.e. a single optic system in order to capture images, a collector device which translates the image into electronic video signals, and an encoder that allows transmission of the signal.

The result of this process of capturing-encoding-transmitting-receiving-decoding and displaying of images has been used experimentally since 1952 and is in practice worldwide. In the 40's it was black and white television, and by in 50's a great step was taken by implementing full-color television.

This video, and audio transmission had been known so far as Television (transmitted by electromagnetic signals, by satellite, microwaves or cable), a word that derives from the composition of the roots Tele-vision (Remote vision).

Up to this date, this is the most commonly used way of transmission worldwide. The image it produces is a flat image which has only two planes, due to its monoscopic origin, in other words, it derives from a sole lens in the camera, which horizontally and vertically scans an area of sensors, covering only one perspective area equivalent to observe with only one open eye, thus losing some characteristics of dimension, such as depth or distance between one object and another in the same plane., allowing us to obtain a perspective of flat observation.

Thinking in carrying out a radical change in the form in which the television signals have been transmitted up to this date, I developed a series of new devices which allow to emulate the stereoscopic vision, a unique characteristic of the human being up to this date.

The development of the technology which I propose, is completely different to all that has been developed until now, since it does not deceive the human eye nor uses polarization lenses. By means of my development it is provided a television system in three dimensions, the process consists in capturing images, processing, encoding, transmitting, receiving, and decoding the same. This is the invention I want to protect by means of this patent application, since

so far no one in the world has offered a three-dimension television transmission system using this innovative technology, same which shall substantially change the way human beings communicate with each other.

DISCLOSURE OF THE INVENTION

Currently, the video image capturing system is based on a monoscopic camera (1), which has only one lens, and by electronic generation of encoded signals for each image during their transmission, and by receiving and decoding the encoded signal in a typical television system. The result is a monoscopic perception of the images, in other words, in two planes, horizontal and vertical, missing the depth feature of the objects the image displays.

This invention and development of the new technology which I propose, allows to send and decode three-dimension television signals, and is disclosed by the following figures and block diagrams:

Figure 1. Block diagrams of the invention in general.

Figure 2. Monoscopic video camera.

Figure 3. Stereoscopic video camera.

Figure 4. Three view perspectives: left and right monoscopic views, and stereoscopic perspective.

Figure 5. Diagram of a stereoscopic camera.

Figure 6. Flow diagram of the process of encoding, amplifying, and transmitting via two different frequencies.

Figure 7. Receiver with antenna and two-channel dual signal decoder.

Figure 8. Diagram showing the parts of the stereoscopic image viewer.

Figure 9. Diagram of the stereoscopic decoder-receiver.

Going back to said figures, the invention comprises three basic parts: the stereoscopic camera (2), the signal decoder-receiver (7), and the stereoscopic viewer (6), and it requires a conventional television signal transmission system. The stereoscopic camera (2) takes the image, and transmits it by any means to reach the decoder-receiver (7), which displays the image in the viewer as an stereoscopic image (6), providing an immediate three-dimension perspective (figure 1).

DETAILED OPERATION

By using the stereoscopic camera which takes the video image simultaneously from two lenses, and two collectors, being separated apart by distance equivalent to the average distance between the centers of the two pupils of the human eye, thus ensuring that two images are taken at the same moment (figure 5).

These images, are collected, processed and encoded independently for each left and right channel, by using known methods and technology (figure 5).

Both signals are processed, and may either be recorded in two coordinated recording systems, be them analog or digital, or they may be transmitted in real time via two typical transmission systems, in any channel or available means (figure 6).

Using the so far existing infrastructure, such as encoding, amplifying, transmitting, and modulating systems, the process obtained in the stereoscopic camera is carried out. This signal is sent by two different transmission frequencies, such as conventional television channels, individually but simultaneously, for example, channel 5 and channel 7, or channel 11 and channel 13, each channel receiving one signal (figure 6).

The dual decoder (7) has two built-in tuners, one for each visual channel (left and right). Each one receives the signal from one transmission channel, for example channel 5 and channel 7, via the antenna (10), and the signals are received, and decoded separately, and sent each one to a screen in the viewer, in other words, left and right signals (11) (figure 9).

The viewer (6) comprises a liquid crystal displays or active pixel displays with magnification, and both displays are located in the viewer, one for each channel, left and right, (8 and 9), in such a way that when using the viewer, the images is displayed in front each eye, on the liquid crystal or active pixel display corresponding to that eye (figure 8). This displays are similar to the ones uses in current compact video recording cameras.

Likewise, there is an audio system which decodes the surrounding stereo signal currently used in television sets, and home equipment (figure 9).

For powering up the viewer and the decoder there is a system based in long-lasting Lithium ion batteries, to energize all circuits (figures 8 and 9).

By coordinating the simultaneous stereoscopic-video transmission, and by receiving it by the decoder (figure 9) and displaying it by the viewer (figure 8), the human brain carries out a superposition operation on the left and right images (3 and 4), as if the user were directly watching with his/her own eyes what it is happening miles away from him/her.

This three-dimension view effect is observed when our brain decodes a signal originated by two independent sources (each eye being a source) allowing to obtain a differential of perspective angle, which in turn allow us to perceive the depth or distance at which the objects are located. This stereoscopic vision (5) results from the superposition or combination of the images each eye receives in the brain.

This disclosed invention totally differs from the systems that have been developed up to date, since the existing three-dimension transmission techniques, as well as the polarized image system that have been used, require excluding polarization lenses, by means of micas or lenses, and they further use the high-speed two-perspective transmission method, taken by independent cameras with polarized lenses, in order to deceive the visualization process of the human being, thereby causing an effect of

discomfort, headaches and tiredness. On the other hand, my invention discloses the real time display of simultaneously continuos images for each eye, without deceiving the natural process of the brain, and thereby the discomfort and other symptoms caused by the known processes disappear.

My invention also differs from the virtual reality digitized computer-generated image, which ultimately is a generated simulation, and is not real imaged information.

The most interesting part of my invention is that this new comprehensive technology provides us with an effect that not only corresponds to the natural viewing process, but also allow us to perceive the depth (volume) of things being transmitted, thereby practically obtaining an effect of physical presence at the place the image was taken, no matter the user is located miles away.

This realistic effect of physical presence has not been provided by any known technology, and the advantages and applications that may be directly obtained from this technology are huge. To mention some of them, remote three-dimension surgery would be possible, remote driving, watching a football game taking place miles away, live transmitting three-dimension show, three-dimension advertisement in order to perceive the exact characteristics of a product by carrying out the transmission using this technology, witnessing a travel journey or having a videoconference and capture all the details that we perceive as volume in space.

Claimings amendments:

As we mentioned before, this tridimensional televisión System is completely different from all existing estereoscopic technologies, as it keeps left and right images complete and without any loss on video frames or video fields. Both images are kept intact they are never multiplexed and they are never color-filtered. They are compressed in a digital form using a software algorithm and decompressed before being displayed separetely one to each eye just as they were originaly taken on a visor that contains dual mini displays placed each one in front of each eye. This method is totaly different from those systems that require the use of polarization (red-blue) glasses and from those that use multiplexion systems and require shutter glasses. The method we use in this tridimensional televisión System is revolutionary and applies to several different fields

I Claim:

1) Method used to acquire, transmit, receive stereoscopic images composed by two independent video signals that are kept complete and they reach one each eye by using a visor that contains a set of dual and independent mini displays, providing a continius video stream that never required the colour separation nor the alternation of images nor any kind of multiplexion, receiving and diplaying on each eye the complete original video stream without any loss on video frames nor video fields and without using colour filtres and that does not requires to VIEW an external monitor as this System counts with its own dual mini display System placed each one in front of each eye.
2) Method were each eye receives a continious video stream by two mini-displays using two mini LCD color monitors placed right in front of each eye and does not requires an external display
3) Meted used to capt original images by the use of two lenses and two coupled charged devices separated on an average human pupil distance and that NEVER mixes this two signals and that does not alternate frames nor fields and does not uses colour filtres of any form, but keeps both video streams complete in a digital compresión video stream
4) Meted to Integrate digital signals by obtaining the digital difference of each video stream capted by each CCD, getting Left minus Right on a Digital JPEG secuence of MPEG4 codification and sends this compressed digital information by one digital video stream to any digital storage, reproduction, transmit or digital video data processing System
5) Method that does not requires of any external display to acheive three dimmensional effect or stereoscopic viewing
6) Receptor and digital decoder that process two signals in a parallel form simultaneously and independently and digitally decompress both signals and receives information of two independent video streams digitally compressed

for stereoscopic effects and when such digital signals are decompressed they are complete, without any kind of loss on multiplexion or colour filter process.

7) Method used to capture, transmit, receive and decode three dimensional images by the use of this technique and any of the devices mentioned before
8) Method used to receive images with dual mini monitors one on each eye, that do not require the use or viewing of an external monitor and that is not based on the colour polarization nor in the multiplexing systems (as the systems that require shutter glasses)
9) Method used to transform monoscopic cameras to stereoscopic cameras that sep two video streams intact and do not requires of colour filtres nor image frame or fields multiplexion
10) Method based on the clamings mentioned before used to display stereoscopic images of any kind of videoconsoles that use separated video channels (left-right) that were generated on a digital and independent way and processed digitaly without any loss in frames, without any colour polarization and without any field or frame multiplexion and that does not requires of an external display or monitor to acheive the three dimensional effect
11) Method based on the claimings mentioned before to display stereoscopic images of any kind of computer that use separated video channels (left-right) that were generated on a digital and independent way and processed digitaly without any loss in frames, without any colour polarization and without any field or frame multiplexion and that does not requires of an external display or monitor to acheive the three dimensional effect

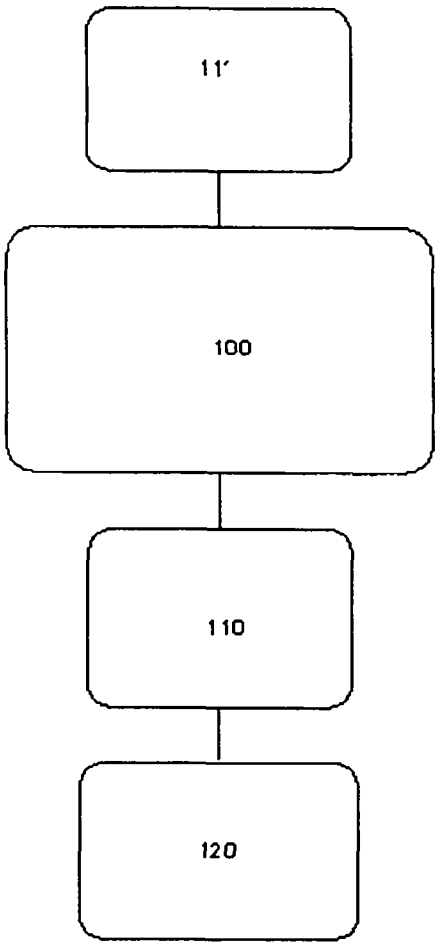


FIGURE 1

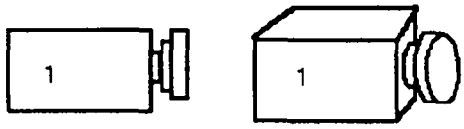


FIGURE 2

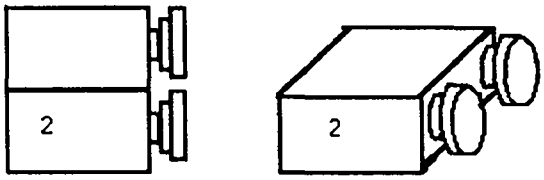


FIGURE 3

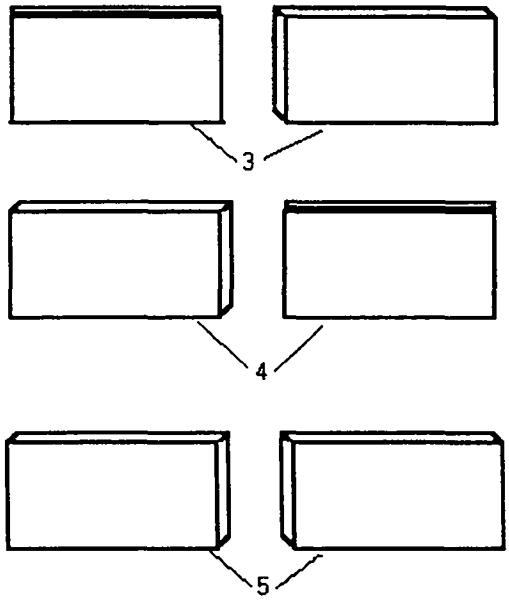


FIGURE 4

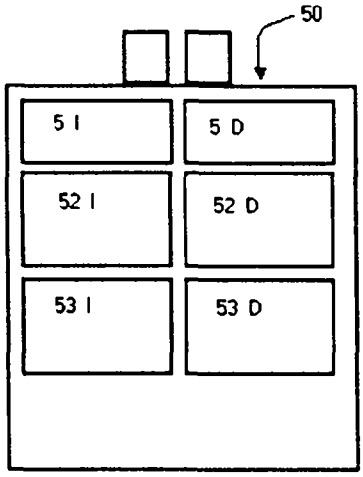


FIGURE 5

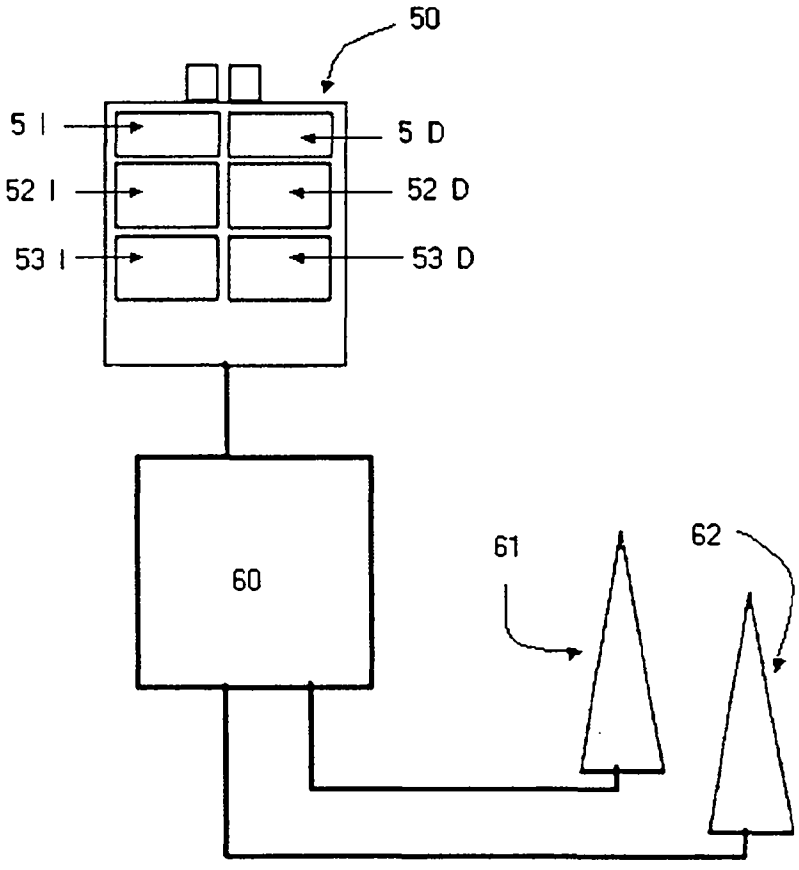


FIGURE 6

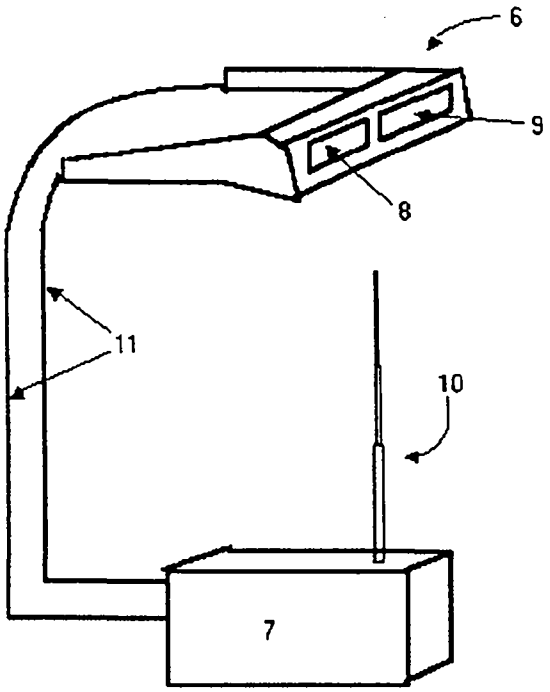


FIGURE 7

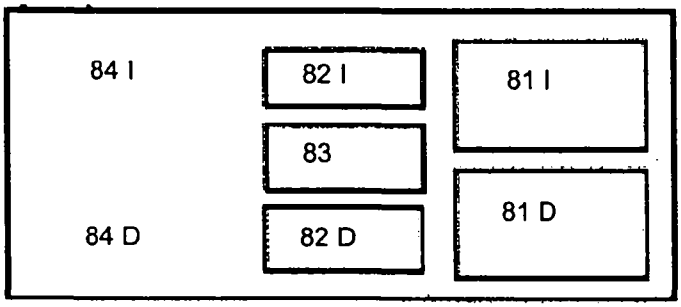


FIGURE 8

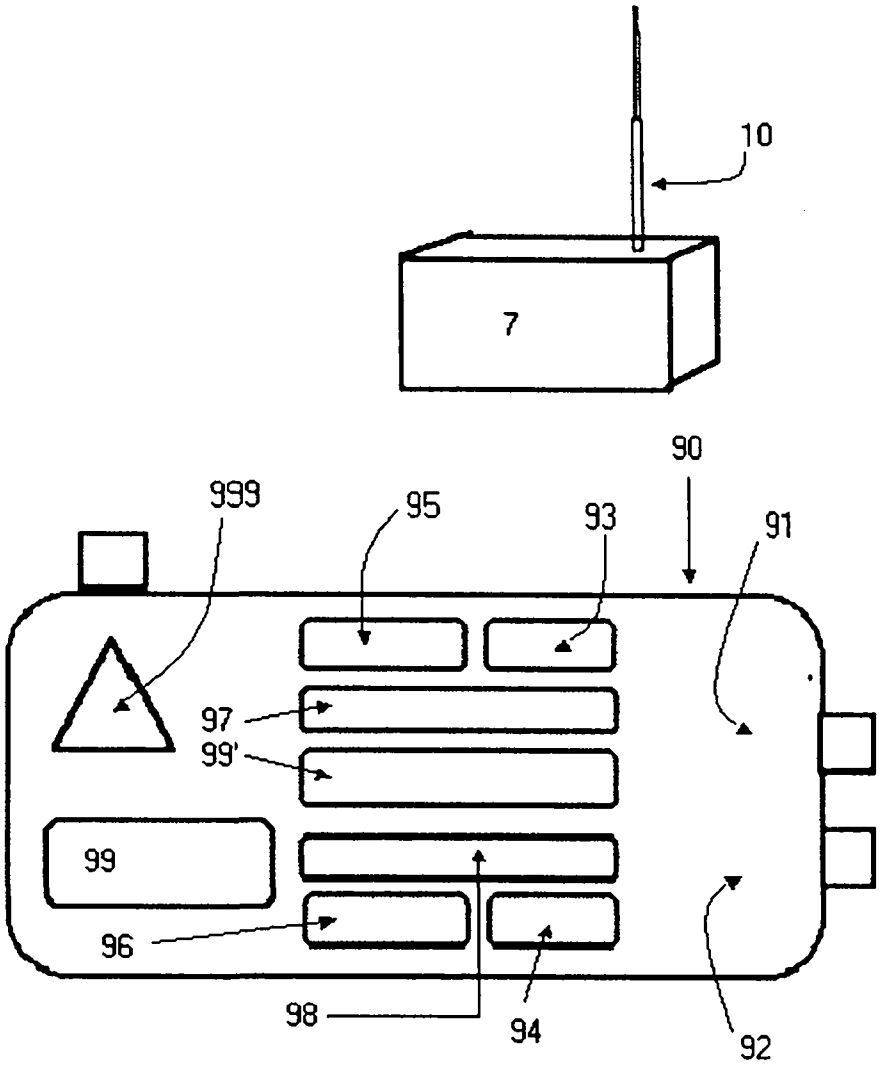


FIGURE 9