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(54) **GYMNASTIC AND SPORTS APPARATUS COMPRISING A STEREOSCOPIC PROJECTION SCREEN**

(57) The present invention relates to a gymnastic and sport apparatus with stereoscopic screen which incorporates a gymnastic apparatus with control over its parameters of actuation, and a screen with stereoscopic projection by means of two projectors controlled by a computer which synchronizes the projected images with the variables of the gymnastic apparatus and vice versa when the variables of actuation of the gymnastic appa-

ratus are selected they are synchronized by means of the computer with the variables of projection of the images and with those of reproduction of the sound. The assembly is covered partially by means of panels which help to prevent distraction of the user that is immersed in the reality projected and achieved by means of the synchronization of the sounds and the pace and inclination of the treadmill.

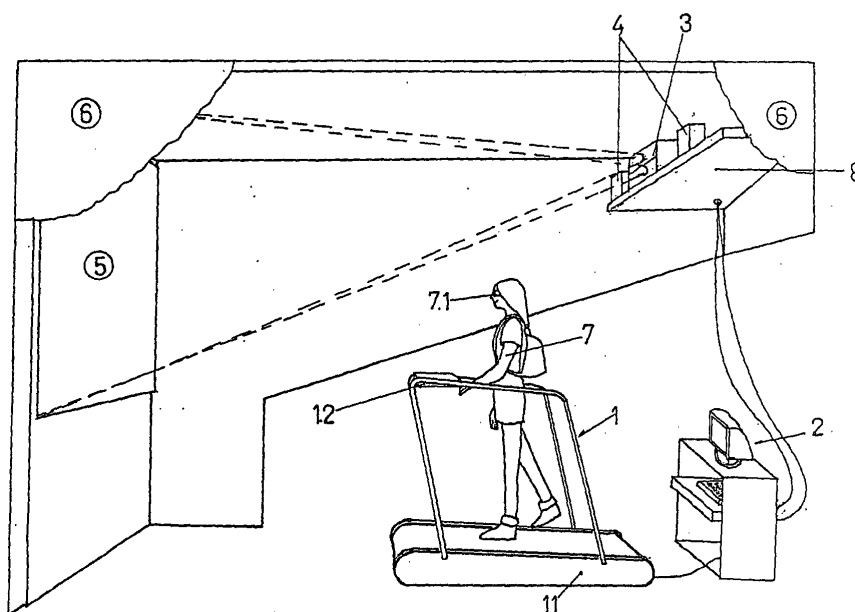


FIG.1

EP 1 386 642 A1

## Description

### OBJECT OF THE INVENTION

[0001] The present invention relates to a gymnastic and sport apparatus with stereoscopic screen which is incorporated in a gymnastic apparatus like for example a treadmill or an exercise cycle or any other similar apparatus, and a screen with stereoscopic projection by means of two projectors controlled by a computer, which allows the synchronization of the projected images with the pace and inclination of the treadmill, as well as the sound, and the control of the succession of the images with the level of speed or degree of inclination or other parameters selected on the gymnastic apparatus.

[0002] The gymnastic apparatus is mounted between a front screen of stereoscopic projection and the projectors which are located above and behind the user.

[0003] The assembly is covered partially by panels which help to prevent distraction of the user that remains engrossed in the projected reality achieved by means of the synchronization of the sounds and the pace and inclination of the treadmill.

### BACKGROUND OF THE INVENTION

[0004] Various devices are known, commonly termed simulators, which serve to provide a user with a reality in which he finds himself engrossed.

[0005] These simulators include an image which can be displayed on a monitor, sound and a chamber isolated to a greater or lesser degree which can be capable of movement in space and which assists in making the user feel the situation which it is sought to represent.

[0006] There are various simulators protected as Patents of Invention which relate to different configurations and situations to be simulated.

[0007] The Spanish Patent ES2135912 relates to a learning facility for teaching and training in the use of means for fire-fighting.

[0008] In this learning facility use is made of a large-sized screen on which evolutionary images are displayed representing a fire following a sequence controlled by a computer.

[0009] The person that performs the exercise has modified extinction apparatuses available whose area of impact of the virtual jet on the screen can be located, the corresponding information being transmitted to the computer.

[0010] The computer determines the area of influence and the development of the fire and displays such development on the screen so that an interaction is established with the individual that is being trained in fire-fighting.

[0011] The Spanish Patent ES2000955 describes a machine for practising rowing in which use is made of a video screen, a seat capable of longitudinal displacement and adjustable supports for the feet.

[0012] This machine is specialized in the simulated practice of rowing.

[0013] The Patent PCT W9717805 describes a screen capable of displaying images with the sensation of looking through a window at a three-dimensional scene with sensation of depth.

[0014] In the field of simulators of great complexity mention is made of the Patent WO9533539 in which a sensorial simulator is described for its use as a medium to experience a pre-recorded predetermined reality.

[0015] This simulator includes a seat capable of movement in a plurality of degrees of freedom because it combines three sets of pneumatic cylinders synchronized with a computer and a control joystick which permits interaction with the user.

[0016] A cinematic concept similar to that employed in the patent PCT WO9524249 except that in this simulator the capacity of the chamber is greater, it can hold a larger number of people, and by being closed avoids distractions which result in a reduction in the effectiveness of simulation of the reality it is desired to produce.

[0017] The present invention is a gymnastic apparatus which incorporates a stereoscopic screen which allows a pre-established course to be simulated with the sensation of walking through the places represented.

### DESCRIPTION OF THE INVENTION

[0018] The present invention relates to a gymnastic and sport apparatus with screen for stereoscopic projection.

[0019] This gymnastic apparatus comprises a treadmill or an exercise cycle or similar apparatus, which has at least the possibility of speed regulation as well as an actuator which allows the inclination of the walkway belt to be varied in the case of a treadmill, or the pedalling resistance in the case of an exercise cycle.

[0020] This type of gymnastic apparatus is common and exists on the market with independent controls.

[0021] Practising on this type of gymnastic apparatus (treadmills, exercise cycles, etc.) is boring since the room is stationary and the image that one perceives is always the same.

[0022] In this invention, the gymnastic apparatus has been connected to a computer which is capable of acting on these variables, like speed, resistance, inclination, etc., making use of the appropriate program and which is not object of the invention.

[0023] This same computer establishes control in the speed of projection of a stereoscopic image, and of the sound which accompanies the image.

[0024] The image is projected in front of the user located on the gymnastic apparatus, this being located in the centre of the assembly and partially isolated by some side panels which prevent the entrance of light which impairs the viewing of the screen and distracts the user's attention from the projected reality.

[0025] The projection is a sequence recorded in a real

scenario following a pre-established route becoming involved in a determined environment such as the entrance to a football stadium, a stroll in the city, or a walk along a forest road for example.

[0026] This stereoscopic recording is what allows the user to have the sensation, with the help of the required glasses, of being immersed in the situation in which it was recorded and with stereoscopic perception.

[0027] The technology of stereoscopic vision is known although it has never been used in conjunction with a gymnastic apparatus and a computer which synchronizes the pace and inclination thereof, as well as the sound.

[0028] It is this stereoscopic perception which assists in augmenting the level of realism of the image.

[0029] Once the sequence has been recorded the computer takes charge of synchronizing the image and the gymnastic apparatus, whereby it is possible to achieve:

- That it is the recorded image which by means of the computer acts on the gymnastic apparatus defining the speed, resistance or degree of inclination, or as many parameters on which it is possible to act.
- That it is the user that by means of the control panel of the gymnastic apparatus defines the desired parameters of actuation (speed, resistance, inclination, etc.), being transmitted to the computer which by means of this computer modifies the speed or inclination of projection of the stereoscopic images, as well as the reproduction of the sounds.

[0030] If the scene is along a street with a slope, it is necessary for the gymnastic apparatus to be also inclined; or, if the end of a slope is reached, the treadmill lowers the actuator and reduces the slope and possibly increases the pace since it is possible that the pace be quicker in a real situation with less slope or downhill.

[0031] The same thing happens to the environmental sound which is heard during the scene, it should be in accordance with what is shown in the image.

[0032] It is also possible to slow down the sequence of projection of the images or any other parameter thereof, so that if the imposed pace is less, the images should pass more slowly.

[0033] The projectors of the stereoscopic image can make use both of analogue technology and digital, it being this latter which has proved more effective since it allows both a greater control over the image and a longer useful life span of the support on which the images are stored.

[0034] The digital images can be stored on a CD-ROM, on a DVD, on a hard disk, or on any other means of digital storage.

[0035] For example, if the images are recorded in compact DVD format, there is no wear on the heads and one has great control in the projection speed as it is con-

trolled by the computer.

[0036] The computer is the instrument which allows the different variables to be synchronized, both the variables of projecting the images which act on the gymnastic apparatus, and those of the gymnastic apparatus by acting on the variables of projection of the stereoscopic images.

[0037] As a particular case, we can have variations of the pace due to the route represented in the scene, and variations of the pace because the user decides to cover the route more slowly.

[0038] The sides of the screen incorporate panels which help the user to concentrate on the screen without being distracted, as well as preventing the entrance of light from the exterior which would impair the image seen on the screen.

[0039] The position of the projectors is above the head of the user and slightly behind so that the user only sees the image which is projected in front of him.

## **DESCRIPTION OF THE DRAWINGS.**

[0040] The present descriptive specification is completed with a set of drawings, by way of illustration of the preferred embodiment and in no way restricting the invention.

[0041] Figure 1 shows the gymnastic apparatus in perspective with the stereoscopic screen and the arrangement of the projectors together with a schematic of interconnection with the computer where the side panel has been partially suppressed in order to see all the elements of the invention.

## **PREFERRED EMBODIMENT OF THE INVENTION.**

[0042] In the light of the foregoing, the present invention consists of a gymnastic and sport apparatus with screen for stereoscopic projection for practising sport with the sensation of advancing along a previously recorded route.

[0043] Figure 1 shows in perspective the group of elements which comprise the invention.

[0044] The gymnastic and sport apparatus is a treadmill (1) with the capacity to regulate the speed of the walkway belt (1.1) and the angle of inclination by means of a computer (2).

[0045] The computer (2) synchronizes the speed of reproduction of the stereoscopic image projected by the two projectors (3) on the screen (5), the sound reproduced by the speakers of a sound reproduction system (4), and the speed of the walkway belt (1.1) on which the user (7) is located as well as its inclination.

[0046] It is also possible for the user to select a mode of actuation in which the speed or other parameters of projection of the stereoscopic image is synchronized after having selected certain parameters in the treadmill (1).

[0047] In both cases the synchronization is carried out

by means of the computer (2).

[0048] Both from the computer (2) and from the control panel (1.2) of the treadmill it is possible to modify the pace of the movement.

[0049] The projectors (3) are located on a support (8) 5 located above the user (7) and slightly behind in such a way that the latter (7) only see the stereoscopic image, with the help of the special glasses (7.1), projected on the screen (5) in a distraction-free manner.

[0050] This same support (8) is that which on one and 10 the other side holds the speakers of the sound reproduction system (4).

[0051] On one and the other side of the user (7) some 15 panels (6) are mounted which protect partially from possible distractions with respect to the projected image.

[0052] The essential nature of this invention is not altered by variations in materials, form, size and arrangement of the component elements, described in a non-restrictive manner, sufficient for an expert to proceed to the reproduction thereof. 20

treadmill.

3. Gymnastic and sport apparatus with screen for stereoscopic projection according to the first and second claims **characterised in that** the image projected on the screen (5) is not stereoscopic.

## Claims

1. Gymnastic and sport apparatus with screen for stereoscopic projection, **characterised in that** it is constituted by a gymnastic apparatus, a computer (2) and means of projection of stereoscopic images wherein it is possible to carry out a synchronization between the variables of projection of the images 25 and of the sound reproduction with those of operation of the gymnastic apparatus, so that according to the variables of projection of the images (speed, inclination of the terrain, etc.) and of reproduction of the sound, by means of the computer (2), the variables are defined of actuation of the gymnastic apparatus (speed, pedal resistance, inclination of the belt) or vice versa, it is possible based on establishing the parameters of actuation of the gymnastic apparatus to define the parameters of projection of the stereoscopic images and of reproduction of the sound; wherein the image is projected by means of 30 two projectors (3), whilst the sound is reproduced by a system (4), the speakers of said sound reproduction system (4) and the projectors being located 35 on a support (8) above and behind the user (7), wherein the user wears some glasses (7.1) which allow the stereoscopic image to be viewed projected on a screen (5) located in front of the user and flanked by two panels (6) which protect the user 40 from external distractions. 45
2. Gymnastic and sport apparatus with screen for stereoscopic projection according to the first claim **characterised in that** the regulation of the pace of 55 evolution of the scenes, the sound and the treadmill (1) are controlled simultaneously both from the computer (2) and from the control panel (1.2) of the

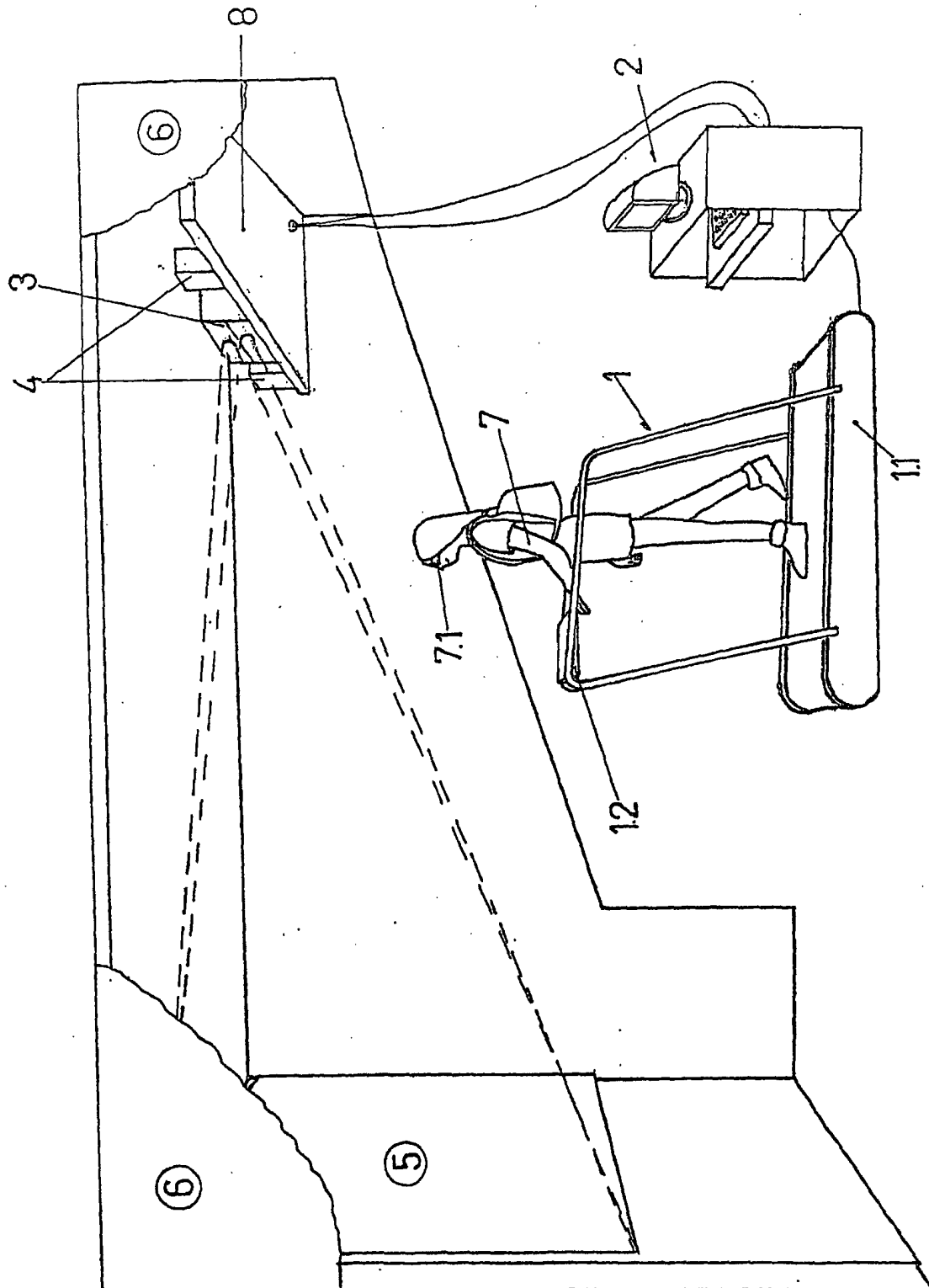


FIG.1

## INTERNATIONAL SEARCH REPORT

International application No.

**PCT/ ES 03/00097**

| A. CLASSIFICATION OF SUBJECT MATTER<br><b>IPC 7: A63B 24/00</b><br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                              |                                                                                      |
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| B. FIELDS SEARCHED<br>Minimum documentation searched (classification system followed by classification symbols)<br><b>IPC 7: A63B</b><br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br><b>WPI, EPODOC, PAJ.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                      |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                              |                                                                                      |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Citation of document, with indication, where appropriate, of the relevant passages           | Relevant to claim No.                                                                |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | EP 817154 A1 (SARCOS GROUP) 07.01.1998; column 3 , line 27 - column 8, line 27; figures 1-5. | 1-3                                                                                  |
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| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | JP 7-080096 A (SONY CORP.) 28.03.1995; paragraph 11-29; figures 1-7.                         | 1                                                                                    |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                              |                                                                                      |
| * Special categories of cited documents:<br>"A" document defining the general state of the art which is not considered to be of particular relevance<br>"E" earlier document but published on or after the international filing date<br>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>"O" document referring to an oral disclosure, use, exhibition or other means<br>"P" document published prior to the international filing date but later than the priority date claimed<br>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>"&" document member of the same patent family |                                                                                              |                                                                                      |
| Date of the actual completion of the international search<br><b>02 June 2003 (02.06.03)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                              | Date of mailing of the international search report<br><b>06 June 2003 (06.06.03)</b> |
| Name and mailing address of the ISA/<br><b>S.P.T.O</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                              | Authorized officer                                                                   |
| Facsimile No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                              | Telephone No.                                                                        |

Form PCT/ISA/210 (second sheet) (July 1992)

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

**PCT/ ES 03/00097**

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)                                   | Publication<br>date                                  |
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| DE 3210899 A1                             | 06.10.1983          | NONE                                                         |                                                      |
| JP 7-080096 A                             | 28.03.1995          | NONE                                                         |                                                      |

Form PCT/ISA/210 (patent family annex) (July 1992)