

adapted to detect the positions of both feet of the game player and determine the position of his head using this information and other pieces of information to be described later.

[0068] A sheet member basically fabricated by the principle of (4) using the material of (4) is adopted as the pressure-sensitive sheet member **531**. Specifically, elongated pressure-sensitive conductive ink portions **5312** are arrayed at specified intervals in longitudinal direction on the rear surface of one film base **5311** as shown in **FIG. 16A**, whereas elongated pressure-sensitive conductive ink portions **5314** are arrayed at specified intervals in lateral direction on the rear surface of the other film base **5313** as shown in **FIG. 16B**. A film member **531** having pressure-sensitive portions in a matrix arrangement as shown in **FIG. 16C** can be fabricated as shown by adhering the rear surfaces of the both film bases **5311**, **5313** together. For example, a specified voltage is successively applied at a high speed to lead wires of the respective pressure-sensitive conductive ink portions **5312** of the one film base **5311** and a voltage detecting circuit is connected with lead wires of the respective pressure-sensitive conductive ink portions **5314** of the other film base **5313**. The positions of the feet on the pressure-sensitive sheet member **531** can be specified based on an application timing of the voltage to the pressure-sensitive conductive ink portions **5312** and the pressure-sensitive conductive ink portions **5314** detected to have been pressed by the voltage detecting circuit and their level can be detected. If such a pressure-sensitive sheet member **531** is used, the positions of both feet of the game player can be detected in a two-dimensional manner in transverse direction and forward and backward directions. In this embodiment, the three-dimensional position of the head of the game player standing on the pressure-sensitive sheet member **531** if the position detector **433** shown in **FIG. 15** is adopted and the position determining device **433g** is provided with a function of determining a position in the two-dimensional space.

[0069] Since the three-dimensional position of the game player's head can be determined in this way, the viewing point in the game space can also be moved in depth direction on the screen of the monitor **11**.

[0070] (6) If the pressure-sensitive sheet member of (4) shown in **FIG. 15** in which the pressure-sensitive conductive ink portions are arranged side by side in forward and backward directions is provided in addition to the head detector **130** of the second embodiment or the head detector of (1) to (3), the three-dimensional position of the game player's head can be specified as a whole since the position of the game player's head in depth direction can be specified by this pressure-sensitive sheet member.

[0071] (7) In the first embodiment, the ultrasonic receivers **32**, **33** are arranged in positions located on a straight line at the left and right sides of the ultrasonic transmitter **31** to detect the height position and the transverse position of the game player's head. Instead, three ultrasonic receivers may be arranged in three positions on a horizontal plane where an ultrasonic transmitter is located, three ellipses may be determined based on periods measured by the respective ultrasonic receivers, i.e. distance information, and an intersection of these three ellipses may be detected as the position of the game player's head. This arrangement has an advantage of detecting the position of the head in the 3D space. It is sufficient to provide at least three ultrasonic receivers.

[0072] (8) Although the present invention is applied to the shooting game in the foregoing embodiment, it may be

applied to a boxing game or other types of fighting games in which a game player fights with other character(s). The present invention is also applicable to, for example, a guessing game in which hidden objects are guessed by being viewed in various directions or like games in which an operation unit such as a gun unit is not particularly used.

[0073] As described above, according to the present invention, the image from the viewing point intended by the game player can be actively displayed by moving the viewing point of the simulated camera to follow free movements of the game player, thereby widening the width of a gaming character and making the game more interesting.

[0074] Further, since the operation unit can be operated in connection with the movement of the viewing point, the progress of the game becomes more interesting.

[0075] Furthermore, the position of the head in at least one direction on the horizontal plane can be determined based on the output of the sheet-shaped pressure sensor for detecting the position of both feet of the game player.

[0076] Further, the position of the head on the horizontal plane and its height position can be detected.

[0077] Furthermore, the center of gravity position of both feet can be detected and the position of the game player's head can be determined using at least this center of gravity position information.

[0078] Further, the position of the head can be detected without interfering the game player's movements.

[0079] Furthermore, the position of the game player's head can be detected using one propagation medium transmitter and two propagation medium receivers.

[0080] Further, the position of the game player's head in the 3D space can be detected using one propagation medium transmitter and three or more propagation medium receivers.

[0081] Furthermore, the position of the game player's head in one linear direction and its height, i.e. the position of his head on a vertical plane can be determined.

[0082] Further, the position of the game player's head can be determined based on the picked image of the game player.

[0083] Furthermore, the silhouette can be easily extracted from the picked image of the game player.

[0084] Further, the position of the game player's head can be determined based on the image obtained by receiving the infrared rays emitted from the infrared emitting member put on the game player.

[0085] Furthermore, the position of the head can be easily detected since a difference in brightness between the area of the game player's silhouette and the other area can be emphasized.

[0086] This application is based on Japanese Patent Application Serial No. 2000-245251 filed in Japanese Patent Office on Aug. 11, 2000, the contents of which are hereby incorporated by reference.

[0087] As this invention may be embodied in several forms without departing from the spirit of essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within metes and bounds of the claims, or equivalence of such metes and bounds are therefore intended to be embraced by the claims.