UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HTC CORPORATION, HTC AMERICA, INC., and
VALVE CORPORATION,
Petitioner,

v.

ELECTRONIC SCRIPTING PRODUCTS, INC.,
Patent Owner.

Case IPR2018-01032[1]
Patent 8,553,935 B2

Before ANDREI IANCU, *Director of the United States Patent and Trademark Office*, WILLIAM M. FINK, *Vice Chief Administrative Patent Judge*, and ROBERT J. WEINSCHENK, *Administrative Patent Judge*.

FINK, *Vice Chief Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

[1] Valve Corporation filed a Petition in IPR2019-00074, and has been joined as a party to this proceeding.

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I. INTRODUCTION

HTC Corporation and HTC America, Inc. filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of claims 1–21 of U.S. Patent No. 8,553,935 B2 ("the '935 patent"). Paper 2 ("Pet."). Electronic Scripting Products, Inc. ("Patent Owner") filed a Preliminary Response. Paper 5 ("Prelim. Resp.").

On September 13, 2018, we instituted trial. Paper 6 ("Inst. Dec."). After institution, Patent Owner filed a Response. Paper 8 ("PO Resp.").

On January 18, 2019, we granted Valve Corporation's Motion for Joinder in *Valve Corp. v. Electronic Scripting Products*, Case IPR2019-00074 (PTAB filed Oct. 11, 2018). Paper 12, 10. In doing so, we joined Valve Corporation to this proceeding, resulting in HTC Corporation, HTC America, Inc., and Valve Corporation (collectively "Petitioner") challenging the claims of the '935 patent. *Id.*

Petitioner filed a Reply to Patent Owner's Response. Paper 14 ("Reply"). Patent Owner filed a Sur-Reply. Paper 16 ("Sur-Reply").

An oral hearing was held on June 4, 2019. A transcript of the hearing has been entered into the record. Paper 23 ("Tr.").

This Final Written Decision ("Decision") is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–21 of the '935 patent are unpatentable.

A. Related Proceedings

The parties inform us that the '935 patent and a related patent, U.S. Patent No. 9,235,934 B2 (Ex. 1002), are the subject of a patent infringement lawsuit in the U.S. District Court for the Northern District of California:

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Electronic Scripting Products, Inc. v. HTC America, Inc., No. 3:17-cv-05806-RS (N.D. Cal. filed Oct. 9, 2017). Pet. 1–2; Paper 4, 2; *see also Valve*, Case IPR2019-00074 (Paper 1, 1–2; Paper 6, 2). With respect to the '934 patent, we denied petitions for institution of *inter partes* review.

B. The '935 Patent (Ex. 1001)

The '935 patent relates to determining an absolute pose of a manipulated object in a real three-dimensional environment, particularly of a manipulated object used by humans to interface with the digital world. Ex. 1001, 1:24–28. An object's pose combines the three linear displacement coordinates (x, y, z) of any reference point on the object and the three orientation angles, also called the Euler angles (φ, θ, ψ), that describe the object's pitch, yaw, and roll. *Id.* at 1:46–50.

According to the '935 patent, one-to-one motion mapping between space and cyberspace is not possible without the ability to digitize the absolute pose of a manipulated object with respect to a well-defined reference location in real space. Ex. 1001, 2:49–52. The disclosed invention optically infers the absolute pose of the manipulated object by relating Euler-rotated object coordinates describing the orientation of the object to world coordinates (X_o, Y_o, Z_o). *Id.* at 11:43–47. More specifically, knowledge of the absolute positions of invariant features or beacons in world coordinates (X_o, Y_o, Z_o) allows an optical measuring arrangement to describe the absolute pose of the object with absolute pose data expressed in parameters (x, y, z, φ, θ, ψ) in Euler-rotated object coordinates within world coordinates (X_o, Y_o, Z_o). *Id.* at 11:65–12:4.

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Figure 21 of the ’935 patent is reproduced below:

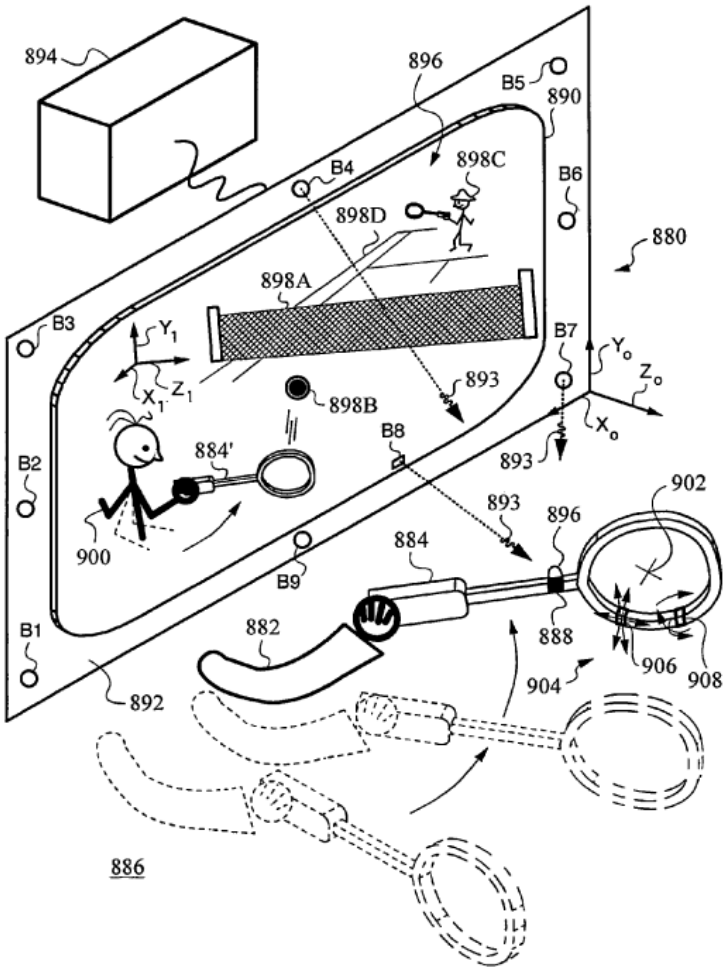

FIG. 21

Figure 21 illustrates a “cyber game” in which user or player 882 interacts with game application 880 by moving manipulated object 884, in this case a tennis racket, in real three-dimensional environment 886. Ex. 1001, 37:9–13. Visual tennis match elements 898A–D and image 884′ of tennis racket 884 held by user 882 are displayed on screen 890. *Id.* at 37:29–44. The display of image 884′ changes in response to the detected absolute pose of racket 884. *Id.* at 38:12–20.

The absolute pose of racket 884 is determined using on-board optical measuring arrangement 888 and auxiliary motion detection component 904.

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Ex. 1001, 37:14–16, 37:65–66, 38:12–14. Optical measurement arrangement 888 infers absolute pose data (x, y, z, φ, θ, ψ) of racket 884 by sensing light 893 emitted from beacons B1–B9 disposed on and around screen 890. *Id.* at 37:14–21, 37:61–64. Auxiliary motion detection component 904 is an inertial sensing device that includes three-axis gyroscope 908 for providing information about changes in orientation (φ, θ, ψ) and three-axis accelerometer 906 for providing information about linear displacement (x, y, z). *Id.* at 37:65–38:11.

The combination of absolute pose data (x, y, z, φ, θ, ψ) and relative motion data is used by tennis game 880 as input for interacting with output 896. *Id.* at 38:12–14. Such absolute pose data and relative motion data can be combined using any suitable combination or data fusion techniques well-known in the art. *Id.* at 35:24–34; 44:51–55.

C. Illustrative Claim

Of the challenged claims, claims 1 and 12 are independent. Claim 1 is illustrative of the claims at issue and is reproduced below:

> 1. A method for use with a system having a manipulated object, the method comprising:
>
> a) accepting light data indicative of light detected by a photodetector mounted on-board said manipulated object from a first plurality of predetermined light sources having known locations in world coordinates;
>
> b) accepting relative motion data from a relative motion sensor mounted on-board said manipulated object indicative of a change in an orientation of said manipulated object; and
>
> c) determining the pose of said manipulated object based on said light data and said relative motion data, wherein

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