

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re *Inter Partes* Review of:                     )  
U.S. Patent No. 7,166,062                             )  
Issued: Jan. 23, 2007                                 )  
Application No.: 09/641,627                         )  
Filing Date: Aug. 18, 2000                         )

For: **System For Interaction With Exercise Device**

**FILED VIA E2E**

**DECLARATION OF JIM RUTBERG IN SUPPORT OF  
PETITION FOR *INTER PARTES* REVIEW  
OF U.S. PATENT NO. 7,166,062**

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## **I. Introduction and Qualifications**

1. I have been retained by Peloton Interactive, Inc. (“Petitioner”) to provide my opinion on exercise-related topics related to certain claims of U.S. Patent No. 7,166,062 (attached to the accompanying Petition as Ex. 1001 and henceforth referred to as “the ’062 patent”)<sup>1</sup> in support of this Petition for *Inter Partes* Review.

2. I have been a professional coach and exercise content creator since 1999. I have written and co-written numerous books and articles on training, including “Ride Inside” (2020), an indoor cycling training book that I co-authored with Joe Friel.

3. I graduated from Wake Forest with a Bachelor of Science in Exercise Physiology in 1997.

4. After that, I spent 3 years as a competitive cyclist, eventually reaching the elite amateur level.

5. In 2000, I was one of the early-stage employees of Carmichael Training Systems, one of the first companies to pioneer the development and sale of remote-based endurance coaching services delivered over the Internet.

6. During my time at Carmichael Training Systems (2000-2017), I collaborated with hundreds of professional endurance coaches to develop training

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<sup>1</sup> All exhibits referenced herein are attached to the accompanying Petition.

content (books, blogs, training plans, workouts, instructional audio and video content, podcasts, etc.) to educate and inform amateur athletes on the application of sports science best practices to the pursuit of their individual performance goals.

7. I co-authored nine books, all within the realm of sports science, endurance coaching, endurance training, and health and wellness.

- Ride Inside: The Essential Guide to Get the Most Out of Indoor Cycling, Smart Trainers, Classes, and Apps, by Joe Friel with Jim Rutberg. Velopress, 2020.
- The Time-Crunched Cyclist, 3rd Edition, by Chris Carmichael and Jim Rutberg. Velopress, 2017. (Second Edition, 2012. First Edition, 2009.)
- Training Essentials for Ultrarunning, by Jason Koop with Jim Rutberg. Velopress, 2016.
- The Time-Crunched Triathlete, by Chris Carmichael and Jim Rutberg. Velopress, 2010.
- 5 Essentials for a Winning Life, by Chris Carmichael and Jim Rutberg. Rodale, 2006.
- Chris Carmichael's Fitness Cookbook, by Chris Carmichael and Jim Rutberg. Penguin Putnam, 2005.

- The Carmichael Training Systems Cyclists' Diary, by Chris Carmichael with Jim Rutberg. Berkeley Publishing, 2005.
- Chris Carmichael's Food for Fitness, by Chris Carmichael with Jim Rutberg. Penguin Putnam, 2004. (New York Times Best Seller).
- The Ultimate Ride, by Chris Carmichael with Jim Rutberg. Penguin Putnam, 2003.

8. From 2000 through 2021 I have written and ghostwritten training content for media outlets, commercial brands, and non-profits, published in print, online, and/or email newsletters by Velonews, Inside Triathlon, Triathlete Magazine, Outside Magazine, Bicycling Magazine, Bicycling Australia, Road Bike Action, the American Diabetes Association, Ironman (World Triathlon Corporation), Pearl Izumi, TrainingPeaks (Peakware, LLC), Strava, Saris, Stages Cycling, and others.

9. From 2000-2012 I wrote competition reports, analysis and commentary related to the Tour de France, for online and newsletter publication by a wide range of media outlets and brands, including Bicycling, Oakley, Outside Magazine, Velonews, Trek Bicycles, The Denver Post, the Associated Press, Pezcylingnews.com, and others.

10. I produced more than two dozen full-length indoor cycling training videos that were sold by Carmichael Training Systems in VHS, DVD, and video

download formats. Roles included creating the workouts, scripting the motivational content for on-camera coaches, working with set design and camera placement, post-production editing and music selection.

11. I produced marketing and content campaigns, as well as registered-rider communications, to promote entry sales and participation in amateur cycling events for Haute Route, LLC and Gran Fondo National Series.

12. I have ghostwritten a weekly blog distributed to more than 50,000 subscribers, primarily focused on endurance training and sports nutrition for cyclists, triathletes, and runners, since 2010. I have also edited and distributed additional twice weekly email newsletters to the same audience on similar subjects.

13. In 2020, I co-authored a book entitled, “Ride Inside: The Essential Guide to Get the Most Out of Indoor Cycling, Smart Trainers, Classes, and Apps” with Joe Friel for Velopress. Joe Friel is a professional cycling and triathlon coach, best-selling author of more than 15 iconic training and sports nutrition books, and co-founder of Peaksware. I was brought into the “Ride Inside” project specifically for my expertise in the application of endurance training methodologies to indoor cycling modalities, including the equipment, software, and applications, as well as at-home and in-person group exercise classes and competitions.

14. My complete *Curriculum Vitae* is attached as Ex. 1026.

## II. Summary of Materials Reviewed and Considered

15. All of the opinions contained in this Declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this Declaration, while drawing on my experience in the field of exercise and workout design, I reviewed the following documents:

Ex. No.	Description
1001	U.S. Patent No. 7,166,062 (“’062 patent”)
1005	U.S. Patent No. 6,152,856 to Studor (“Studor”)
1006	U.S. Patent No. 5,645,509 to Brewer (“Brewer”)
1008	U.S. Patent No. 5,785,630 to Bobick (“Bobick”)
1012	U.S. Patent No. 6,053,844 to Clem (“Clem”)
1013	U.S. Patent No. 6,059,062 to Hickman (“Hickman”)
1019	U.S. Patent No. 6,050,924 to Shea (“Shea”)
1023	U.S. Patent No. 5,961,424 to Warner (“Warner”)

16. My opinions are additionally guided by my appreciation of how a person of ordinary skill in the art (“POSA”) would have understood the claims of the ’062 patent at the time of the alleged invention, which I have been asked to assume is July 8, 1999.

17. I do not hold myself out as an expert in any engineering or software fields. That said, I have over two decades of experience using,

consulting on, and creating content for use with computer-based training tools and equipment from the exercise and fitness perspective.

18. Thus, when I discuss how a POSA would have understood prior art or other things, I am discussing only the training/exercise aspects of the POSA's understanding. As I will explain herein, the POSA for the case has engineering and training skills. My opinion does not address the engineering aspects beyond what a POSA skilled in the exercise/training arts would have understood based on experience and education in the exercise/training field.

### **III. The '062 Patent—Summary**

#### **A. Description**

19. The '062 patent describes improving home exercise equipment “by providing exercise devices that are capable of simulating a group or class workout environment and synchronizing operation of the exercise devices with exercise programming.” '062 patent 2:29-33. The exercise device also “communicates with a communication system that enables real-time communication with a trainer or alternatively access to one or more stored exercise programs.” '062 patent 2:41-44.

20. The '062 patent explains allowing this interaction addresses a primary problem with group training—convenience:

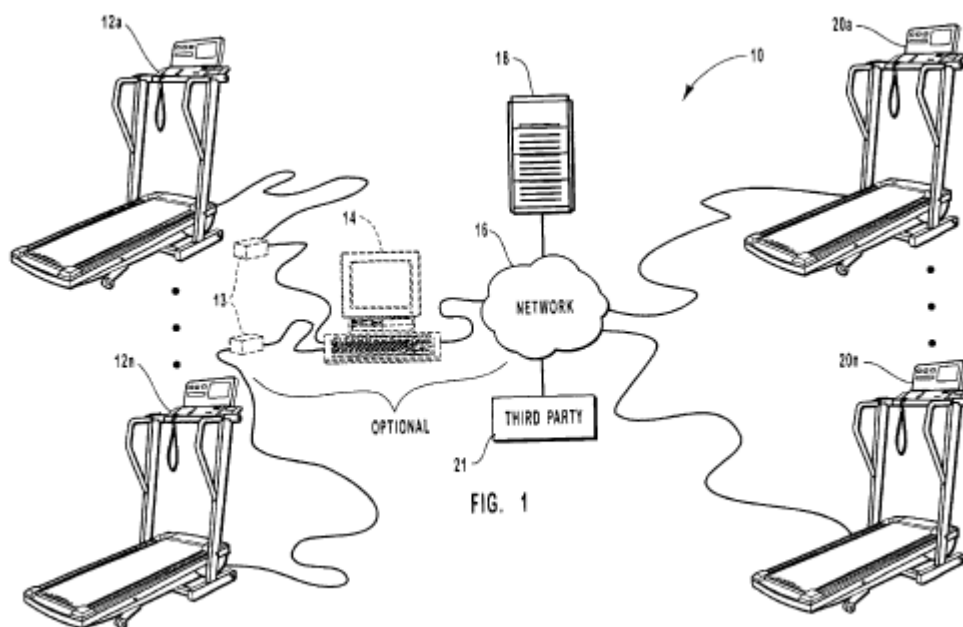
One of the primary disadvantages with group training, however, is that **it is typically available only at health clubs and,**

**therefore, is not as convenient as exercising in the privacy and comfort of one's own home.** It would, therefore, be a definite advancement in the art of home exercise equipment to provide the desirable benefits of group exercise in a home setting. Some efforts have been made in the prior art to introduce a level of “interactivity” into exercise machines.

. . .

However, these approaches nevertheless fail to provide many desirable benefits of group exercise.

21. An exercise system taught by the '062 patent is shown in Figure 1, below.



'062 patent Figure 1.

22. The exercise device may include audio and video input devices. “In one embodiment, audio input device 90 may take the form of a microphone, while video input device 92 may take the form of a video camera.” ’062 patent 12:10-12. These input devices “enable a user to perform communication, such as real time communication with other users of exercise devices” and also enables “the user to visually and/or audibly communicate with the trainer.” ’062 patent 11:63-66, 31:14-21.

23. The exercise device may also receive audio and video signals that will be displayed on audio and video output devices. The audio output device can take the form of a speaker, while the video output device can take the form of a video display. ’062 patent 12:67-13:1, 13:31-33. The ’062 patent explains that live or stored motivational content can be sent to assist in engaging the user:

In one embodiment of the present invention, **the motivational content is stored in communication system 18 and includes an audio/video presentation of a personal trainer and others engaged in a series of exercises of varying difficulty.** In another embodiment of the present invention, **the motivational content is a live-on-live, real-time exercise program presented by one or more personal trainers** that is either specific to one particular user or alternatively broadcast or optionally “webcast” to any user that it may access communication system 18.

'062 patent 7:26-35. This motivational content includes “any audio material, including dialog, narration, sound effects, and/or music, either alone or in combination with video material.”

24. The exercise device may also include “a safety mechanism that is capable of manipulating the operating parameters of the exercise mechanism in the event that a packetized second control signal is interrupted.” '062 patent 32:45-48. When the network connection is interrupted, the safety mechanism can respond in several ways. In one example, the safety mechanism “automatically engages a program stored within data storage module 266 upon disengagement of the connection with communication module 254.” '062 patent 32:23-27. “Alternatively, safety module 268 may maintain the operating parameters of exercise module 264 at the same level as before disengagement of user module 252 from communication module 254, thereby sending safety signals that maintain the operating parameters of exercise module 264 at the same level as before interruption of the programming.” '062 patent 32:29-35. In another example, “safety module 268 sends one or more safety signals that slowly decrease all the operating parameters of exercise module 264 to either a user defined or communication module 254 defined base level or to zero upon disengagement of user module 252 from communication module 254.” '062 patent 32:35-40.

**B. Claims**

25. I have been asked to review claims 8, 30, and 90 (“Audio and Video Input Device Claims”) as they relate to incorporating audio and video input devices, such as microphones and cameras. I have also been asked to review claims 8, 22, 23, and 59 (“Audio and Video Output Devices Claims”) as they relate to incorporating audio and video output devices, such as displays and speakers. I have also been asked to review claims 4 and 92 (“Synchronized Control and Audio and Video Signals Claims”) as they relate to synchronizing control signals with audio and video. I have also been asked to reviews claims 5 and 54 (“Receiving Signals From a Trainer or The Exercise Device of a Trainer Claims”) as they relate to providing signals from an exercise device of a trainer. I have additionally been asked to review claims 38 and 95 (“Safety Mechanism Claims”) as they relate to a “safety mechanism.”

26. I have not been asked to review these claims as they relate to any other subject matter including the engineering and software aspects of those claims, nor do I have opinions on any other subject matter of those claims. Moreover, I have not been asked to review any other claims, nor do I have opinions on any other claims.

**IV. Level of Skill of a Person of Ordinary Skill in the Art (“POSA”)**

27. Counsel asked me to opine on the hypothetical person of ordinary skill in the art with respect to certain aspects of this case. I understand that the POSA is a hypothetical construct used for some analyses in patent law. I understand that the claims are construed from the POSA’s viewpoint, and the factual determinations underlying a legal conclusion of obviousness (such as the scope and content of the prior art, and the differences between the prior art and the claims) are performed from the perspective a person of ordinary skill in the art.

28. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art at the relevant time, which I have been instructed to assume is July 8, 1999.

29. I have been informed and understand that a POSA is a hypothetical person who is presumed to be aware of all pertinent prior art, thinks along conventional wisdom in the art, and is a person of ordinary creativity.

30. I have been informed by counsel that the following five non-exclusive factors may be used to determine the level of skill level in the relevant art:

- 1) the types of problems encountered in the art;
- 2) the prior art solutions to those problems;

- 3) the rapidity with which innovations are made;
- 4) the sophistication of the technology; and
- 5) the educational level of active workers in the field.

31. A predicate question to addressing these issues is determining the relevant “the art.”

32. I note that the field of the invention of the ’062 patent is home exercise equipment simulating group workout environments or personal training sessions. ’062 patent Abstract, 2:29-33, 2:41-44. The prior art I discuss in this declaration also relates to the same or a similar art.

- Studor: “exercise equipment, and more particularly [] a system to simulate real world exercise courses to users operating such exercise equipment” that can provide “‘communal’ exercise sessions in concert, for competitive sporting events, or for coached exercise regimes.” Studor 1:21-24, 8:36-38 (Ex. 1005).
- Clem: “exercise system” which allows a user to “interact with fitness experts on-line and provide exercise information receiving control information wherein the received control information can permit interaction between the fitness server device and the user.” Clem Abstract (Ex. 1012).

- Hickman: “exercise system” that provides a local station with an exercise apparatus that “can be considered to be the communication tool of a human personal trainer” and a training “script [that] can be influenced not only by the local station 12, but also by the human personal trainer at the remote system computer 66.” Hickman 2:31-45, 7:49-8:14 (Ex. 1013).

33. As a result, the “art” is a hybrid of (1) engineering of exercise devices (including treadmills and bicycles as well as any attached processors, displays, etc.) and (2) exercise workouts and personal training sessions that the exercise equipment displays.

34. I do not have an opinion regarding the level of skill of a POSA on the engineering of exercise equipment, though I conclude that at least some education and/or professional experience is required. I do not have an opinion regarding how much, and such an opinion would be beyond my level of expertise.

35. However, in my opinion, the level of skill should also require—in addition the exercise equipment expertise such as that noted above—at least a Bachelor’s degree in the exercise field (*e.g.*, Exercise Physiology or similar) or at least two years’ experience in the exercise field (as, *e.g.*, personal trainer, coach, fitness instructor, etc.).

36. I arrived at this conclusion after analyzing the five factors as they apply here. To start, the prior art identifies problems related to exercise equipment and simulating group exercise programs or personal training sessions. Studor, for example, recognized “[t]ravel to public indoor exercise facilities takes time” and “[e]xercising in traditionally public setting such as health clubs and gyms can also be awkward” because “they are constantly reminded that they are surrounded by others.” Studor 1:55-56, 1:62-66. Likewise, the ability to simulate an exercise program or personal training session by remotely controlling exercise equipment is another problem encountered in the prior art. Clem, for example, states “the known devices do not provide the ability to conveniently alter the control programs within the exercise equipment or to communicate with others regarding control of the exercise equipment during a workout.” Clem 1:59-62.

37. Similarly, while a person with skill in exercise equipment design can implement processors and displays in exercise apparatuses to display a programmed or streamed workout, they might not have any basis to decide what should happen if the connection to the workout is interrupted. A person with education and/or professional experience in the exercise field, however, has an understanding of what mechanisms should be in place to provide a safe and effective experience. For example, Clem provides a safety interface “within the

user location 34 between controller 28 and network connection device 18 for ... shutting the treadmill off.” Clem 3:27-31.

38. I also base my opinion on my personal experience in the exercise field, and in particular, with creating training content and exercise prescription content (*i.e.*, individual workouts and long-term training calendars) for use by athletes on computerized and networked exercise equipment, as well as non-computerized or non-networked equipment.

39. I have not been asked to, and do not offer any opinions on the engineering or implementation of exercise equipment.

40. However, I am an expert in the exercise field, in particular designing workouts that can be displayed on exercise equipment. I will therefore limit my testimony to exercise-related topics. Likewise, and I explained at the outset (at the end of the Summary of Materials Reviewed section), when I discuss what or how a POSA would have understood something, I am addressing the exercise/training aspects of the hypothetical POSA’s understanding. I will simply use the term POSA, however, for brevity and clarity.

41. For purposes of this Declaration, and unless otherwise noted, my statements and opinions, such as those regarding my experience and understanding of a POSA generally (and specifically related to the references I

consulted herein), reflect the knowledge that existed in the field as of July 8, 1999. This is true even if the testimony is stated in the present tense.

**V. Claim Construction**

42. In my analysis, I gave all claim terms their ordinary and customary meanings in the context of the patent. If I applied a different or alternative construction, I made that apparent in the relevant discussion.

**VI. Understanding of Legal Principles Relevant to Patentability**

**A. Anticipation**

43. I understand that a claim is anticipated when a single, prior art document describes every element of the claimed invention. The reference must not only disclose all elements of the claim, but must also disclose those elements arranged or combined as in the claim.

**B. Obviousness**

44. I understand that a prior art reference can render a patent claim obvious to one of ordinary skill in the art if the differences between the subject matter set forth in the patent claim and the prior art are such that the subject matter of the claim would have been obvious at the time the claimed invention was made. In analyzing obviousness, I understand that it is important to consider the scope of the claims, the level of skill in the relevant art, the scope and content of the prior art, the differences between the prior art and the claims, and any secondary considerations.

45. I understand that the claimed subject matter is obvious when an ordinary artisan would have been motivated to combine pre-existing elements and that combination yields no more than would have been expected. I also understand that in assessing whether a claim is obvious, one must consider whether the claimed improvement is more than the predictable use of prior art elements according to their established functions. I understand that there need not be a precise teaching in the prior art directed to the specific subject matter of a claim because one can take account of the inferences and creative steps that a person of skill in the art would employ. I further understand that a person of ordinary skill is a person of ordinary creativity.

46. I understand that obviousness cannot be based on the hindsight combination of components selectively culled from the prior art. I understand that in an obviousness analysis, neither the motivation nor the avowed purpose of the inventors controls the inquiry. Any need or problem known in the field at the time of the invention and addressed by the patent can provide a reason for combining elements. For example, I understand that it is important to consider whether there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. I understand that known techniques can have obvious uses beyond their primary purposes, and

that in many cases a person of ordinary skill can fit the teachings of multiple pieces of prior art together like pieces of a puzzle.

47. I understand that, when there is a reason to solve a problem and there is a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. I further understand that, if this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense, which bears on whether the claim would have been obvious.

## **VII. Background Knowledge**

### **A. Audio and Video Input Devices**

48. Claims 8, 30, and 90 include elements that relate to audio and/or video input devices. I have listed these elements below.

49. Claim 8 of the '062 patent recites:

An exercise device as recited in claim 1, wherein the interface means is selected from the group consisting of: (i) one or more audio input devices; and (ii) one or more video output devices.

50. Claim 30 of the '062 patent recites:

An exercise device as recited in claim 29, wherein the at least one user interface device is selected from the group consisting of one or more audio input devices and one or more video input devices.

51. Claim 90 of the '062 patent recites:

An exercise system as recited in claim 85, further comprising one or more input devices gathering a signal from a user of the at least one exercise apparatus, the one or more input devices being selected from a group consisting of audio and video.

52. Generally speaking, audio and visual communication has been a critical part of engaging an exerciser. Exercise engagement leads to more consistent and effective training. It has been known for decades that “exercise equipment which makes workouts more enjoyable and fun ... entices more people to exercise.” Bobick 1:65-67.

53. As Studor explains, audio experienced by a user can “motivate the user to an optimum workout level” and “enhance the user’s overall exercise experience.” Studor 13:45-47. Audio can be particularly important during difficult parts of a session. Studor recognizes that audio can be “played back at strategic point for the user’s entertainment, distraction, and physiological encouragement.” Studor 13:48-50.

54. In the mid-1990s, companies built on this principle by providing “virtual” training and user experiences. Studor acknowledged that:

“Virtual Reality” exercise equipment is another such market segment (one which has potential overlap with the home market, but which has largely failed to do so to date). Several major manufacturers of exercise equipment (e.g., Tectrix, Nautilus,

Life Fitness, Transcape, Kettler, Precor, and Reebok) have developed such exercise machines.

Studor 2:40-45.

55. By the late 1990s, virtual experiences for home exercise devices were more common. These virtual experiences made it more convenient for users from beginners to trained athletes. For beginners, it may be difficult to get started, either because it is inconvenient to go to a health club or because the beginner may feel awkward or uncomfortable. The virtual experience provides the benefits of a health club, but with no travel time and the privacy of the user's home. For trained athletes (particularly for cyclists and runners), the virtual experience allows these athletes to train indoors despite bad weather, business travel, or traffic safety. Indoor cycling and running offer control over workout conditions.

56. Providing audio and video of the user was known to enhance the virtual experience and improve the effectiveness of the workout session.

57. By providing audio of the user through a microphone, exercisers could communicate to a trainer or other users that the exerciser needs additional encouragement. This allows the trainer to hear the user's breathing.

58. By providing video of the user, the trainer could view the user's exercise and provide corresponding feedback to adjust the user's upper body

stability, posture, and pedaling or running technique. The trainer can also suggest breathing techniques to optimize performance.

**B. Audio and Video Output Devices**

59. Claims 8, 22, 23, and 59 include elements that relate to audio and/or video input devices. I have listed these elements below.

60. Claim 8 of the '062 patent recites:

An exercise device as recited in claim 1, wherein the interface means is selected from the group consisting of: (i) one or more audio input devices; and (ii) one or more video output devices.

61. Claim 22 of the '062 patent recites:

An exercise device as recited in claim 21, wherein the means for reproducing the second signal comprises an output device selected from the group consisting of an audio output device and a video output device.

62. Claim 23 of the '062 patent recites:

An exercise device as recited in claim 21, wherein the means for reproducing the second signal comprises an output device selected from the group consisting of an audio output device and a video output device.

63. Claim 59 of the '062 patent recites:

An exercise device as recited in claim 49, wherein the means for reproducing the second signal comprises one or more audio output devices and one or more video output devices.

64. As I stated before, generally speaking, audio and visual communication has been a critical part of engaging an exerciser. Exercise engagement leads to more consistent and effective training. It has been known for decades that “exercise equipment which makes workouts more enjoyable and fun ... entices more people to exercise.” Bobick 1:65-67.

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Studor 2:40-45.

67. By the late 1990s, virtual experiences for home exercise devices were more common. These virtual experiences made it more convenient for users from beginners to trained athletes. For beginners, it may be difficult to get started, either because it is inconvenient to go to a health club or because the beginner may feel awkward or uncomfortable. The virtual experience provides the benefits of a health club, but with no travel time and the privacy of the user's home. For trained athletes (particularly for cyclists and runners), the virtual experience allows these athletes to train indoors despite bad weather, business travel, or traffic safety. Indoor cycling and running offer control over workout conditions.

68. Providing audio and video of a trainer to a user through a display and speaker was known to enhance the virtual experience and improve the effectiveness of the workout session. Indeed, such displays and speakers on exercise devices were known and common in the industry. Studor 7:1-12 “[t]he audio sub-system 38 of the computer system 16 reproduces the audio data stored in the media 20.”), 7:13-16 (“The video sub-system 40 reproduces video data stored in the media 20, and outputs either or both of television (TV) type video or SVGA signals to the monitor 42 used by the exercise system 10.”); Hickman

4:63-5:17 (describing display and speaker); Shea Figs. 4, 5, 7; 7:5-16 (describing and showing display and speakers on stationary bicycle).

69. By providing audio of the trainer through a speaker, trainers could communicate to an exerciser instructions and additional encouragement. This allows others to provide entertainment, distractions, and encouragement dynamically.

70. By providing video of the trainer through a display, a trainer could provide visual demonstrations on the proper way to adjust the user's upper body stability, posture, and pedaling or running technique. The trainer can also demonstrate breathing techniques for the user to optimize performance.

71. In addition, video and audio outputs allowed the user to simulate real world experiences, such as bicycling in the country. Hickman 9:6-15; Studor 3:31-37. Such experiences help motivate an exerciser to continue to exercise.

**C. Synchronized Control and Audio and Video Signals**

72. Claims 4 and 92 include elements that relate to synchronizing a control signal with an audio or video signal. I have listed these elements below.

73. Claim 4 of the '062 patent recites:

An exercise device as recited in claim 3, wherein the control signal is synchronized with at least one of the audio signal and the visual signal.

74. Claim 92 of the '062 patent recites:

An exercise system as recited in claim 85, wherein the packetized control signals are synchronized with at least one of an audio signal or a video signal.

75. Varying the speed, incline, or resistance of the workout provides multiple advantages. First, trainers have historically looked for ways to make exercise interesting for the exerciser. One way that they have done so is by varying the speed, incline, or resistance of the workout. By varying these parameters, the exerciser can have a more effective and enjoyable workout.

76. Second, varying these parameters can target and strengthen different muscle groups. The demands on various muscles are different when you run up an incline, across a flat surface, or down a decline.

77. Third, alternating short bursts of intense activity with periods of easier activity (called interval training) improves aerobic capacity and enables an exerciser to complete an effective workout in less time than a steady-intensity cardiovascular workout. Even with the easier recovery periods, the higher caloric expenditure during hard efforts typically leads to a higher net energy expenditure during interval workouts compared to steady-intensity workouts.

78. Fourth, interval training can increase speed and endurance. Interval training simulates physiological adaptations, such as increasing mitochondrial density, fat oxidation, muscle capillarization, and lactate tolerance. These

changes will allow a person to exercise for longer periods of time before fatigue sets in.

79. However, one issue that arose with personal exercise devices was that it was difficult for the trainer to prepare exercise routines with desired speed, incline, or resistance parameters with the trainer remote from the user. As such, exercise devices began to incorporate programs that allowed the trainer to simultaneously, and in a synchronized manner, control the operating parameters of the exercise device while providing an accompanying visual image.

80. For example, in Studor, a video file is synchronized with terrain characteristic data so that the user experiences a “real-world course exercise experience.” Studor 3:31-37.

81. Similarly, Hickman described a program where the user experienced “an imaginary bicycle ride through the country.” Hickman 9:6-8. The program would then provide a display of a hill while the resistance simultaneously increased. Hickman 9:8-15.

82. By having simultaneous control and video signals, the user could simulate a run or bicycle ride as if in the real world from the convenience of their home. Such a workout can be more enjoyable and allow for increased motivation for the user to work out. *See e.g.*, Brewer 1:66-2:1 (“it may be desirable to

present exercise programs with a related video image to enhance exercise experience or to increase the user's interest").

83. Likewise, simultaneous control permitted trainers, during real time training sessions, to be able to convey instructions consistent with operating parameters of the exercise devices. By providing trainers the ability to change the operating parameters, the trainer can increase the level of difficulty where appropriate to help the exerciser reach certain performance goals. The trainer can also decrease the level of difficulty where appropriate to keep the exerciser safe and prevent injury.

**D. Receiving Signals from a Trainer or the Exercise Device of a Trainer**

84. Claim 5 of the '062 patent recites:

An exercise device as recited in claim 3, wherein a trainer promulgates the control signal.

85. The '062 patent discloses that the "trainer" could be either a human being (*i.e.* a "live trainer") or a "website, video, disk, or dynamic or interactive software program" (*i.e.* a "stored trainer"). '062 patent 3:65-4:3, 4:10-12. Because claim 5 recites a "trainer" without specifying the type, either a "live" or "stored" trainer is within the scope of claim 5.

86. Claim 54 includes elements that relate to receiving audio, video and synchronized control signals from an exercise device of a trainer. I have listed these elements below.

87. Claim 54 of the '062 patent recites:

An exercise device as recited in claim 49, wherein the communication system receives the one or more audio and video signals and the synchronized control signals from an exercise device of a trainer.

88. One traditional and well-known form of exercise training involves a trainer performing exercise concurrently with the exerciser. By having the exerciser exercise at the same time with the trainer, the trainer could increase the motivation of the exerciser to continue. It was well-known that exercisers often prefer to exercise with others, even if the level of exercise differs between exercisers.

89. One problem with home exercise devices such as treadmills or stationary bicycles was that the exerciser had to exercise alone. As Hickman described, without the camaraderie often found in settings where others are also exercising, such as group workout sessions or spin classes, “it is easier for users, as individuals, to discontinue their exercise ... program.” Hickman 1:57-60.

90. Real time two way communication with these home exercise devices through the internet (as is described in Clem and Studor) helped resolve this

issue, as it permitted the exerciser to exercise with a trainer despite being at home while the trainer was at a remote location. Clem 2:53-65. For example, Studor explained that with its real time simulations, “currently popular Spinning workouts at health clubs could be done at home in the natural environment simulation provide[d] by the exercise system 10, with a spinmaster giving workout commands.” Studor 9:14-18. Similarly, Clem provided a system where the trainer could both interact in real time *and* provide control signals from a remote location. Clem 2:17-21.

91. In addition, these programs permitting real time audio and video interaction with the exerciser also would allow a trainer to provide interactions from an exercise device of their own.

92. As I discuss in this declaration, a POSA would have been motivated to include video and audio input devices into an exercise device. Similarly, a POSA would have been motivated to use such devices so the trainer could exercise during a real time two way communication with the user and then provide video/audio and control signals to the user from the exercise device. That way, the trainer could provide the camaraderie that comes from exercising together while also controlling the user’s exercise routine. The trainer could also model the proper form of exercising because they would be able to exercise on the device while still being able to control the user’s device.

**E. Safety Mechanisms**

93. Claims 38 and 95 include elements that relate to safety mechanisms.

I have listed these elements below.

94. Claim 38 of the '062 patent recites:

An exercise device as recited in claim 29, wherein the exercise device further comprises a safety mechanism, said safety mechanism capable of manipulating the operating parameters of the exercise mechanism in the event that the packetized second control signal is interrupted.

95. Claim 95 of the '062 patent recites:

An exercise system as recited in claim 85, further comprising a safety mechanism in communication with the at least one exercise apparatus, the safety mechanism manipulating the at least one exercise apparatus in the event that a packetized control signal is interrupted.

96. An issue that these home exercise devices had to address is what would happen if the connection to the virtual experience is lost. There were several known options that any exercise program could employ if a session were interrupted: if the exercise program was already downloaded, the user could just continue on the program; the exercise equipment could continue at the current difficulty level; the exercise equipment could begin a cool down process; the exercise equipment could immediately stop.

97. If the exercise program was already downloaded, continuing the program would be the ideal response. If the connection were only temporarily lost, changing the programming (particularly, if the connection was intermittently lost) could be jarring. By continuing the programming, the exercise device would allow the user to finish the workout with no interruption, even if the user were no longer able to interact with others. This is not an option if the program is not downloaded.

98. The option of continuing on the same difficulty level could also be advantageous in the situations where there is an intermittent loss of connection. However, this is not a good option where there is an indefinite loss of connection. The connection could have been lost at a particularly difficult point in the program, and continuing at the same level of difficulty could be too tiring for the user.

99. For home exercise devices designed to provide a virtual experience, an appropriate and broadly applicable response when a connection is indefinitely lost would have been to begin a cool down procedure.

100. Immediately stopping the exercise device allows the user to stop, check on the connection, and determine whether the user would like to reconnect, or use the exercise equipment in the traditional (non-networked) way. This is the safest option, but could be jarring and create a bad exercise experience if the user

only has a bad connection and no other reason for stopping their exercise session. This is particularly true with exercise systems using stationary bicycles with direct drive gearing, whereby the flywheel and pedals are directly linked. With direct drive systems, the inertia of the flywheel would transfer to torque in the pedals, which are in turn connected to the user's body. Direct drive stationary bicycles were popular by the mid-1990s because they create a more realistic experience than a free-wheeling configuration:

The benefit of exercising on a direct drive exercise bicycle is well known. Direct drive exercise bicycles typically utilize a high-inertia flywheel driven by a fixed-gear drive train. The flywheel is driven by the rider up to relatively high revolutions per minute (rpm). Because of the direct drive feature, the drive train must rotate at a fixed ratio of rpm as compared to the flywheel based on the gear ratio. One benefit of the direct drive exercise bicycle is that the direct drive gear train provides "pedal-through assistance" for the rider. The "pedal-through" feature assists the rider by pushing the pedal through the top and bottom dead center pedal positions to help make the transition smooth and efficient. Other benefits are derived from the direct drive interaction between the inertia flywheel and the crank arms to which the rider's feet are attached. The inertia flywheel provides a smooth, non-jerky pedaling rhythm which provides an efficient and rigorous exercise for the rider, especially at relatively high rpms, such as 60 to 100 rpm.

U.S. 5,961,424 (“Warner”) 1:14-32.

101. Warner also recognized that the direct drive system is problematic “when the rider wishes to quickly stop the pedals” and instead it is “necessary for the rider/operator to gradually decrease his cranking rate in order to slow down the inertia wheel.” Warner 1:49-54.

## **VIII. Studor In View of the Knowledge of a POSA**

### **A. Audio and Video Input Device Claims**

102. Although Studor does not explicitly describe incorporating audio and video input devices into the exercise device, such as a microphone or camera, a POSA would have been motivated to do so.

103. Studor discusses using the exercise system for “interactive coaching.” Studor 6:65. An exercise expert implementing Studor would have been motivated to include a microphone and camera to provide audio and video to a fitness coach or trainer for a safe and effective workout.

104. As discussed above, video of the user is important so that the trainer can advise the user on correct form. Through the video the trainer can identify whether the user’s posture and technique is correct, or whether the user looks stable. Further, trainers—when they can see the people exercising—see things that are not in the data. Effort is not represented in data. A person’s data may indicate an output of X watts or heart rate, but cannot determine the person’s

perceived level of exertion—or how hard or difficult it is for the athlete to achieve or sustain that level of output. The expression and general demeanor of a person indicates that person's level of effort and perceived exertion, as well as verbal feedback. Trainers and coaches use such information for many purposes, such as general encouragement during the workout, on-the-spot changes to the workout routine, and also long-term adjustments to the person's routines.

105. Further, through the audio, the user can communicate any pain or discomfort that the trainer cannot observe visually. The user can also communicate through the audio whether the difficulty is too easy or too hard, or whether the user needs more encouragement. Similar to the opportunity to observe an exerciser's effort level and perceived exertion via video, through audio the trainer can listen to the exerciser's breathing. The rhythm and rate of an exerciser's respiration can indicate whether they have reached “ventilatory threshold,” or the point at which breathing goes from deep and rhythmic to uncontrolled, shallow panting. Ventilatory threshold indicates the transition between sustainable and unsustainable exercise intensities.

**B. Receiving Signals from a Trainer or from an Exercise Device of a Trainer Claims**

106. Studor discusses simulating spinning workouts with a spinmaster, exercise in concert or in competition, and interactive coaching. Studor 8:24-37, 6:65, 9:15-18. Although Studor does not explicitly discuss receiving audio and

video signals and the synchronized control signals from an exercise device of a trainer, a POSA would have been motivated to implement the exercise system of Studor to do so.

107. As I described earlier, a POSA would have been motivated to send signals from the “live trainer” or the device of a trainer because it would allow the trainer to accompany the user in performing exercise. Having the trainer exercise alongside the user could encourage the user to continue to perform the workout and maintain an exercise regimen. This is particularly true for the exercise in concert or competition discussed in Studor.

108. A POSA would have recognized the benefits and convenience of automating the live “spinmaster” and “coached ... regimes” taught by Studor to include promulgated control signals. A POSA would have recognized that a live trainer with such capabilities could customize the exercise program for each individual user, based on *a priori* knowledge of that user or the user’s performance in the current program. For example, in a multi-user session as taught by Studor, a POSA would recognize that the “users located on different continents” may not have the same physical abilities. Therefore, it would be advantageous to scale the difficulty level accordingly, which Studor already had the capability to do. Studor 12:30-36 (“e.g., easy, realistic, hard”); Fig. 5.

Providing Studor's live trainer ("spinmaster") the ability to scale the resistance was an obvious extension of Studor's express capabilities.

109. Further, the trainer would not have to leave the exercise device to change the user's workout if the trainer's device could control the user's device. In addition, by having the trainer's interaction in real time with audio and video with the trainer exercising on the device, the user could see the trainer also performing the exercise and the trainer could demonstrate proper exercise technique, which might be more difficult if not on an exercise device.

### **C. Safety Mechanism Claims**

110. Although Studor does not explicitly describe incorporating a safety mechanism capable of manipulating the operating parameters of the exercise mechanism in the event that the control signal is interrupted, a POSA would have been motivated to do so.

111. Studor discusses features in the exercise system that "automatically decrease[s] the difficulty" when "a strict cap on their heart rate is reached." Studor 16:23-27. An exercise expert implementing Studor would have been motivated to extend those safety components to "automatically decrease the difficulty" when the control signal is interrupted.

112. A dangerous situation could occur if the control signal is lost at a particularly difficult part of the exercise program, in particular with popular

direct drive (“spin”) exercise bicycles taught by Studor. Studor 9:14-20 (“currently popular Spinning workouts”). An appropriate and broadly applicable response in that situation is to reduce exercise intensity (*i.e.* slower pace or lower resistance) or start a cool down procedure. The safest response in that situation is to automatically decrease the difficulty and stop the exercise machine. This would be consistent with Studor’s goal to “ensure a safe workout.” Studor 16:27-28.

## **IX. Clem In View of the Knowledge of a POSA**

### **A. Audio and Video Input Device Claims**

113. Although Clem does not explicitly describe incorporating audio and video input devices into the exercise device, such as a microphone or camera, a POSA would have been motivated to do so.

114. Clem discusses using the fitness system 10 to “interact on-line with a live fitness expert.” Clem 2:54-55. An exercise expert implementing Clem would have been motivated to include a microphone and camera to provide audio and video to a fitness coach or trainer for a safe and effective workout.

115. As discussed above, video of the user is important so that the trainer can advise the user on correct form. Through the video the trainer can identify whether the user’s posture and technique is correct, or whether the user looks stable. Further, trainers—when they can see the people exercising—see things

that are not in the data. Effort is not represented in data. A person's data may indicate an output of X watts or heart rate, but cannot determine the person's perceived exertion—or how hard or difficult it is for the athlete to achieve or sustain that level of output. The expression and general demeanor of a person indicates that person's level of effort and perceived exertion, as well as verbal feedback. Trainers and coaches use such information for many purposes, such as general encouragement during the workout, on-the-spot changes to the workout routine, and also long-term adjustments to the person's routines.

116. Further, through the audio, the user can communicate any pain or discomfort that the trainer cannot observe visually. The user can also communicate through the audio whether the difficulty is too easy or too hard, or whether the user needs more encouragement. Similar to the opportunity to observe an exerciser's effort level and perceived exertion via video, through audio the trainer can listen to the exerciser's breathing. The rhythm and rate of an exerciser's respiration can indicate whether they have reached "ventilatory threshold," or the point at which breathing goes from deep and rhythmic to uncontrolled, shallow panting. Ventilatory threshold indicates the transition between sustainable and unsustainable exercise intensities.

**B. Audio and Video Output Device Claims**

117. While Clem does disclose a “display,” it does not explicitly describe incorporating audio and video output devices into the exercise device, such as a display monitor or speaker. A POSA would have been motivated to do so.

118. Clem discusses using the fitness system 10 to “interact on-line with a live fitness expert.” Clem 2:54-55. An exercise expert implementing Clem would have been motivated to include a display monitor and speaker to provide audio and video to a user for a safe and effective workout.

119. Video from the trainer is important for the user to see so that the trainer can demonstrate correct form to the user. Through the video the trainer can demonstrate whether the user’s posture and technique is correct, or provide other instructions. Further, having a trainer visible to the user can provide a more personal touch that exercisers can appreciate.

120. Further, through the audio, the trainer can communicate encouragement and other instructions. By having a speaker for the audio, for example, the user can receive instructions even when looking away from the display screen, *e.g.*, to watch television.

121. Further, conveyance of instructions via the speaker permits the trainer to convey instructions in an enthusiastic tone to encourage the user to proceed with the next exercise and complete the target number of efforts. An

enthusiastic verbal conveyance of instruction would have been known to a POSA to potentially improve exercise motivation.

122. An additional benefit to conveying instructions via a speaker is for the visually impaired. A POSA would have been motivated to incorporate this feature so that those that are visually impaired might be able to use the computer-instructor to guide the exercise routine. Similarly, providing the instructions or exercise names as video benefits users who are hearing impaired. Generally, a POSA would have been motivated to provide instructions in as many ways as possible, not just to accommodate the visually or hearing impaired, but also because users have varying preferences for how they obtain information while exercising.

**C. Synchronized Control and Audio and Video Signal Claims**

123. Clem discusses having both control and audio and video signals. Clem 2:17-21, 2:53-3:7. To the extent it does not explicitly describe having those signals synchronized, a POSA would have been motivated to do so.

124. Clem describes that “a user at a user location 34 can interact on-line with a live fitness expert located at the web site 12 to engage in a real time two way communication regarding matters related to fitness.” Clem 2:53-56. Such communication can include the uploading and downloading of video and audio information. Clem 2:64-65. Clem also describes that the web site can also

transmit control signals, either directly or indirectly through a control program. Clem 2:66-3:7. Thus, “[t]he user can ... interact with fitness experts online and ... receive control information wherein the received control information can permit interaction between the fitness server device and the user.” Clem 2:17-21. A POSA would have been motivated to communicate these video/audio and control signals simultaneously and in a synchronized manner.

125. As I discussed earlier, having synchronized signals allows for a simulation of a natural environment, which can improve a user’s motivation to work out.

126. In addition, having synchronized control and video/audio signals allows the trainer, during a two-way real time communication as discussed in Clem, to provide instructions for the precise parameters (such as incline or speed) that the user was experiencing. Such real time instructions make the workout more effective (because the trainer is using current information) while also allowing the trainer to provide encouragement or safety instructions. For example, the trainer can count down to when the trainer is going to increase the incline and speed of a treadmill, thus ensuring the user is ready for the precise moment that they need to pick up the intensity. Such simultaneous control and video/audio signals improves the safety of the workout while ensuring effectiveness.

**D. Receiving Signals from a Trainer or from an Exercise Device of a Trainer Claims**

127. While Clem discusses that a “user can interact with fitness experts on-line and ... receive control information,” it does not explicitly describe having the user receive the video and audio signals and control signal from an exercise device of a trainer. Clem 2:17-21. However, a POSA would have been motivated to do so.

128. As I described earlier, a POSA would have been motivated to send signals from the device of a trainer because it would allow the trainer to accompany the user in performing exercise. Having the trainer exercise alongside the user could encourage the user to continue to perform the workout and maintain an exercise regimen.

129. Further, a POSA would have understood that it would have been the trainer promulgating a control signal from a web site during an interactive training session (as taught in Clem) because the trainer could want to change the incline or speed of the user’s device to improve the user’s workout.

130. Further, the trainer would not have to leave the exercise device to change the user’s workout if the trainer’s device could control the user’s device. In addition, by having the trainer’s interaction in real time with audio and video with the trainer exercising on the device, the user could see the trainer also

performing the exercise and the trainer could demonstrate proper running technique, which might be more difficult if not on an exercise device.

**E. Safety Mechanism Claims**

131. Although Clem does not explicitly describe incorporating a safety mechanism capable of manipulating the operating parameters of the exercise mechanism in the event that the control signal is interrupted, a POSA would have been motivated to do so.

132. Clem describes a “safety interface” in the fitness system “for detecting whether a user falls off or the user heart rate goes too high and shutting the treadmill off.” Clem 3:27-31. An exercise expert implementing Clem would have been motivated to incorporate the safety interface to shut the treadmill off when the control signal is interrupted.

133. A dangerous situation could occur if the control signal is lost at a particularly difficult part of the exercise program. An appropriate and broadly applicable response in that situation is to reduce exercise intensity (*i.e.* slower pace or lower resistance) or start a cool down procedure. The safest response in that situation is to automatically decrease the difficulty and shut down the treadmill.

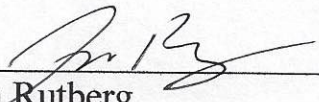
**X. Conclusion**

I have made the above opinions related to the validity of the '062 patent and all statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

Rutberg Declaration for *Inter Partes Review* of USP 7,166,062

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 8, 2021 in Colorado Springs, CO.

  
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Jim Rutberg