

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PELOTON INTERACTIVE, INC.,

Petitioner,

v.

JOHNSON HEALTH TECH CO., LTD.,

Patent Owner.

PTAB Case No. IPR2023-01163

Patent No. 10,032,227

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,032,227
CHALLENGING CLAIMS 1-20**

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EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 10,032,227 (“’227 patent”)
1002	Declaration of R. Lee Rawls (“Rawls”)
1003	File History of U.S. Patent No. 10,032,227
1004	U.S. Patent No. 9,785,827 (“Ray”)
1005	U.S. Patent No. 7,736,273 (“Cox”)
1006	U.S. Patent Pub. No. 2010/0160115 A1 (“Morris”)
1007	Reserved
1008	U.S. Patent No. 6,638,198 (“’198 patent”)
1009	File History of U.S. Patent No. 10,796,375
1010	U.S. Patent No. 11,227,340 (“’340 patent”)
1011	U.S. Patent No. 8,574,131 (“Daly”)

Petitioner Peloton Interactive, Inc. (“Peloton”) respectfully requests *inter partes* review (“IPR”) of claims 1-20 of U.S. Patent No. 10,032,227 (“’227 patent,” Ex. 1001).

I. INTRODUCTION

Although the ’227 patent specification attempts to justify its existence through its pragmatic goal—helping insurance companies stop fraud—an examination of the ’227 claims show they contain absolutely nothing novel. Rather, they are directed to well-known, decades-old combinations of treadmills, user-detection sensors, and the data those sensors generate.

To promote safety, treadmills since the 1980s have consistently included some form of user-detection device and a “safety switch” to cease operation if a user slips, falls, or is no longer present on the device. (Rawls, ¶¶ 35-37, 57-59.) One common type of safety switch is a lanyard the user can attach to their clothing and if the user drifts so far back on the treadmill deck that the lanyard reaches its limit, its key will detach, stopping the treadmill. (Rawls, ¶¶ 60-63.)

One drawback of the lanyard-type device is that, as long as the lanyard’s key is inserted in the treadmill, the treadmill can still operate even if the lanyard is not clipped to the user. (Rawls, ¶ 64.) Thus, many treadmills began to include sensors (such as optical, pressure, and current sensors) to determine whether a user is present. (Rawls, ¶¶ 65-83.) As the prior art expressly acknowledges, such sensors

also allowed users to collect verified data regarding their treadmill exercise and to provide such information to a third party (e.g., a trainer, doctor, or insurance company). (Rawls, ¶¶ 84-102.)

Although the '227 patent purports to prevent a person from operating a motorized exercise machine unoccupied to register false metrics without actually exercising, (Ex. 1001, 2:29-36), the '227 patent itself admits that the prior art contained all the components and concepts of such a system (e.g., belt, motor, sensor, controller, communication interface, reporting user exercise data) long before its 2014 priority date. (Ex. 1001, 1:35-67.) The long record of prior art summarized by Mr. Rawls is replete with references discussing the claimed treadmill features including data transmissions to third parties for the purposes of verifying eligibility for insurance premium discounts based on exercise performance. (Rawls, ¶¶ 48-49, 103-111.) Such systems necessarily distinguished between data representing verified exercise (when sensors demonstrated a user was operating the machine) and non-verified exercise data (when sensors revealed a user was not engaged).

Given that the '227 patent merely rehashes a conventional apparatus and its standard features being employed in a known and obvious way, IPR should be instituted and '227 claims 1-20 should be canceled.

II. OVERVIEW OF THE '227 PATENT

A. The Alleged Invention

The '227 patent describes a conventional exercise apparatus, such as a treadmill, and a way to verify whether a user is exercising so that his/her exercise habit could be demonstrated to an insurance company to receive incentives, such as savings on insurance payments. (Ex. 1001, 1:18-34, 2:23-36.) However, exercise data reported from motor-driven exercise machines—like treadmills—is not trustworthy because a user could simply turn on a motor-driven treadmill without actually running or otherwise using the machine. (*Id.*, 1:51-2:15.) The '227 patent purports to solve this problem via a “verification function and verifying method” that can “verify an exercise use thereof.” (*Id.*, 2:23-36.)

Figure 1 illustrates an admittedly conventional motor-driven treadmill including a base 8, a motor, a motor-driven operating member 20—a belt—sensors, controller 40 that generates exercise use data when powered on, and communication interface 50 configured to report out the exercise data to a display or over a network. (*Id.*, 1:45-51, 3:45-4:45, 6:5-54; Figs. 1-2.)

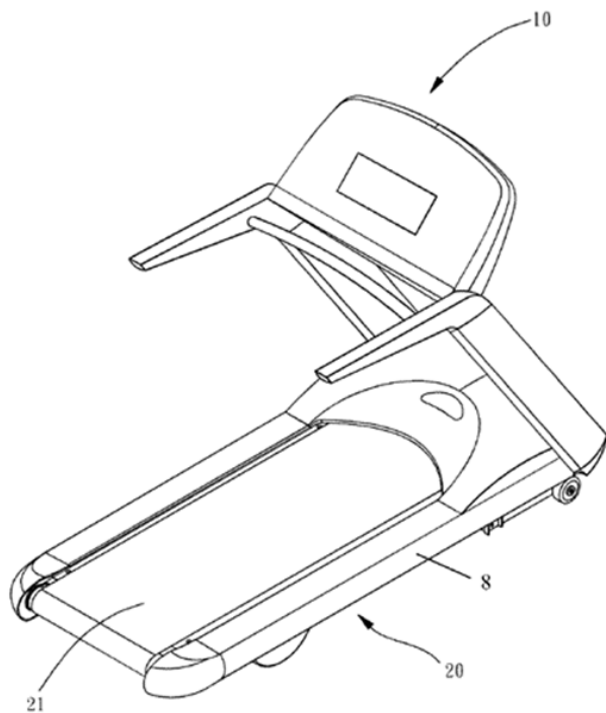


Figure 1

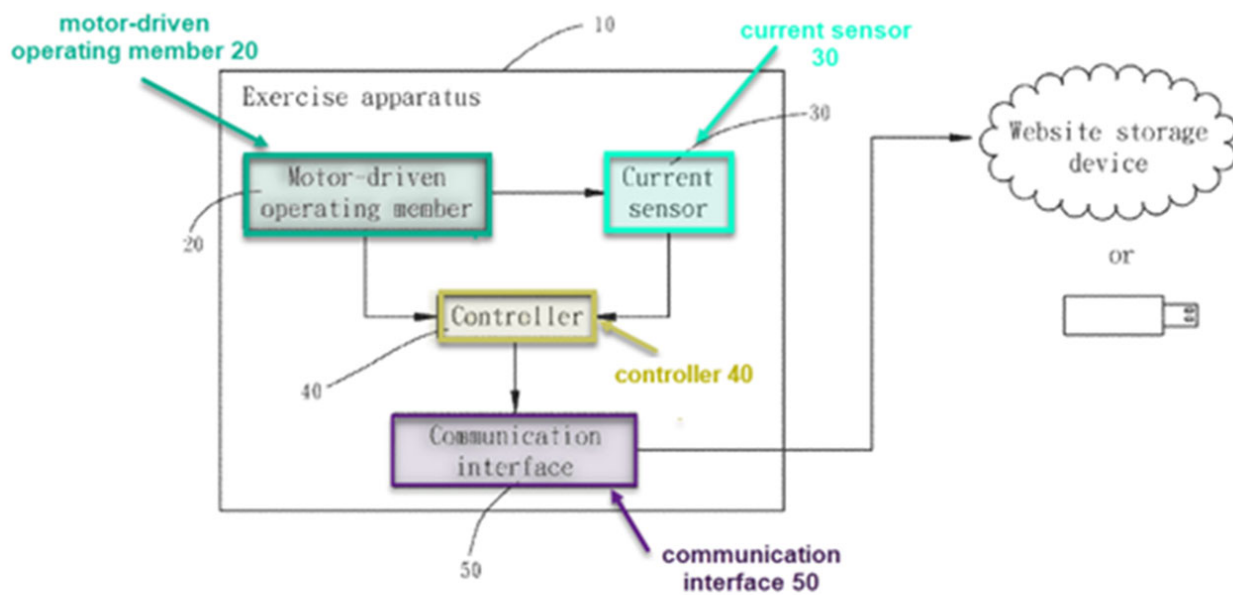


Figure 2 (Annotated)

The alleged invention takes these admittedly known components and uses them for the limited purpose of distinguishing the treadmill-generated exercise use data based on when the user is detected on the moving belt (validated exercise use data) versus when the belt is moving without a detected user (non-validated exercise use data). (*Id.*, 2:37-52.) The decision flowchart in Figure 6 provides an example of the validation process.

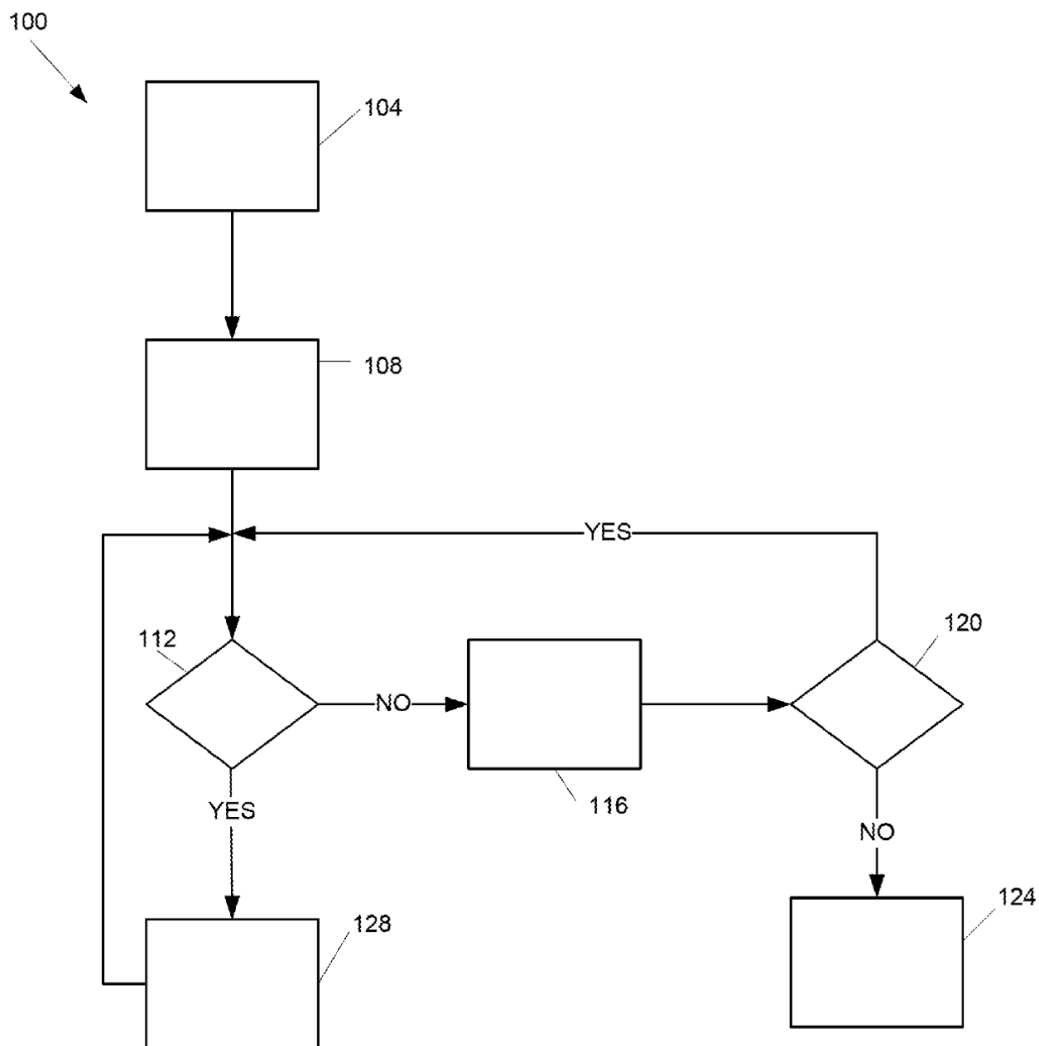


FIG. 6

The treadmill is powered (step 104) and its controller 40 receives data from user detect sensors such as pressure, current, or optical sensors (step 108). (*Id.*, 6:66-7:11.) Based on sensor signals, controller 40 determines whether a user is actively engaged with the treadmill (step 112). (*Id.*, 7:12-23.) If controller 40 determines that a user is not on the machine, the process generates “non-validated exercise use data” (116) (*id.*, 7:23-33), and the process is repeated at step 120 (if the motor continues moving the belt) to determine if a user engages. (*Id.*, 7:30-40.) Conversely, if controller 40 determines that a user is engaged, the process generates “validated exercise use data” (step 128). (*Id.*, 7:41-47.) Validated exercise use data can be stored locally, communicated to a user on a display, or reported out to third parties over a network. (*Id.*, 7:44-47.)

The claims of the '227 Patent merely repeat the known treadmill elements and recite generation of validated and, in some claims, non-validated exercise use data. As illustrated below, the claims of the '227 patent recite known and obvious limitations and are thus invalid. (*See also* Rawls, ¶¶ 114-120.)

B. The Prosecution History

During the prosecution of the '227 patent, claims 12-17 were withdrawn (Ex. 1003, 42-49) and, in the first substantive Office Action, claims 1-11 and 19-20 were considered allowable, and independent claim 18 was rejected as anticipated by Yi (U.S. Publication No. 2009/0176629A1). (Ex. 1003, 29-33.) Applicant amended

independent claim 18 (which ultimately issued as claim 14) to include claim 19 limitations related to a pressure sensor that detects the user's engagement with the belt. (Ex. 1003, 24.) Notice of Allowance was subsequently issued. (*Id.*, 8-12.)

C. The Priority Date

For the limited purpose of this Petition only, Petitioner assumes that the '227 patent is entitled to its December 30, 2014 provisional filing date. All prior art in this Petition predates this priority date.

III. OVERVIEW OF THE PRIOR ART

A. Morris

Morris described accurately detecting when a user is on a treadmill for both safety and data analysis purposes. (Morris, Title, [0004]-[0005].) Morris disclosed an exemplary “reluctance-type sensor comprising a magnet and induction coil to detect induced current based on the movements of a treadmill deck with respect to the treadmill frame caused by the movements of a user.” (*Id.*, [0007].) Morris' user detection is shown in Figure 9.

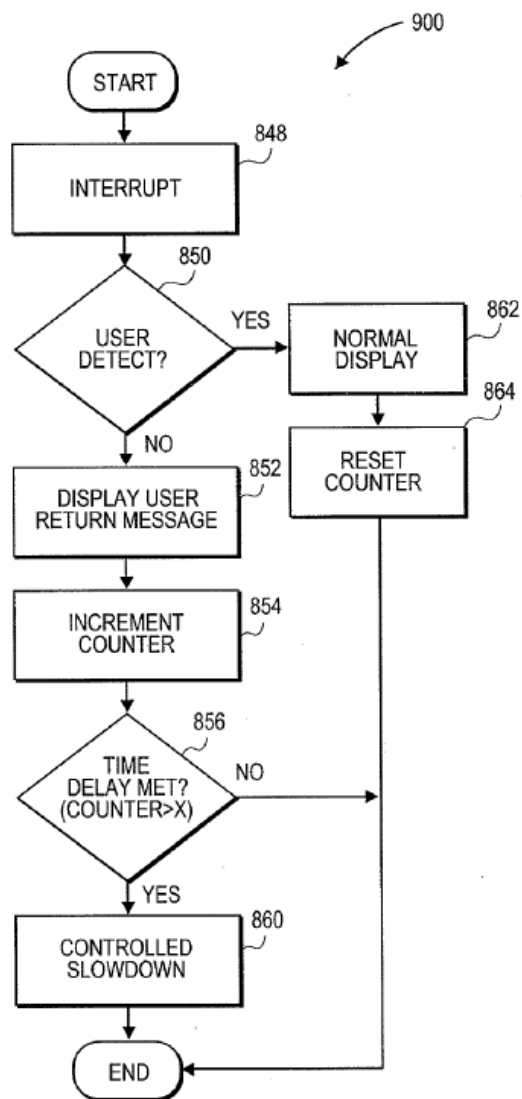


FIG. 9

During a user's workout, Morris' user detection sensor determined whether or not a user is present. (*Id.*, [0045].) When a user was detected, the user's workout program would continue without interruption. (*Id.*) If a user was not detected, Morris' FIT processor would determine how long a user was not present. (*Id.*) If the

user did not return before a timeout threshold was surpassed, a controlled slowdown was initiated to stop the treadmill. (*Id.*) (*See also* Rawls, ¶¶ 121-123.)

B. Ray

Ray sought to motivate users to exercise on treadmills, and also solved the same problem discussed in the '227 patent—preventing a person from fraudulently obtaining credit for exercise that the person didn't perform, with the intent of manipulating wellness programs and insurance companies for discounts. (Ray, Abstract, 3:13-42, 4:37-44, 7:30-33, 9:17-36.)

Ray explained that prior art exercise devices failed “to accurately validate [the] identity [of a] user . . . thus enabling the inactive wellness program participant[s] to obtain false wellness program credit for exercise performed by another.” (*Id.*, 3:13-29, 8:25-28.) For example, dishonest users (or the user's friend) could shake a pedometer to generate false exercise information “while sitting on the couch watching television” (*id.*, 3:21-29) or give their gym swipe card to a friend. (*Id.*, 3:16-18.)

To solve these problems, Ray disclosed a process for validating exercise data through use of a sensor that detects engagement of a user with a treadmill. This process included an exercise “validation” feature that verified the user's identity and the exercise performed, which also provided a “motivation” feature by displaying a

real-time virtual image of the user's physical improvements (thinning) as they continued to exercise. (*Id.*, 4:52-54, 5:40-46, 6:36-42, 8:26-28.)

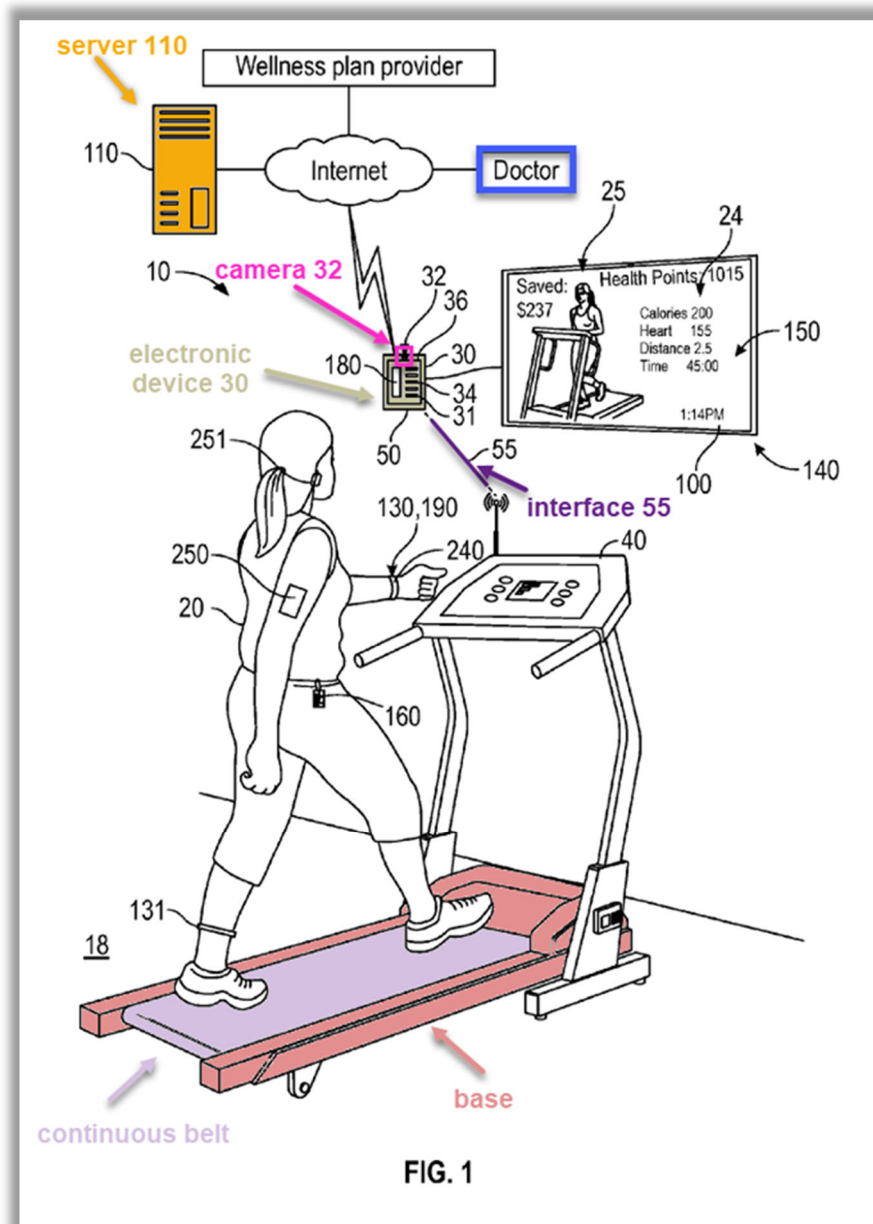


Figure 1 (annotated)

Figure 1 showed a treadmill 40 including a camera 32 (*i.e.*, sensor) that tracked a user's movement in real-time to confirm that a user is engaged with the

machine. (*Id.*, 6:43-46, 12:59-67, 14:6-14.) Ray’s treadmill 40 also generated exercise data 24 displayed on the treadmill screen in the form of data and a virtual image. (*Id.*, 5:41-58, 12:61-64, 13:50-67, 14:3-5, 16:51-55, 17:61-18:19, Figs. 1-3.)

As long as a user was exercising, camera 32 captured a real-time video of the user or images (*id.*, 14:31-46) and a computer caused a user’s virtual image to become thinner and healthier based on the intensity and length of the user’s workout (*id.*, Abstract, 5:41-46, 10:59-67, 13:20-30, 16:17-21.) As such, Ray’s motivational image was generated “in accordance to the speed or duration of the detection of movement of the user **20** by the camera **32**.” (*Id.*, 13:50-67.)

The user’s image and exercise data could be stored on server 110 (*id.*, 23:30-36), or transmitted over the internet to third parties, such as a user’s doctor, insurance company, or wellness practitioner. (*Id.*, 5:41-58, 13:7-10.) But if the user was not detected or was not exercising, the camera would no longer capture the user’s image. (*Id.*, 14:31-55.) (*See also* Rawls, ¶¶ 124-128.)

C. Cox

Cox was directed to a treadmill data acquisition system that used a current sensor to detect a user to generate a stride analysis. (Cox, Abstract, 6:40-54.)

Cox used a current sensor that recorded electric current signals of the treadmill “as a person walked on the treadmill” to “enable[] a calculation of power” or energy

usage by the motor of treadmill 30. (*Id.*, 2:56-64.) Cox used variations in the electric current to conduct its stride analysis. (*Id.*, 5:34-47, 6:40-54.)

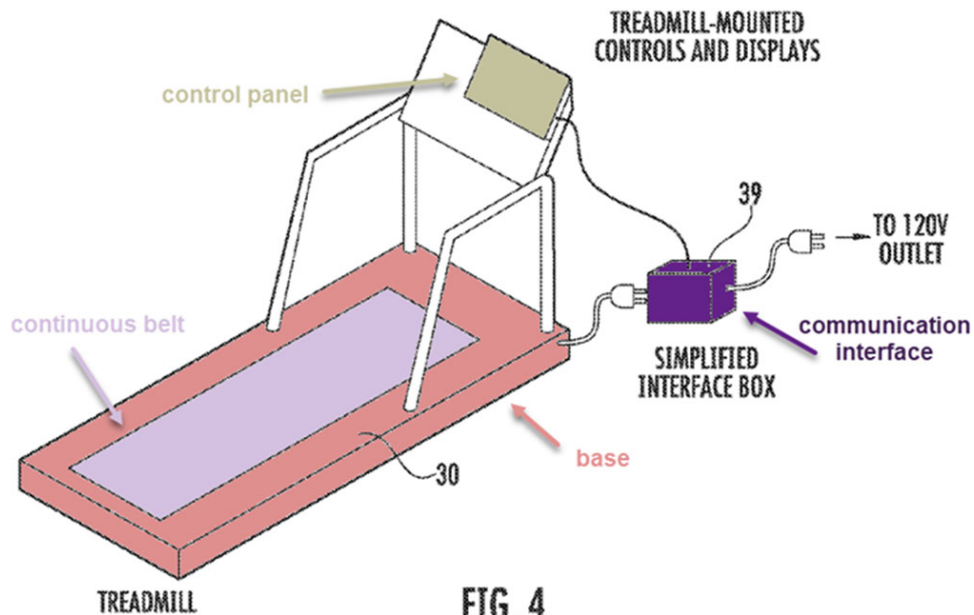


FIG. 4
(Annotated)

An interface box 39 was placed between the motor and the power source for obtaining current signals. (*Id.*, 4:27-31, Fig. 4 (annotated above).) Cox also disclosed other embodiments, including a fully integrated treadmill with all of the components integrated therein. (*Id.*, 4:37-39.) The data could be used to generate a stride frequency analysis or a stride profile for a user. (*Id.*, 2:35-36, 5:55-64, Fig. 9.) (*See also* Rawls, ¶¶ 129-132.)

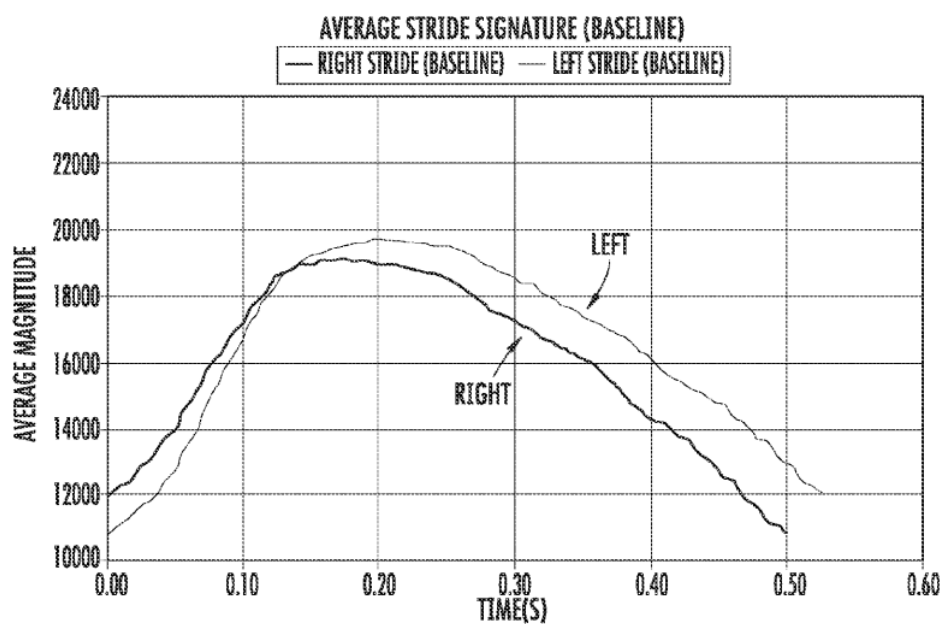
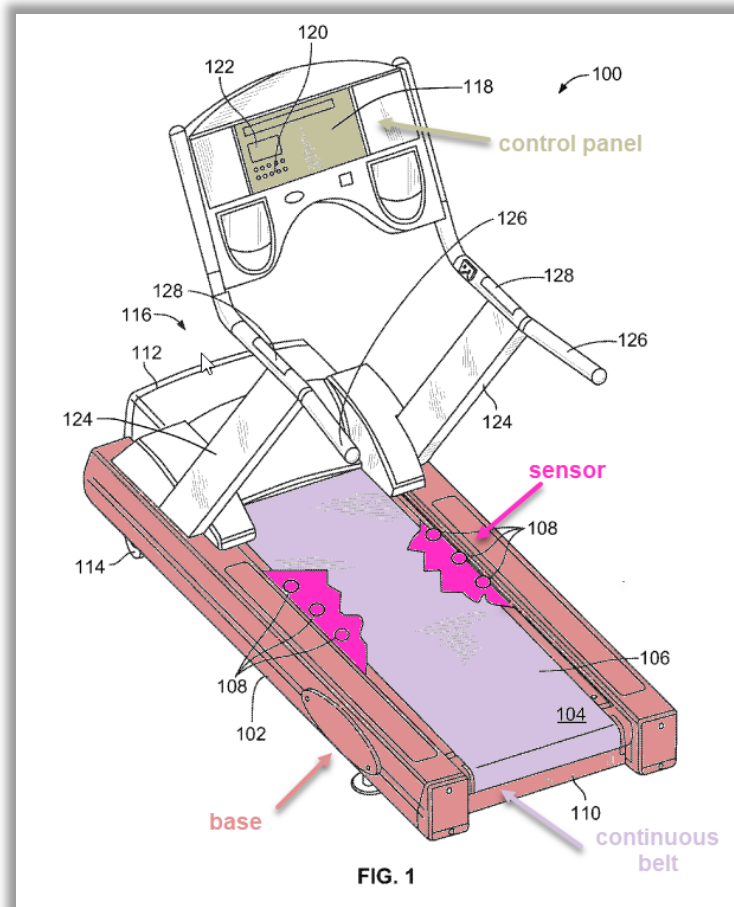


FIG. 9

D. Daly

Daly disclosed a treadmill with a plurality of pressure sensors for detecting user engagement and providing exercise metrics to the user. (Daly, 2:65-3:12, 3:40-51, 4:11-32, 5:62-63.)



Daly's Figure 1 (Annotated)

Daly's pressure sensors were incorporated into the tread's belt and provided output signals when the treadmill's deck was deformed or deflected by the exercising user. (Daly, 6:38-56.) Daly's control system 206 received the sensor signals to determine whether a user was engaged in exercise (such as walking or running) so that it could provide feedback information to the user regarding their cadence. (Daly, 5:62-67, 7:39-50.) (*See also* Rawls, ¶¶ 133-134.)

IV. CLAIM CONSTRUCTION

In an IPR proceeding, the challenged claims are construed “in accordance with the ordinary and customary meaning of such claim[s] as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). At this time, Petitioner does not believe construction of any term is necessary to resolve the invalidity challenges set forth in this Petition. (Rawls, ¶¶ 29-30.)

The claims of the '227 patent have not been construed by any courts as of the filing of this Petition.

V. LEVEL OF ORDINARY SKILL

As of the alleged December 2014 priority date, a person of ordinary skill in the art (POSITA) is a person having: (i) a bachelor’s degree in an exercise related field or mechanical or electrical engineering and (ii) three to five years of industry experience in designing cardiovascular exercise equipment (such as treadmills, bicycles, steppers, ellipticals) or in a similar field. A POSITA could substitute additional education for experience (e.g., substituting an advanced degree relating to the design of cardiovascular exercise equipment or biomechanics, for industry experience in a related field and vice versa). (Rawls, ¶¶ 31-34.)

VI. GROUNDS FOR CHALLENGE

A. Ground 1: Claims 1-9, 12, and 14-20 are Obvious over Morris and Ray.

1. Motivation to Combine

Both Morris and Ray related to exercise equipment (e.g., treadmills), and specifically to detecting a user's presence on a treadmill and presenting exercise data on a display while the user was exercising. (Morris, Abstract, [0006], [0035]; Ray, Abstract, 5:41-48, 13:20-30.) Morris recognized that detection of a user's presence could provide a number of benefits, including motivation (Morris, [0025]), which was one of the main themes in Ray's invention. (Ray, 8:22-26, 11:56-61.) Therefore, a POSITA would have been motivated to combine the complementary teachings of Morris and Ray that addressed similar objectives to achieve predictable results. (Rawls, ¶¶ 135-138.)

In the combination, a POSITA would have incorporated Ray's camera and software instructions for validating user exercise data into Morris' with a reasonable expectation of success. In fact, Morris had already explained its exercise equipment could be fitted with optical sensor(s) (Morris, [0033]), thus providing an express motivation to install and use Ray's camera for user detection. Additionally, Morris' treadmill included an information processing system with several electronic circuits and processors (controller)—FIT processor 520, display processor 522, translator

board 518, motor/incline control board 528 (Morris, [0032], [0034]-[0036], Fig. 6), which could be individual components, or combined together. (Morris, [0035].) They processed the sensor signals, determined the user's presence/absence, communicated with treadmill's motor(s), and presented exercise data such as duration, distance, intensity, incline, cadence, footfall force, a human analog display that mimicked the user's bouncing motion, and a ***virtual reality content***¹ on the screen. (Morris, [0032], [0034]-[0036], [0050], [0056]-[0058], Claims 29-37, Figs., 11-12C.) Therefore, the signal processing and display system of Morris had the necessary capabilities to accommodate Ray's user detection/validation software and implement, with a reasonable expectation of success, its functionalities that included producing and presenting the motivational image of the user exercising. (Rawls, ¶¶ 139-143.) A POSITA would recognize that software instructions could easily be incorporated into Morris' controller and interact with Morris' advanced sensor system design to more accurately detect a user's presence. (*Keynetik, Inc. v. Samsung Elecs. Co.*, No. 2022-1127, 2023 WL 2003932, at *2 (Fed. Cir. Feb. 15, 2023) ("Normally, once the function to be performed by software has been identified, writing code to achieve that function is within the skill of the art.")).

¹ All bold and italic emphases are added by Petitioner unless otherwise specified.

A POSITA would have been further guided by Ray’s express teachings that its user validation and motivation technology could be “easily and affordably merged” into a treadmill (Ray, 9:55-57), and would have understood that incorporating Ray’s user detection and presentation into Morris’ treadmill would have been obvious and would have produced predictable results with a reasonable expectation of success. (Rawls, ¶¶ 143-144.)

A POSITA would have been further motivated to make this combination because it would have improved the capabilities of Morris’ treadmill by adding Ray’s motivational image that showed a thinner image of the user as the intensity and duration of exercise increased, thus contributing “to the user’s sense of self-worth and self-esteem.” (Ray, 11:55-59; 13:50-57.) While Morris recognized that its user data could be “output to a computer or saved in memory” for later access (Morris, [0050]), inclusion of Ray’s functionality to share the exercise data with a remote location in real time would have allowed “a more efficient flow of that data to ... a physician or personal trainer” (Ray, 7:11-22), thus providing another added benefit motivating a POSITA to make this combination. (Rawls, ¶¶ 138, 145.)

2. Claim 1

Before addressing claim 1 limitations, it is beneficial to address validated and non-validated exercise use data of Elements 1[g] and 1[h].

The '227 patent and its claims describe “validated exercise use data” as exercise data that is generated while the user is actually exercising on the exercise machine—*i.e.*, when the user is engaged with the operating unit that is moving, such as when the user is walking/running on a treadmill while the belt is running. (Ex. 1001, 2:35-52.) Similarly, the '227 patent describes “non-validated exercise use data” as exercise data generated while the user is not on the exercise machine, but the exercise machine is running—*i.e.*, when the movement of the belt is detected without an exercising user. (*Id.*) Neither the claims, nor the detailed description, of the '227 patent, impose additional requirements on these terms.

The context in the Background of the '227 patent explains that motor-driven treadmills could run unattended and produce fake exercise data without the user actually exercising. (Ex. 1001, 1:51-2:19.) For this reason, health insurance companies would not accept data produced by motor-driven exercise equipment as proof of the user’s exercise habits for providing discounts. (*Id.*) The '227 patent purports to solve this problem via a “verification function and a verifying method.” (*Id.*, 2:29-30.) But the disclosed method to generate “validated” exercise use data, even in the more detailed steps of Figure 6, simply entails generating non-validated data when the exercise machine’s operating member (belt) is moving and the user is not detected and generating validated exercise use data when the user is detected while the operating member is moving.

Notably, the '227 patent describes Figure 6 operations as “*an example* of exercise use verification application” (Ex. 1001, 6:55-58), and uses loose and permissive language by stating: “the controller *can* record (*or otherwise identify*) the non-validated exercise use data as validated exercise use data” (*id.*, 7:42-44). The claims of the '227 patent are even broader and simply recite that a non-validated exercise use data is the data generated “in response to movement of the operating unit relative to the base and the sensor does not detect engagement of the user with the operating unit,” and validated exercise use data is the data generated “in response to movement of the operating unit relative to the base, and the sensor does detect engagement of the user with the operating unit.” (*Id.*, 8:1-8).

Looking elsewhere within other family members, the related '340 patent includes a claim 19 (dependent of claim 13) that recites “...wherein the reported exercise use data is defined as validated exercise use data.” (Ex. 1010, 10:37-38.) “The reported exercise use data” finds antecedent basis in Claim 13, which explains this simply as the exercise use data produced in response to detecting the user’s engagement with the operating member. (Ex. 1010, 10:1-12). While the “reporting” statement in claim 19 of the '340 patent is not part of the challenged claims of this Petition, all of the presented invalidity grounds also illustrate that the exercise use data obtained when user was detected to be exercising is also reported. (Rawls, ¶¶ 146-151.)

1[pre] “An exercise apparatus comprising:”

Morris disclosed an “exercise machine[] having user detection features” (Morris, [0002], Title, Abstract), where the exercise machine could be a treadmill. (*Id.*, [0007], Claim 29, Abstract, Fig. 1.) (Rawls, ¶ 152.)

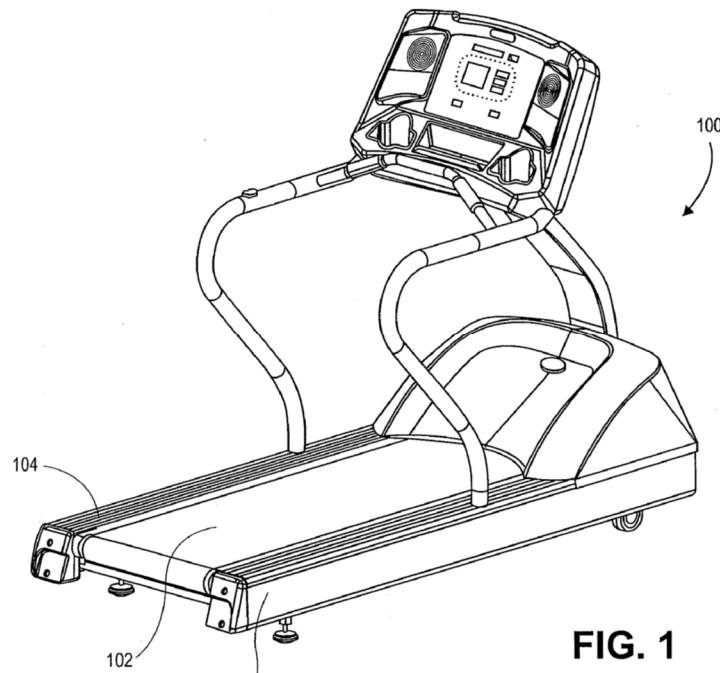


FIG. 1

1[a] “a base;”

Morris’ Figure 1 (above) clearly depicted a treadmill’s base 104 that included a “[d]eck 206 ...generally made of a sturdy material that can withstand the forceful impacts of runners and other users.” (Morris [0027], Fig. 2). The belt of the treadmill was positioned above the deck 206. (*Id.*) (Rawls, ¶ 153.)

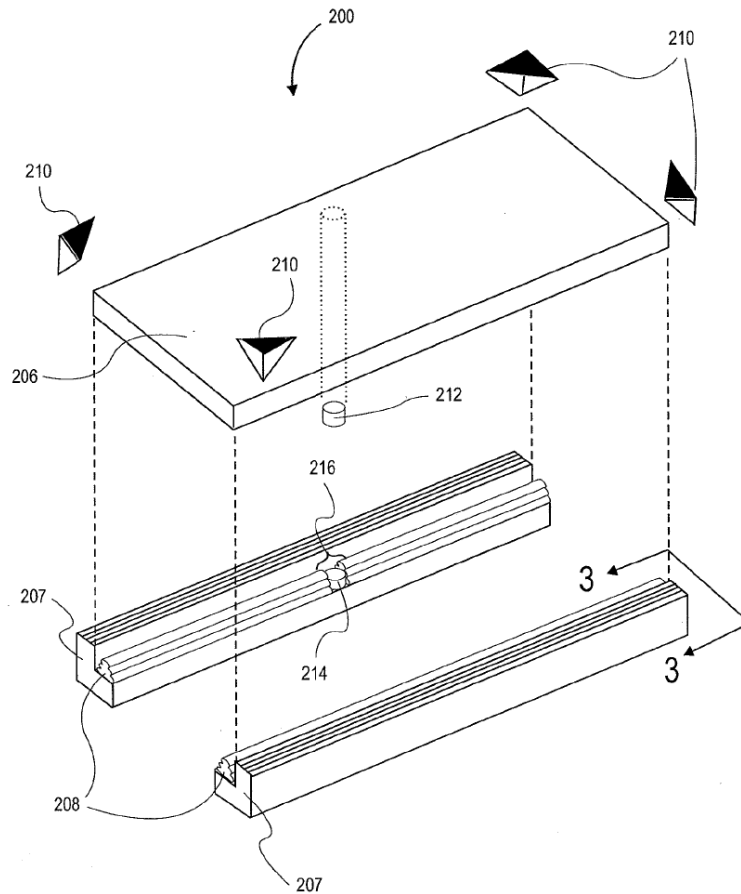
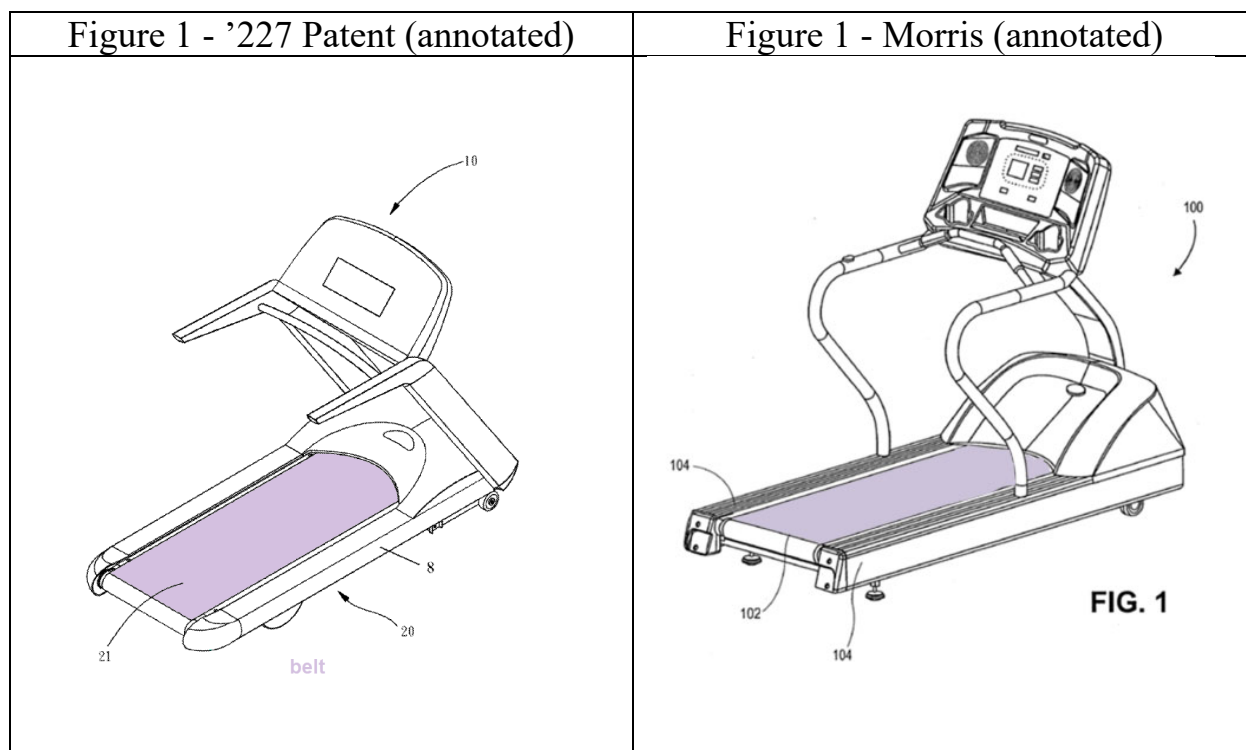


FIG. 2

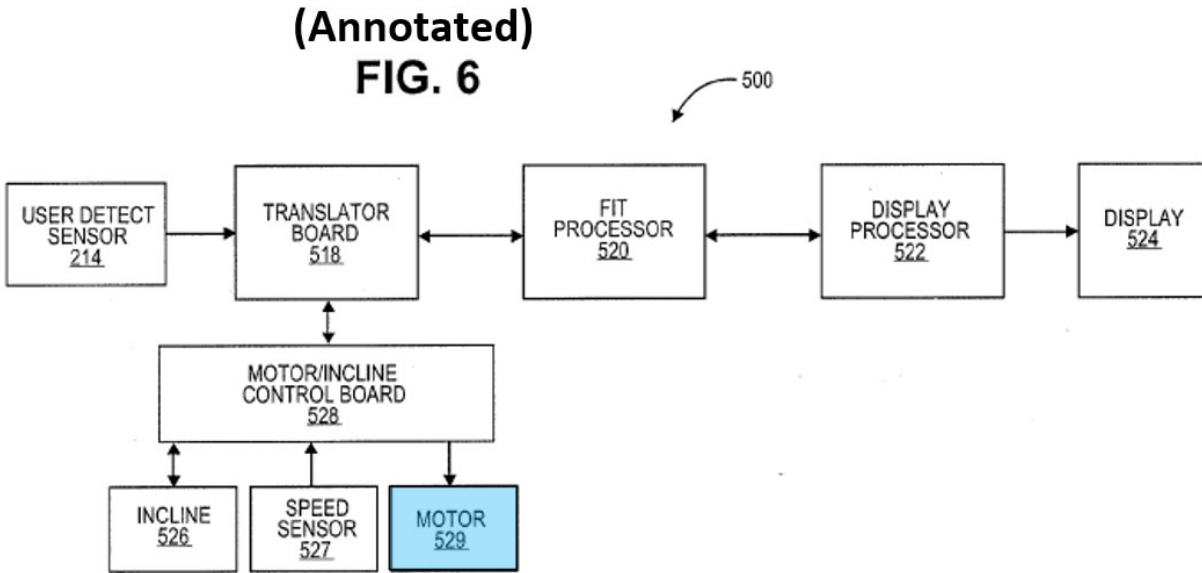
1[b] “an operating unit movable relative to the base;”

The '227 patent's operating member could be an endless belt (Ex. 1001, 2:64-67, 3:54-61.), and Morris disclosed a motor-driven endless belt 102. (See annotated Figure 1 (below) and Morris, [0025], explaining movement of the belt via electric motor.) Morris' “belt [was positioned] above the deck 206” (Morris, [0027]) that moved with respect to the stationary deck. (Rawls, ¶¶ 154-155.)



1[c] “a motor coupled to the operating unit;”

Morris disclosed a motor coupled to its belt (operating unit): “... slight vibrations in the treadmill caused merely by *electric motor driving the belt* may create small, “baseline” signals.” (Morris, [0031].) Morris further described a “motor feedback system capable of monitoring the incline and speed of a treadmill,” and drivers for its motor, including motor/incline control board 528 and motor driver 529, as shown in Figure 6. (*Id.* [0032]-[0033]). (Rawls, ¶ 156.)



1[d] “a sensor operable to detect engagement of a user with the operating unit;”

Morris disclosed a user detect sensor, such as a “*magnet and coil*, ... other magnetic sensors, *optical sensors* or the like.” (Morris, [0033].) For example, Morris described a reluctance sensor including magnet 212 and induction coil 214. (Morris, [0027], Figs. 3A-B.)

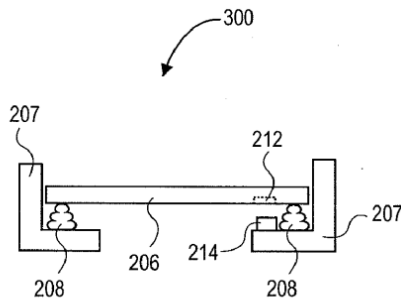


FIG. 3A

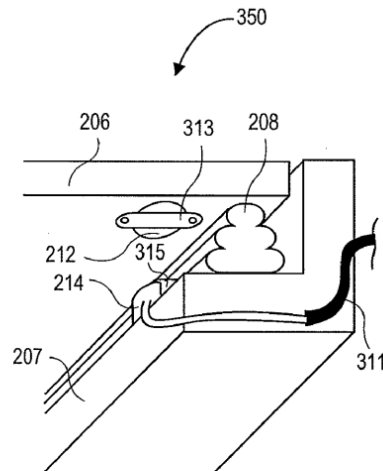


FIG. 3B

As the deck moved from a user's footfalls, the magnet's 212 corresponding movements induce a current in the induction coil 214 that is communicated through wire 311 to a processor, where the signals were used to determine whether a user was present. (Morris, [0027], [0031].) (Rawls, ¶¶ 157-158.)

Ray's Sensor: Ray also disclosed an optical sensor—a camera—and associated data processor that was connected to the exercise machine (Ray, 10:36-50), or could be implemented as part of the treadmill. (Ray, 9:55-57.) Ray's camera “record[ed] [] still or video image[s] or produce[d] a live feed of the . . . exercising user **20** *when movement [wa]s detected by the camera.*” (Ray, 13:20-24.)

Ray explained that:

For example, as long *as the exercise data 24 is being produced by the exercise machine 40*, the camera **32** can be instructed to capture the user's image every 10 minutes.

Therefore, *as long as the user 20 continues exercising, the camera 32 will continue to capture the user's image.*

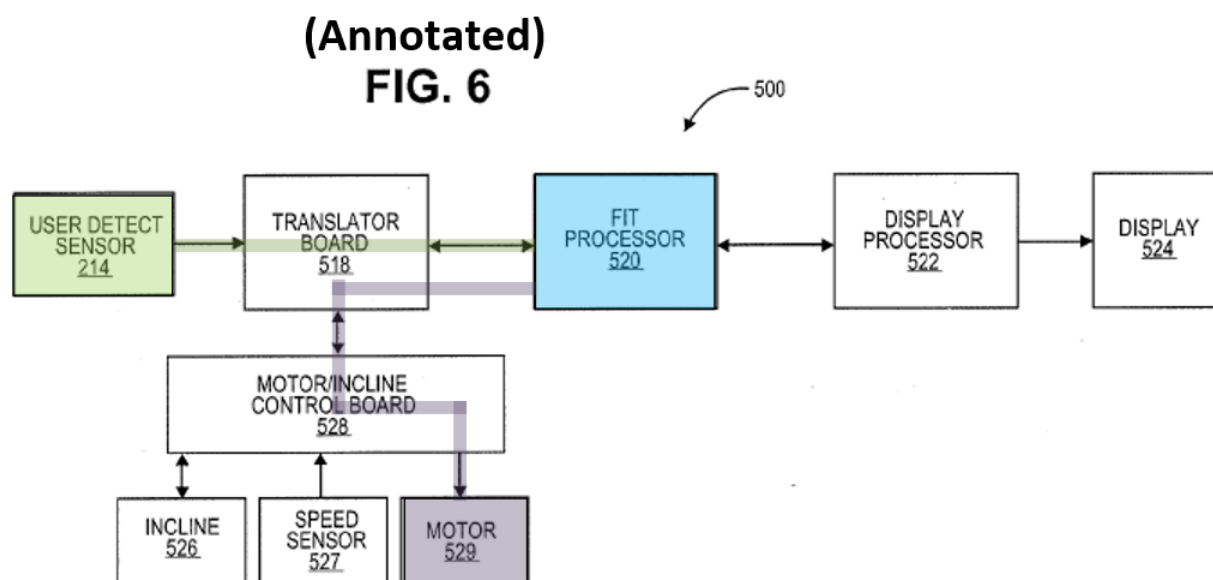
(Ray, 14:34-40, 10:59-64; *see also id.*, claim 1.) Ray's camera also detected when a user was on versus off the moving belt and disclosed that "as long as the treadmill is moving, the camera will operate to take their real-time image while exercising. If the user stops exercising, the camera will no longer record images." (Ray, 6:53-55.) Ray's camera determined a user's presence when "movement . . . (such as the user's shoulders moving up and down)" was detected, thus making clear that Ray's camera *is operable to detect engagement of a user with the operating unit.* (Ray, 14:6-14, 15:55-65.) Finally, Ray's camera could sense small changes in the user's facial color based on blood flow to obtain heart and respiratory rates of the exercising user. (Ray, 16:47-50.)

In the combination, Ray's camera and its analysis software would be combined with Morris' treadmill and augment the reluctance sensor, which provided detection signals indicative of the force exerted by the user on the treadmill as the user was walking or running on the treadmill. The data from the reluctance sensor would be used to accurately and realistically modify the user's virtual image based on the detected footfalls. A POSITA would have a reasonable expectation of success in making this combination because including multiple sensors in treadmills was a routine and well-known task. Additionally, using multiple sensors or sensor types is

consistent with the '227 patent's explanation of "a sensor" for detecting engagement of the user with the treadmill. (See., e.g., Ex. 1001, 5:34-50, 7:5-11 and Fig. 5, describing the sensor can include multiple pressure sensors, as well as optical sensors, current sensors, etc.; see also claim 13.) (Rawls, ¶¶ 159-162.)

1[e] "a controller in communication with the operating unit and the sensor; and"

Morris disclosed a "controller" in the form of a FIT (fitness) processor 520 that was in communication with the motor that drove the belt ("operating unit") and with the user detect sensor ("sensor"), as illustrated in annotated Figure 6.



In alternate mappings, the combination of translator board 518, FIT processor 520, and display processor 522, or the combination of translator board 518 and FIT processor 520, could form the claimed "controller" because Morris described that while those components could be implemented as "physically separate processors

and/or electronic boards, *one or more [of the translator board 518, FIT processor 520, and display processor 522] [could] be combined within single processor.*”

(Morris, [0035].) Combining different processors or implementing them as individual components was obvious and well-known. (Rawls, ¶¶ 163-165.) The mapping of the Morris FIT processor and/or the combination of multiple processors/control boards to the claimed controller is consistent with the ’227 patent’s examples of the controller that included “a microcontroller unit, at least one electronic circuit, and at least one circuit board ... [or] a computer processing system that includes a hardware assembly, a software assembly, and/or a firmware assembly.” (Ex. 1001, 4:14-24.)

Morris’ processor(s) communicated with the user detect sensor because “the user detection inductance coil 214 communicate[d] with the translator board **518**. The translator board **518** interpret[ed] the signals from the inductance coil **214** and forward[ed] them to the FIT processor **520**. The FIT processor 520 ... use[d] this indication to help control a workout program.” (Morris, [0036].) Morris’ processor(s) also communicated with the treadmill belt (operating unit) because it “communicate[d] a signal to the translator board **518**, which in turn communicate[d] signals that cause[d], for example, a treadmill belt drive to slow the treadmill belt and the incline motor to lower the incline.” (*Id.*; see also *id.*, Claims 24 and 32.) (Rawls, ¶ 166.)

1[f] “a communication interface in communication with the controller;”

The '227 patent broadly describes the communication interface as a way to provide exercise data to another device such as to “an outside storage device such as a flash drive, a disk rewriter or a website storage.” (Ex. 1001, 7:64-65, 6:19-22.) The communication interface can also be “an Internet interface, such as a Wi-Fi internet module or an internet port” (*Id.*, 6:40-43.), or can be “programmed or incorporated into the controller **40** such that controller **40** performs the functions associated with the communication interface.” (*Id.*, 6:50-54.) The communication interface can also be a display device. (*Id.*, 6:9-13.)

Consistent with the above, the Morris-Ray combination described a communication interface that provided the exercise use data to a display, to a memory device, to a remote cloud-based server, and/or to a remote location via a live feed.

Specifically, Morris disclosed a communication interface in the form of (1) a display device 524 and/or (2) a display processor 522 which communicated with the display device 524. (Morris, Figs. 6, 11, 12A-12C.) Morris' display processor could be a separate component from its FIT processor or could be combined with it. (Morris, [0035].) The display processor could “command the display **524** to display indications of the presence or absence of a user” (Morris, [0036]), and could include “a television interface, a display interface, an iPod®” and the like. (Morris, [0035].)

The display could be an LCD, a plasma or a touch screen, and the like. (*Id.*; see also *id.*, [0023]-[0024], Figs. 11 and 12A & C.) (Rawls, ¶¶ 167-169.)

Ray's Communication Interface: Similarly, Ray disclosed (1) a display (Ray, Figs. 1-3, 12:59-67, 13:50-54), which could be integrated into the treadmill (Ray, 9:55-57), (2) a communication interface that allowed the user's motivational image and other exercise data to be transmitted over the Internet, e.g., via a live feed to a remote location (*id.*, 3:46-51, 6:67-7:10, 8:1-10, 13:65-67) and/or (3) a communication interface that allowed exercise data to be sent to a storage device such as cloud-based server. (Ray, 3:46-51, 5:65-6:5, 7:4-10.) Ray's Figure 3 further illustrated a specific embodiment, in which the treadmill had an "interface 55" for transmitting exercise data to another device. (Ray, 13:31-36.) (Rawls, ¶¶ 170-171.)

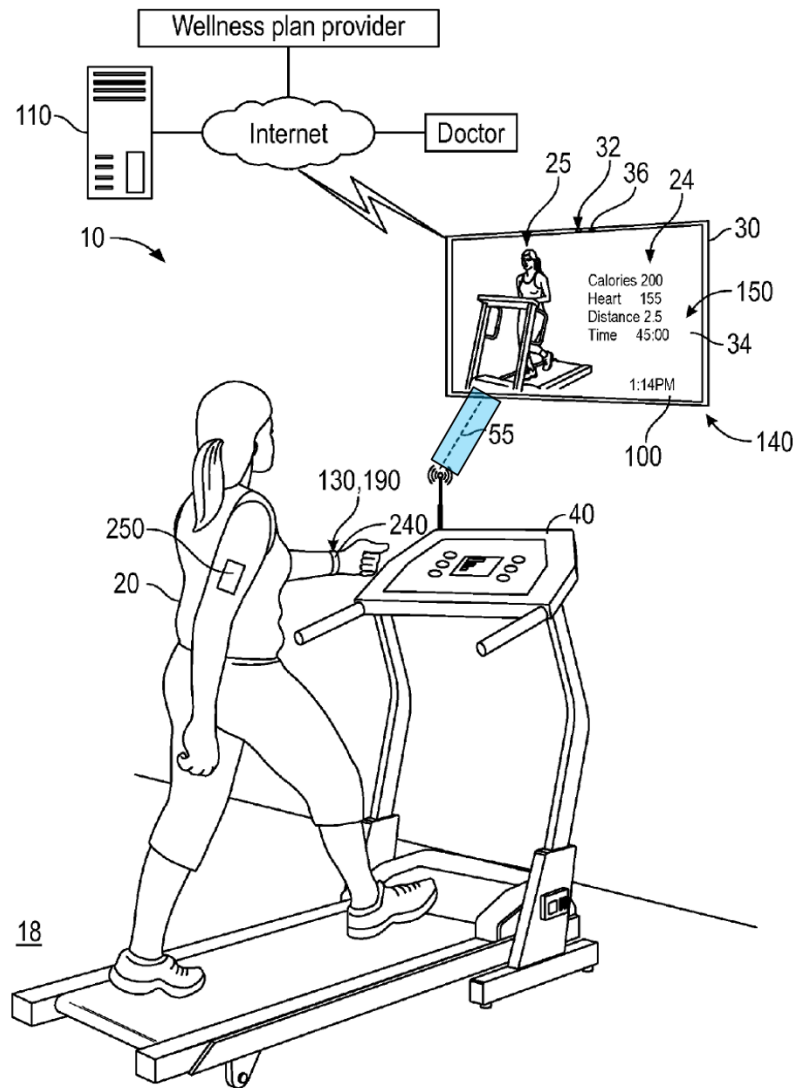


FIG. 3
(Annotated)

The various communication interfaces in Ray's, to the extent they did not overlap with Morris', could be readily implemented in Morris' treadmill, well within the capabilities of a POSITA. (Rawls, ¶¶ 144, 189.)

Accordingly, any one or combinations of the above constituted the claimed communication interface. The communication interface was in communication with

the controller because it received the generated exercise data from, and under the control of, the controller in order to transmit to a storage device and/or to a third party via a live feed. (Rawls, ¶ 172.)

1[g] “wherein the controller is configured to generate a non-validated exercise use data in response to movement of the operating unit relative to the base and the sensor does not detect engagement of the user with the operating unit,”

1[h] “wherein the controller is further configured to generate a validated exercise use data in response to movement of the operating unit relative to the base and the sensor does detect engagement of the user with the operating unit, and”

Limitation 1[g] and 1[h] are addressed in reverse order.

Morris and Ray taught limitation [1h]. Specifically, Morris explained that “exercise equipment may present information to a user through a display” (Morris, [0050]), showing exercise use data including “information such as *pace*, heart rate (when available), incline, *distance*, program profile, and/or the like.” (Morris, [0051]; see [blue annotations](#) in Figure 11.)

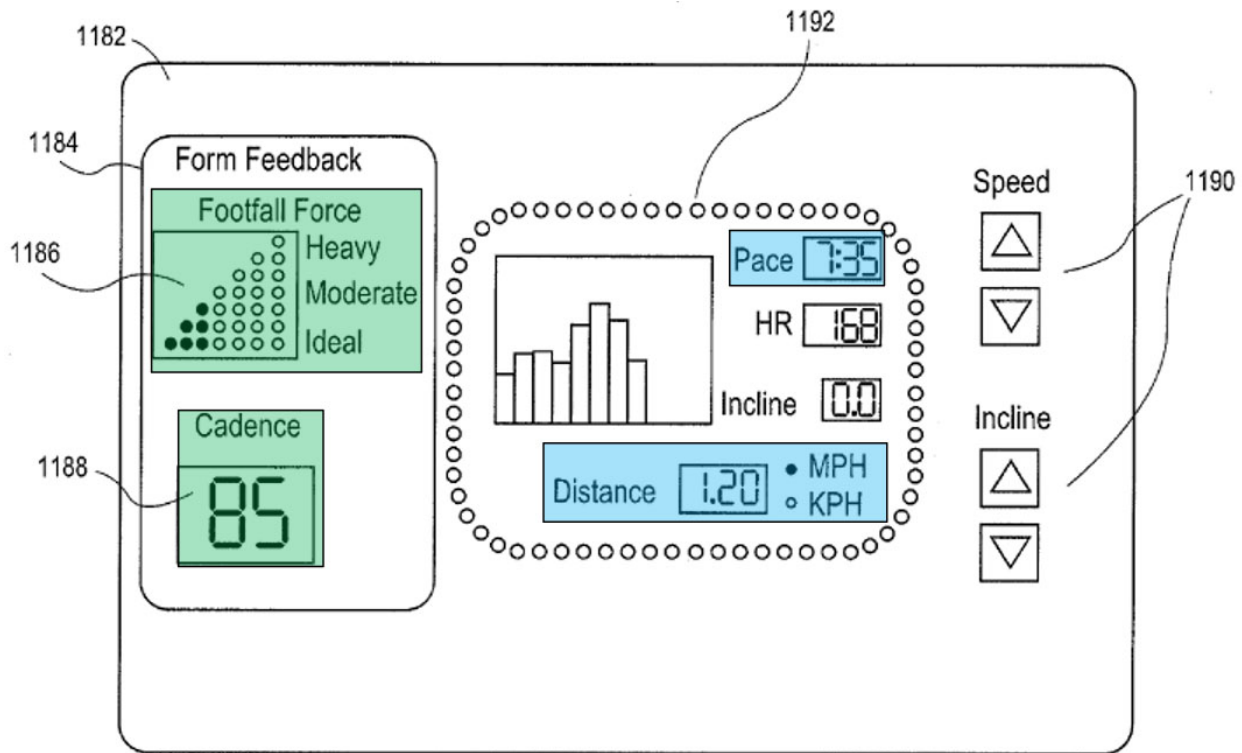


FIG. 11
(Annotated)

Morris additionally described generating and displaying exercise use data such as a *footfall force* represented on a “force graph 1186 [that] include[d] one or more indications of force, such as increased bar length of the graph, color changes, and the like for heavier footfall forces ...[and] *a user’s cadence—generally expressed as steps per minute...* measured based on the detection of each impact over a period of time.” (Morris, [0053]; see **green annotations** in Figure 11.)

Morris explained that “user detection sensor readings [were] evaluated more often *while the treadmill belt [wa]s moving.*” (Morris, [0040].) Therefore, a

POSITA would have understood that the exercise use data obtained from the sensor readings were generated while the belt (operating unit) was moving, and reported out to the treadmill screen. (Rawls, ¶¶ 174-176.) A POSITA would have also found this obvious because information such as pace and the user's cadence were tied to the time spent, or the distance traveled, while the user was exercising on a moving treadmill, and were therefore validated exercise use data generated and reported while user was engaged with the treadmill as the tread's belt was moving. (Rawls, ¶ 176.)

Ray's Validated Exercise Use Data: While Morris explained that exercise use data was produced while the user engaged with the treadmill, Ray made it explicit that validated exercise use data would only be produced while the user was being detected exercising. Notably, Ray disclosed generating, transmitting, and displaying exercise data 24, such as calories, heart rate, distance and time. (Ray, 5:46-48, 10:64-67, 13:31-36; see also **blue highlights** in annotated Figure 1.) Ray, for example, explained “[i]n addition to seeing her image, she [could] also view on the display her exercise data such as heartrate, calories burned and distance advanced.” (Ray, 5:46-48.)

Ray's exercise use data further included a virtual image² of the user which was generated and displayed in real time on a screen when the user used the treadmill (*id.*, 4:66-5:11), and became “thinner, healthier, and more aesthetically pleasing.” (*Id.*, 5:41-46; see also **green highlights** in annotated Figure 1.) The image was thinned based on the intensity, speed and/or duration of the user's workout. (*Id.*, Abstract, 5:44-46, 5:23-29, 10:59-67.)

² Consistent with Ray's user image, the '227 patent explained its exercise use data can be “a multimedia content, such as an image and/or a sound.” (Ex. 1001, 6:25-29.)

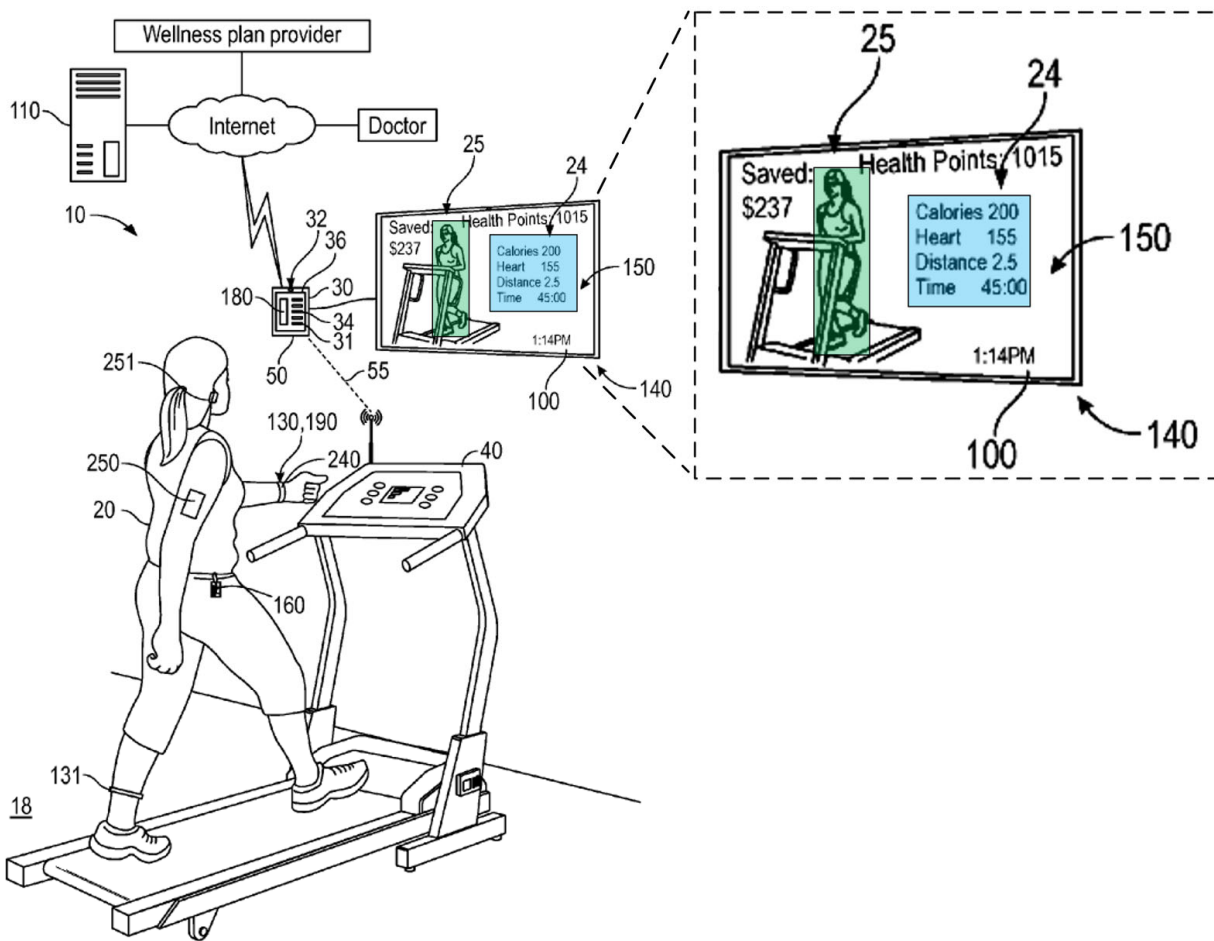


FIG. 1 (Annotated and Display Area Enlarged)

Ray described that the user's thinner/healthier-looking image was generated in *real time* by a computer system, was produced *via the treadmill interfacing with the computer system* and was displayed on the screen *as the user was exercising*. (Ray, 4:67-5:14, 5:23-29, 10:59-67.) For example, Ray explained that the movement of the treadmill could trigger the camera's operation: "the exercise machine 40 indicated movement thereof at the interface 55 with the electronic device 30, resulting in the set of instructions causing the camera 32 to periodically take a

photo.” (Ray, 14:7-11; see also *id.*, 6:54-56: “***as long as the treadmill is moving*** the camera will operate to take their real-time image while exercising.”)

Therefore, it would have been obvious to a POSITA that the user’s image on a treadmill, which changed in real time based on the intensity/speed of a user’s exercise, would be generated when the treadmill’s belt (operating unit) was moving. Additionally, a POSITA would have understood or found it obvious that Ray’s other types of exercise information such as time and distance, would be generated while the treadmill belt (operating unit) was moving, and the exercising user was being detected. (See, e.g., Ray, 13:24-30; “transmit to the server ... ***the time 140 and duration of the exercise performed by the user 20;***” see also, *id.*, 5:45-48: “[i]n addition to seeing her image, she can also view on the display ***her exercise data such as heart rate, calories burned and distance advanced.***”) (Rawls, ¶¶ 177-179.)

In the Morris-Ray combination, the controller would have been configured to detect the user’s presence using a camera (sensor) as described in Ray. The camera, according to Ray, detected a user on the moving belt (operating unit) when, for example, it sensed a user’s shoulders moving up and down (Ray, 14:6-14), and/or by taking real time images of the user “***as long as the treadmill [wa]s moving.***” (*Id.*, 6:53-55.) Ray further explained “***[i]f the user stop[ped] exercising, the camera w[ould] no longer record images.***” (Ray, 6:55-57.)

Accordingly, a POSITA would have understood that Ray's exercise use data (motivational image and other exercise data) was validated exercise use data because it was produced in response to detecting an exercising user on the treadmill and the movement of the belt. The validated exercise use data was also reported (e.g., to the doctor or wellness trainer in real time) (Ray, 5:49-51, 7:4-10, Figs. 1-3) or for storage to a remote server (Ray, 3:47-51, 7:4-10, 8:1-8, Figs. 1-3.) (Rawls, ¶ 180.) Once the user was no longer exercising on the treadmill, the generation and reporting of the user's image would have stopped. (Ray, 6:55-57.)

In addition, Ray also explained that “[u]sing the *validation process* of the invention, the patient's identity *and exercise routine are confirmed* simultaneously.” (Ray, 8:26-28; *see also, id.*, 13:24:30.) Therefore, Ray provided an additional level of validation of the exercise use data based on validation of the identity of the user. (Rawls, ¶ 181.)

As explained above, Morris and Ray both described generating data related to the exercise session of the user on the treadmill, including distance, pace, footfall force, cadence, time, and a user's virtual image, any one or any combination of which can be construed as exercise use data. (Rawls, ¶¶ 181-182.) Accordingly, generating and reporting the user's thinning image while the exercising user was being detected and stopping the reporting of the user's virtual image in the absence

of the user, as explained above, suffices to render obvious generation of “validated exercise use data,” as required in limitation 1[h].

Additionally, it would have been obvious to a POSITA that other exercise use data, such as pace, footfall force, cadence, distance, and/or time would also be reported while the exercising user was being detected and some or all of those additional exercise use data would cease to be reported when the user was no longer exercising. For example, pace, footfall force and cadence could only be generated based on detection of the user’s footsteps, which would no longer be generated in the absence of the user, and the reporting of other information such as time and distance would have been unnecessary as the user had finished exercising, or had left the premises. (Rawls, ¶ 183.)

Limitation 1[g] - Non-Validated Exercise Use Data:

As an initial matter, this limitation was already known and admitted prior art. (See limitation 1[g] in Section VI.C.1, *infra*.)

Nonetheless, in the Morris-Ray combination, Morris taught or suggested this limitation because it explained that “when a user [could] not be detected” (Morris, [0045]) and failed to return within a period of time, such as approximately 6-8 seconds, a ***controlled slowdown*** of the treadmill was triggered. (Morris, [0045], Fig. 8, steps 850-860; see also *id.*, [0008]: “In an embodiment, these signals [could] be used to pause or stop a treadmill, for example, ***when a user departs without stopping***

the belt of the treadmill. These signals [could] also be used to *power down a machine after a user has been gone for a certain period of time.*”). During the interim period when the treadmill was running without a user, Morris explained that a user return message was displayed to ask the user to please return to the treadmill. (Morris, [0045].)

It would have been obvious to a POSITA that, in the Morris-Ray combination, for at least the duration of before slowdown was initiated, exercise information that did not depend on the user’s presence (e.g., time), would be generated in the absence of the user. This information, which was generated while the user was not being detected, would be non-validated exercise use data and would not be reported (e.g., as part of the live feed to the user or the doctor), and would not be subject to Ray’s identity verification. It would have been obvious that the treadmill would continue generating and displaying such non-validated information (e.g., for 6-8 seconds) prior to slowdown of the treadmill because it would have alerted the user that the treadmill is still running (e.g., a safety feature) and would have allowed reporting of the information to be readily resumed without further delay upon the user’s return (e.g., efficiency feature). (Rawls, ¶¶ 184-186.)

Additionally, continuing or not continuing to generate some exercise use data was one of two known options, and therefore picking one or the other would have been obvious. (Rawls, ¶ 187.)

1[i] “wherein the controller transmits the validated exercise use data to the communication interface.”

Ray disclosed this limitation by explaining that the virtual image was sent out as a live feed to third parties such as insurance programs, trainers, and physicians. (Ray, 3:46-50, 5:49-51, 7:4-10, 7:15-22, 7:23-36, 13:7-9.)

In the Morris-Ray combination, Ray’s features that enabled transmission of the validated exercise use data would be incorporated into Morris’ system, e.g., as part of the communication interface, such as the display processor or an additional transceiver, allowing the data to be transmitted to a third party, such as via a live feed to the doctor. In fact, by 2014, providing data transmission capabilities to a remote location in electronic devices and exercise equipment was a well-known and routine task, and obvious to a POSITA. (Rawls, ¶¶ 188-189.)

3. Claim 2

“...wherein to generate the validated exercise use data the controller records the non-validated exercise use data as validated exercise use data for a portion of time that the operating unit moves relative to the base and the sensor does detect engagement of the user with the operating unit.”

As explained in claim 1, it would have been obvious that the treadmill in the Morris-Ray combination would generate certain data, i.e., data non-user related information (e.g., time), even when the user was not being detected, in anticipation of user’s return to the treadmill. Therefore, information generated by the exercise

machine (e.g., elapsed time) or obtained by the camera (e.g., pictures of stationary user, user's heartrate obtained via the camera while user is not moving (Ray, 15:47-41)) while the user was not exercising would not be reported and would be non-validated exercise data. (Rawls, ¶ 190.)

Ray explained that its camera would be triggered based on the movement of the exercise machine (Ray, 14:6-11), and would continue recording, generating and transmitting the motivational image as long as the user was detected exercising on the treadmill. (Ray, 14:11-14, 14:35-40.) Therefore, a POSITA would have found it obvious that, upon a determination that captured image(s) indicated a user was present and exercising (as also confirmed by Morris' reluctance sensor), the user's virtual images and associated exercise data would be recorded (e.g., at the cloud-based server or sent in real time to the doctor (Ray, 7:4-10, 8:1-8)), and would thus be validated exercise use data.

For example, a POSITA would have understood that for the duration of, e.g., 6-8 seconds (Morris, [0045]), the exercise use data would be non-validated data that is not recorded or reported to the doctor; once the user returned (prior to expiration of the 6-8 second time period) and for the duration of the exercise by the user, the exercise use data would be validated exercise use data because it would be recorded and/or reported out, as explained in Ray. This process could continue

every time the user left the treadmill and returned within the prescribed period of time. (Rawls, ¶¶ 191-192.)

4. Claim 3

“...wherein the validated exercise use data includes a distance traveled by the user while the sensor detects engagement of the user with the operating unit.”

Ray disclosed that when a user was exercising on a treadmill, the user could “view on the display her exercise data such as heart rate, calories burned and **distance advanced.**” (Ray, 5:46-48, 10:64-67, 13:31-36, Figure 1; see also limitation 1[h], *supra*.) Morris also disclosed exercise data, including distance traveled, would be presented to the user. (Morris, [0051], Fig. 11; see limitation 1[h], *supra*.) It would have been obvious to a POSITA that the distance traveled would be validated exercise use data because such information would be captured during the time the user was being detected exercising.

Further, Ray described that distance was one of several exercise data that was displayed on the screen when the user was exercising, along with time, heart rate and calories, and further described that “time” was generated and reported as a “validated exercise use data” to a third party. (See claim 4, *infra*.) Therefore, it would have been obvious to a POSITA that “distance” that was listed alongside “time” (see annotated Figure 1 below) would also be exercise data that was collected during the user’s exercise and reported to a third party, such as a doctor. (Rawls, ¶¶ 193-194.)

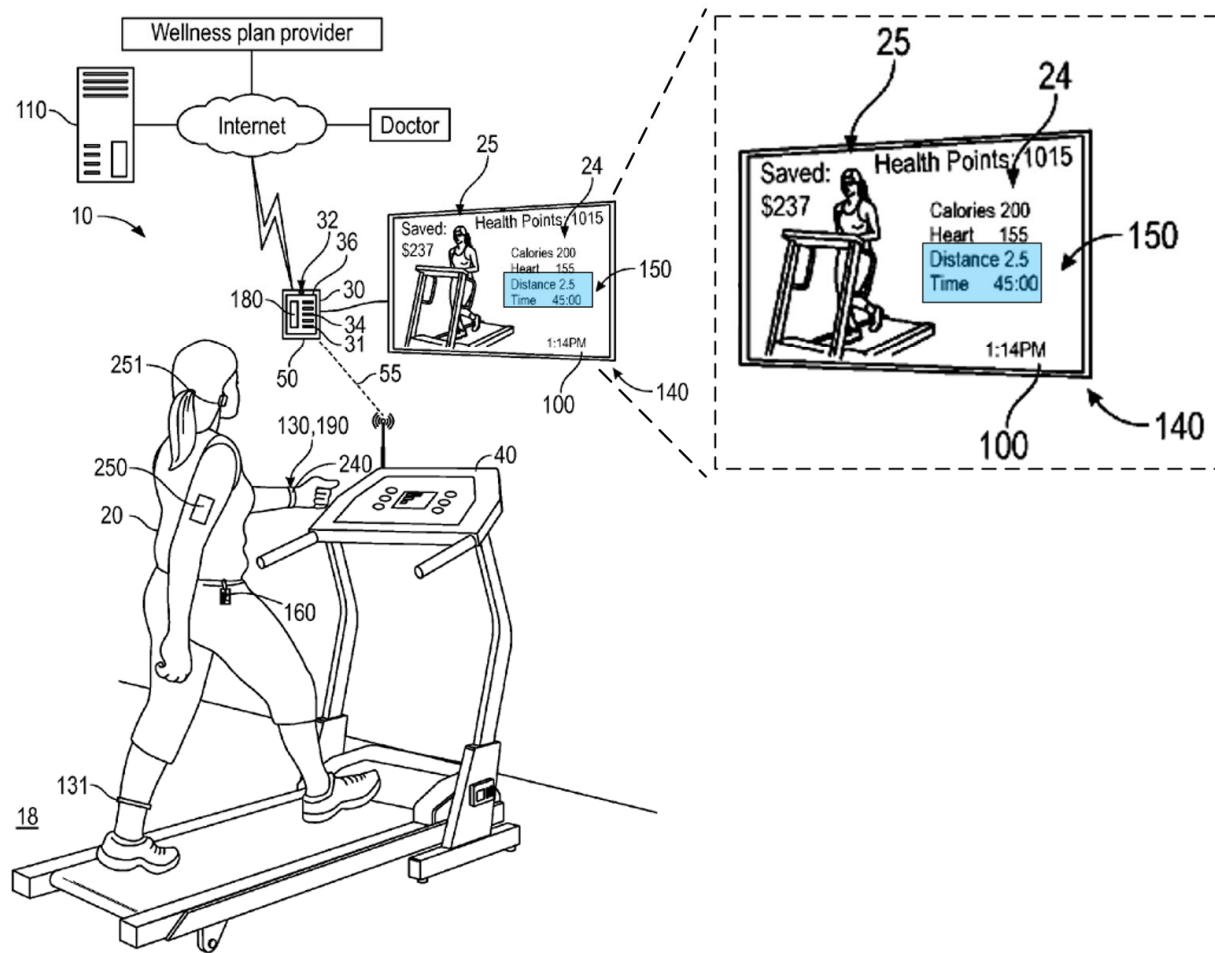


FIG. 1 (Annotated and Display Area Enlarged)

5. Claim 4

“...wherein the validated exercise use data includes a time spent exercising while the sensor detects engagement of the user with the operating unit.”

Ray taught or suggested this claim because Figure 1 of Ray (annotated above) showed time spent exercising was part of the exercise data displayed on the screen while the user was exercising (Ray, 5:46-48) and explicitly stated that, along with identity of the user, *“the time 140 and duration 150 of the exercise performed by*

the user 20” were transmitted to the server and/or reported to the doctor, wellness program, and the like. (Ray, 13:24-30.)

It would have been obvious to a POSITA that “the duration of the exercise performed by the user” was part of the validated exercise use data because it was detected while the user was engaged with the treadmill as detected and confirmed via images of the exercising user, and reported along with identity of the user. (Rawls, ¶¶ 195-196.)

6. Claim 5

“...wherein the communication interface is an internet interface for transmitting the validated exercise use data to a website storage device.”

Ray’s Figures 1 and 2 illustrated its electronic device communicated with the internet, and explained that its electronic device had “at least periodic access to the Internet or other large area network.” (Ray, 12:61-64.)

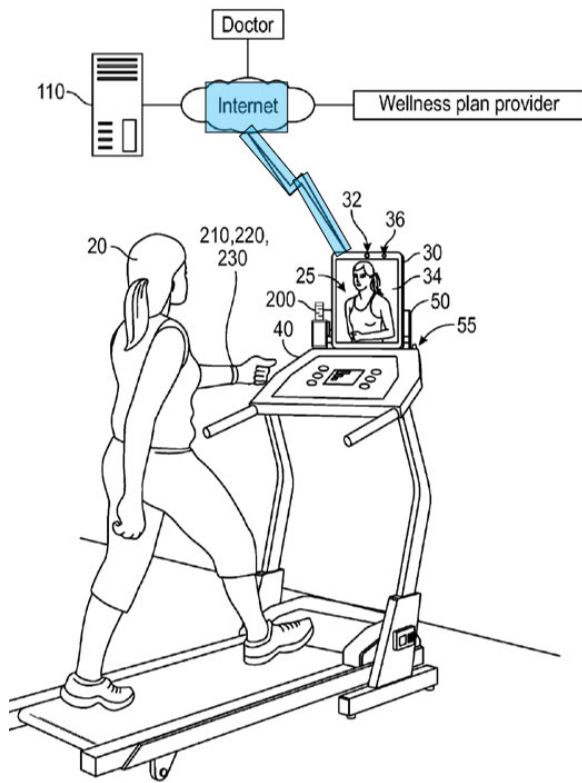


FIG. 2 (Annotated)

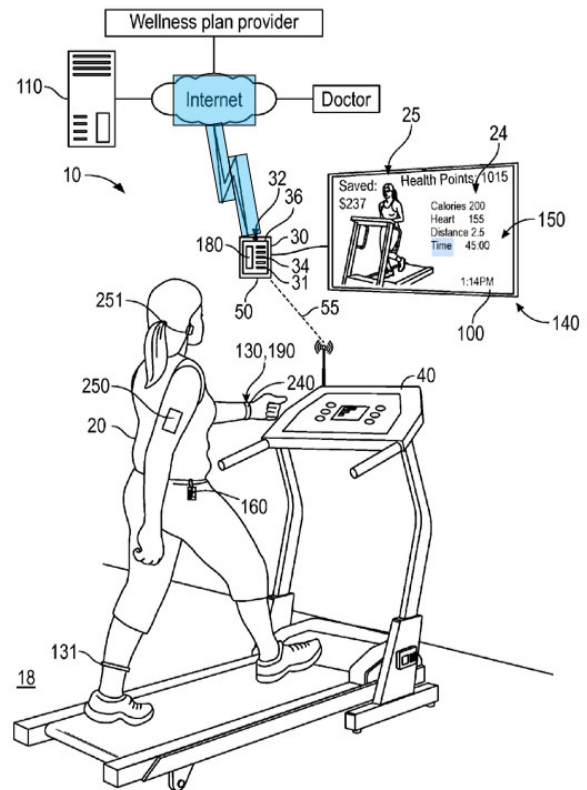


FIG. 1 (Annotated)

Ray’s camera could also “record a still or video image or produce a live feed of the patient or exercising user **20** when movement is detected by the camera **32**,” (Ray, 13:20-24), and such a live feed could be “through the use of technology similar to Skype” (Ray, 6:67-7:3) or Face Time (Ray, 5:5-7), which used the internet.

A POSITA would have understood that the communication interface in the Morris-Ray combination could be “easily and affordably” modified to incorporate internet communication capability that was described in Ray. (Ray, 9:55-57; Rawls, ¶¶ 197-199; see also limitation 1[i], *supra*.)

Website storage device: According to Ray, a user's exercise and identity data was stored on "remote server such as a cloud-based server in order to obtain such data at any time or location." (Ray, 7:4-10.) It would have been obvious to a POSITA that a remote/cloud-based server accessible via the internet would be a "website storage device." (Rawls, ¶ 200.)

7. Claim 6

"...wherein the communication interface is a display device for directly showing the validated exercise use data to the user."

See limitation 1[f], *supra*, explaining that Morris disclosed a display device 524, and so did Ray. The display showed validated exercise use data as illustrated in annotated Figures below. (Rawls, ¶ 201.)

(Annotated)
FIG. 6

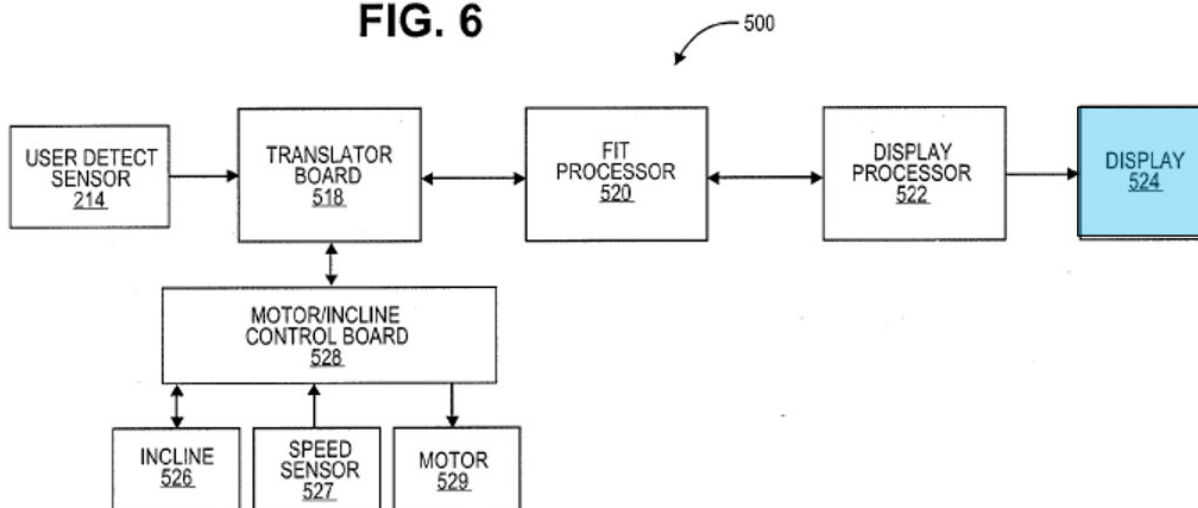
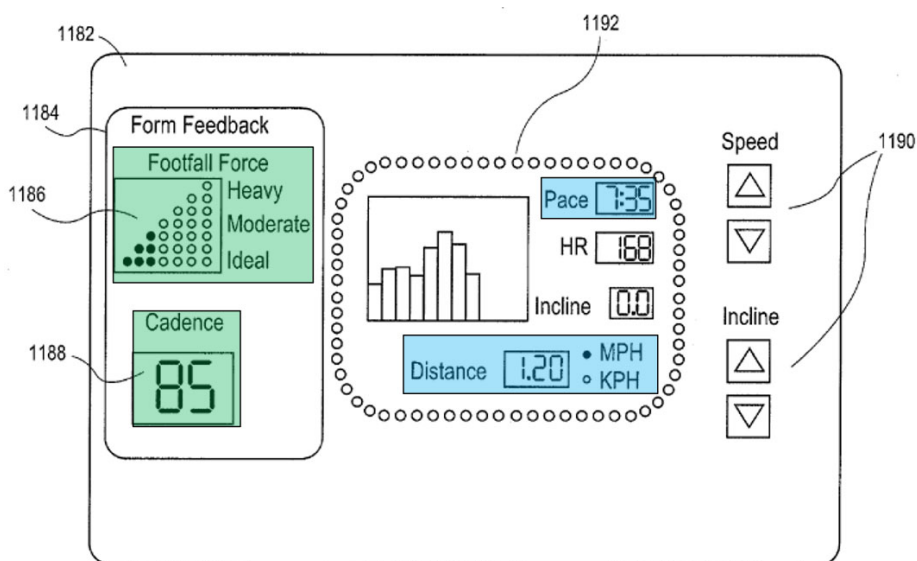


FIG. 11
(Annotated)

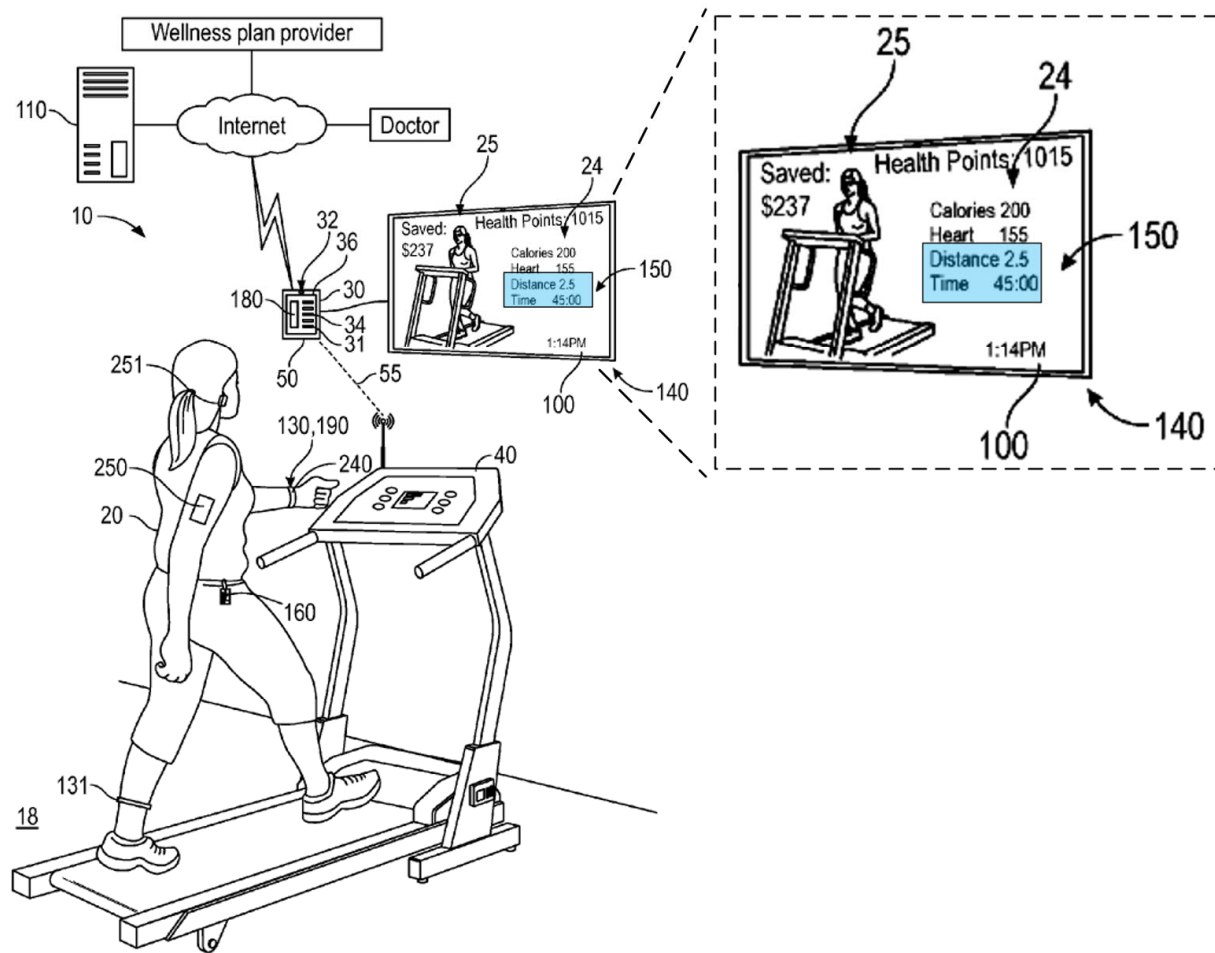


FIG. 1 (Annotated and Display Area Enlarged)

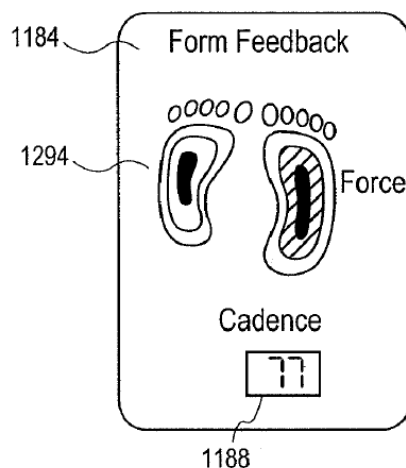
8. Claim 7

“...wherein the sensor includes a pressure sensor, and wherein the controller is configured to analyze data from the pressure sensor to ascertain whether the user is engaging the operating unit.”

Morris rendered this claim obvious. Morris’ reluctance sensor included a magnet and a coil, which produced a varying current in response to sensing the force exerted by the “user’s footfalls or shifts in weight.” (Morris, [0027]; *see also id.*, [0055] and Fig. 11’s force map displaying how the magnitude of the force exerted

by the user's footsteps changed based on differing amounts of force; *id.*, [0047], explaining that signals from the reluctance sensor can be interpreted to make a binary determination of presence or absence of the user.)

FIG. 12B



A POSITA would have found it obvious that Morris' reluctance sensor was a force or a pressure sensor that detected the presence of the user by analyzing the sensor's output signals. As Mr. Rawls explains, pressure and force are related entities and pressure is defined as force per unit area ($P=F/\text{in.}^2$). Therefore, measurement of one entity could have easily produced the other entity. (Rawls, ¶¶ 202-204.)

In the Morris-Ray combination, Morris' user detection mechanism based on reluctance sensors would be augmented with Ray's detection system that used a camera. The two techniques were complementary, and each provided unique

capabilities. Notably, Morris' reluctance sensor produced useful information about the footfall differences and the user's gait (Morris, [0009]), while Ray's video-based detection allowed presentation of the user's thinning image as the user exercised. (Ray, 5:40-46.) Ray, for example, explained that the more intensely the user exercised, the thinner the motivational image would appear. (*Id.*) It would have been obvious to a POSITA that the two user detection techniques in the Morris-Ray combination would be used collectively because they would have improved the detection confidence and provided additional advantages. For instance, Morris' reluctance sensor could provide information about the force of impact of the user's footfall (Morris, [0051]), which would have allowed an accurate determination of how intensely the user exercised; this in turn would have allowed the motivational image to be thinned more realistically based on the actual intensity of the footfalls measured by the reluctance sensor. (Ray, 5:41-45; Rawls, ¶¶ 142, 205-206.)

9. Claim 8

“...wherein the operating unit includes an endless belt that defines a user contact surface, and the pressure sensor is configured to detect an amount of pressure on the user contact surface.”

See claim limitation 1/[b] and claim 7, *supra*, explaining that Morris' operating unit included an endless belt, defining the surface on which the user walked on.

As illustrated in Figures 3A-B and 4, Morris' reluctance sensor was connected to, and positioned, below the deck 206 and sensed the user's footfalls (Morris, [0028]-[0029]) "when his or her feet impact[ed] the belt above the deck 206." (Morris, [0027].) The positions of the deck 206, the sensor (magnet 212 and coil 214) and the belt are annotated in Figure 3A below, illustrating that Morris' sensor detected signals corresponding to the user's foot force/pressure when the user walked on the belt on top of deck 206. (*See also*, Morris, [0027]: "As the deck moves slightly from a user's footfalls or shifts in weight, the magnet's **212** corresponding movements induce a current in the induction coil 214.") (Rawls, ¶¶ 207-208.)

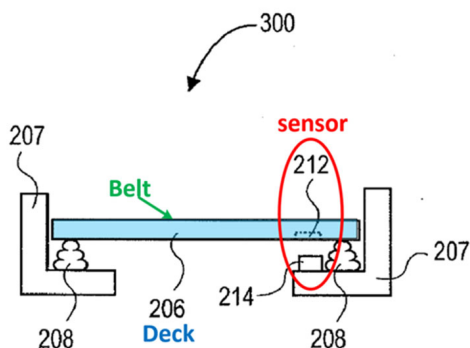


FIG. 3A
(Annotated)

10. Claim 9

"...wherein the pressure sensor includes a plurality of sub pressure sensors."

Morris described using multiple reluctance sensors on the treadmill to, for example, detect differences between the force (or equivalently pressure) exerted by the left and the right footsteps (Morris, [0055]) and/or to provide indications if the user was bouncing from side to side or the like. (Morris, [0056].) (Rawls, ¶ 209.)

11. Claim 12

12[pre] “a motorized treadmill comprising:”

See claim limitations 1[pre] and 1[c], *supra*.

12[a] “a base;”

12[b] “an endless belt movable relative to the base;”

12[c] “a motor operably coupled to the endless belt;”

12[d] “a sensor configured to detect engagement of the endless belt by a user; and”

See claim limitations 1[a]-1[d], *supra*, respectively.

12[e] “a controller configured to record validated exercise use data in response to the sensor detecting of engagement of the endless belt by the user,”

See limitation 1[h], *supra*. Ray rendered this limitation obvious because it described transmitting and storing (recording) the validated exercise use data to remote location, such as a cloud-based server. (Ray, 7:4-10, 8:1-8, 13:6-30.)

12[f] “the validated exercise data including an amount of user exercise time, the amount of user exercise time being generated by an amount of time that the sensor detects engagement of the endless belt by the user,”

See claim 4, *supra*.

12[g] “wherein the sensor includes a pressure sensor configured to detect an amount of pressure on a portion of the endless belt and generate a pressure data, and the controller is configured to analyze the pressure data to detect engagement of the endless belt by the user.”

See claims 7 and 8, *supra*.

12. Claim 14

14[pre] “An exercise apparatus comprising:”

14[a] “a base;”

14[b] “an operating unit movable relative to the base;”

14[c] “a motor coupled to the operating unit;”

14[d] “a sensor operable to detect engagement of a user with the operating unit;”

14[e] “a controller in communication with the operating unit and the sensor; and”

14[f] “a communication interface in communication with the controller,”

See limitations 1[pre]-1[f], *supra*.

14[g] “wherein the controller is configured to generate a validated exercise use data in response to the operating unit moving relative to the base and the sensor detecting engagement of the user with the operating unit, and wherein the controller transmits the validated exercise use data to the communication interface.”

See limitation 1[h] and 1[i], *supra*.

13. Claim 15

“...wherein to generate the validated exercise use data the controller records a non-validated exercise use data as validated

exercise use data for a portion of time that the operating unit moves relative to the base and the sensor detects engagement of the user with the operating unit.”

See claim 2, supra.

14. Claim 16

“...wherein the validated exercise use data includes a distance traveled by the user while the sensor detects engagement of the user with the operating unit.”

See claim 3, supra.

15. Claim 17

“...wherein the validated exercise use data includes a time spent exercising while the sensor detects engagement of the user with the operating unit.”

See claim 4, supra.

16. Claim 18

“...wherein the communication interface is an internet interface for transmitting the validated exercise use data to a website storage device.”

See claim 5, supra.

17. Claim 19

“...wherein the communication interface is a display device for directly showing the validated exercise use data to the user.”

See claim 6, supra.

18. Claim 20

“...wherein the sensor is one of a current sensor, an optical sensor, a pressure sensor, and a thermal sensor.”

Ray described using an optical sensor in the form of a camera. See claim limitation 1[d], *supra*.

B. Ground 2: Claims 10-11, 13, and 20 are Obvious over Morris, Ray, and Cox.

1. Motivation to Combine

See Section IV.A.1, *supra*. A POSITA would also be motivated to combine the teachings of Morris, Ray and Cox. Like Morris and Ray, Cox related to an exercise apparatus—specifically a treadmill—that included sensors that gathered data concerning a user’s fitness and therapy, analyzed that data and provided feedback on their gait, flexibility, mobility, strength, and balance. (Cox, Abstract, 2:65-3:9.) Like Ray, Cox was concerned with detecting a user on a treadmill—by analyzing variations in the current of the tread motor (Cox, 5:33-38)—and providing feedback to the user, as well as reporting exercise data to insurance companies. (Cox, 2:56-3:9, 3:30-37; Ray, 9:27-47.) Both Ray and Cox, therefore, were directed to the same goal of providing feedback to a user to improve their exercise regimen, and their combination would have augmented the treadmill’s functionalities with known features yielding predictable results. (Rawls, ¶¶ 232-233.)

A POSITA would be motivated to combine Morris, Ray and Cox because they would recognize that Cox's current sensor can be used to provide an improved motivational image to the user of the exercise apparatus disclosed in Ray and Morris, including an image that can help correct and improve a user's exercise form. Apart from camera 32, Ray disclosed the benefits of other sensors, such as a stretch resistance foot band sensor, to gather data, which was then analyzed by electronic device 30 so that feedback can be provided to a user. (Ray, 10:24-35, 11:21-55, 16:1-43.) Morris also explained that its treadmill can have multiple user detection sensors (Morris, [0009]), and it could include a wide variety of sensors including induction sensors, optical sensors, potentiometers, and the like. (Morris, [0033].) Therefore, a POSITA would have understood that augmenting the treadmill in the Morris-Ray combination with the additional current sensor of Cox could be done with a reasonable expectation of success.

Cox similarly described that its current sensor could be fully integrated into a standard treadmill (Cox, 4:32-39), did not require restrictive or sophisticated instrumentation, and it posed no risks to users of a treadmill (Cox, 1:54-61), which would have further informed a POSITA that the current sensor and the associated analysis software could be readily integrated into the Morris-Ray treadmill with a reasonable expectation of success and would have produced predictable results.

Additionally, Cox described gait analysis techniques that gave “clinicians a new analysis tool *that [could] be used independently or with other gait analysis techniques* to increase accuracy and objectivity of gait analysis.” (Cox, 3:19-21.) Morris, similarly, explained that its user detection techniques could be used to evaluate the user’s gait. (Morris, [0009].) Accordingly, a POSITA would have been guided by the suggestion in Cox and would have understood that combining the complementary sensing techniques of Morris and Cox would have improved gait analysis. As Cox explained, “[g]ait analysis is essential in physical medicine and is a fundamental tool of the orthopedist, physical therapist, and orthotist/prosthetist. The ability to assess and correct inefficient or dysfunctional gait patterns is fundamental to sound clinical practice.” (Cox, 3:9-13.) Additionally, the current sensor of Cox was an inexpensive option that would have provided redundancy and accuracy to the detections that did not need require the use of multiple pressure sensors on multiple locations. (Rawls, ¶ 236.)

While Morris explained that some prior systems that evaluated “changes in load of the electric motor driving the belt of a treadmill,” could not detect a “load change” as the incline of the treadmill increased (Morris, [0005]), Morris did not specify what type of “load” was being considered, or how they were being analyzed. Cox, on the other hand, made it clear that “walking on the treadmill produced *very little impact on the magnitude of the voltage signals, but produced dramatic*

variations in the magnitude of the electric current” (Cox, 5:33-37), tested *current* signals associated with inclination angles of 5 and 10 degrees, (Cox, Table 1), and explained that its ESA tool could perform both time and frequency analysis to match even small perturbations to their source. (Cox, 3:51-56.) Accordingly, a POSITA would not have been dissuaded by the vague and cursory remarks in Morris’ background section and would have understood that the more detailed testing and evaluation of Cox relied on sensing “current” variations, and its ESA tool could correlate even small changes in the detected signal to produce reliable detection results. (Rawls, ¶ 238.) Additionally, in the Morris-Ray-Cox combination, the presence of the user could be detected collaboratively using the three techniques of Ray, Morris and Cox. Therefore, the presence or absence of the exercising user on an inclined treadmill could be effectively and redundantly carried out under all conditions, while benefiting from the added sophistication and accuracy of gait analysis provided by Cox’s current sensor and the associated ESA tool.

In the combination, the current sensor of Cox would be positioned between the power source to the motor and the treadmill motor to sense the current (Cox, Figure 1), and the analysis software would be incorporated into the processors and electronic boards of Morris. (Rawls, ¶¶ 232-241.) (See also Section VI.A.1 for additional explanations of how Morris’ signal processing system would accommodate additional software functionality.)

2. Claims 10 and 13

“...wherein the sensor includes a current sensor operably connected to the motor, the current sensor is configured to detect an input current into the motor during operation of the operating unit, and wherein the controller is operable to analyze the input current to detect engagement of the user with the operating unit.”

Annotated Figure 1 of Cox (below), similar to Figure 3 of the '227 patent, illustrated that its current sensor was positioned between the electric motor and the electrical power source to sense the electrical current utilized by the motor of treadmill 30. (Cox, 2:16-17, 3:49-56, Figure 1.) Accordingly, Cox's current sensor was positioned to measure the input current to the electric motor.

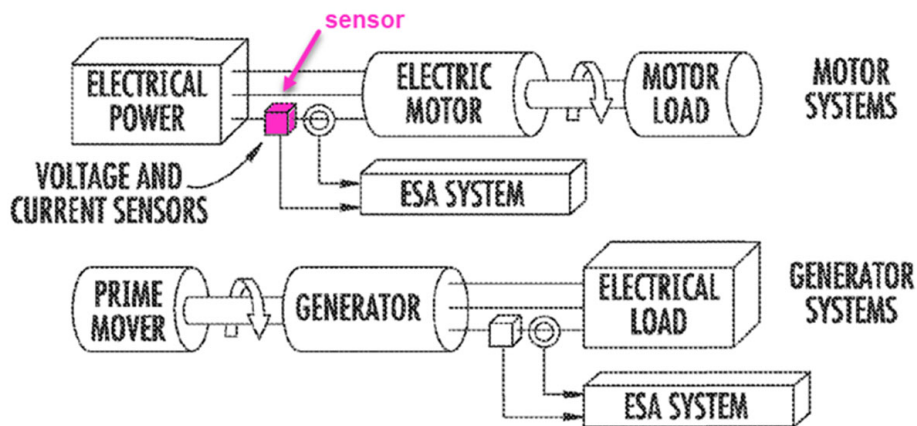
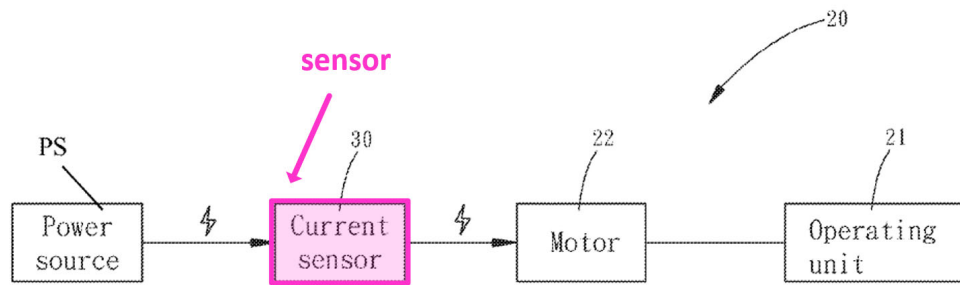
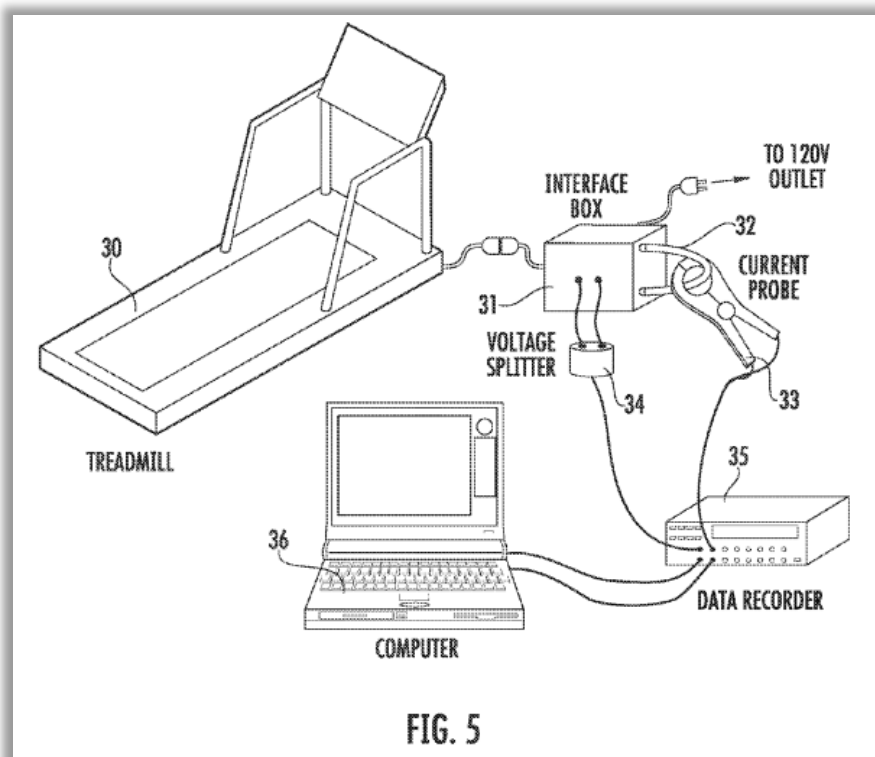


FIG. 1
(Annotated)



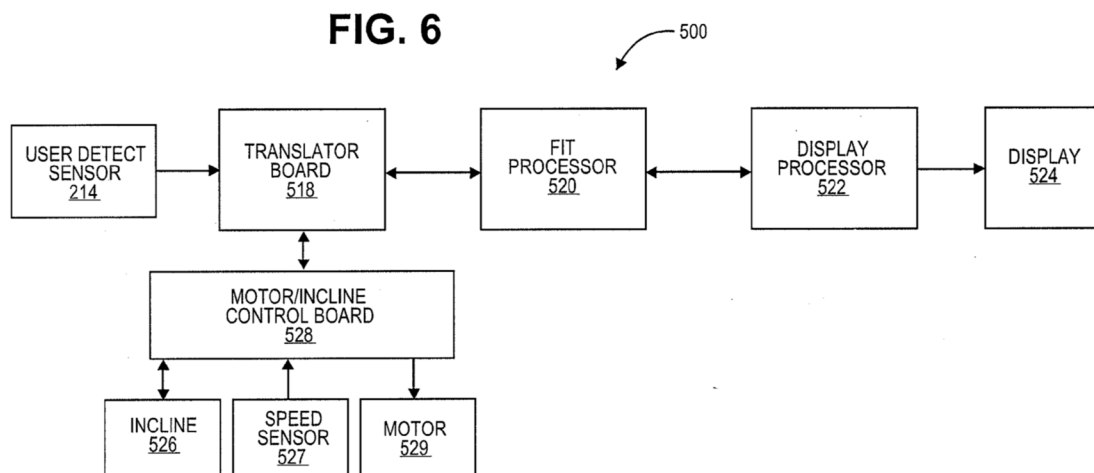
'375 patent – Figure 3 (Annotated)

While Cox clearly stated that its sensing and analysis devices could be fully integrated into the treadmill (Cox, 4:32-39), it used the test set up of Figure 5 to illustrate the concepts of its invention. (Cox, 2:26, 4:40-43.)



In Figure 5, data recorder 35 and/or computer 36 were connected to interface box 31 (with a current sensor), which allowed the computer to receive and analyze data signals associated with the current sensor. (*Id.*, 4:40-50.)

Through this configuration, Cox taught that the current sensor could indicate the physical condition and abilities of the user, including whether the user was walking on treadmill 30. (*Id.*, 1:45-52, 2:1-8, 4:14-26, 4:40-54.) Cox, therefore, taught a current sensor operably connected to the electric motor of treadmill 30, where it was configured to detect input current into the motor and where computer 36 was operable to analyze input current to detect engagement of a user.



As noted above, a POSITA would have been motivated to include a current sensor in the Morris-Ray treadmill and would have used Morris' processors and circuit boards (controller) to receive and analyze the current signals, and to provide back-up on additional methods for accurately detecting a user. (Rawls, ¶¶ 242-245.)

3. Claim 11

“...wherein the controller is configured to analyze a fluctuation in the input current.”

While the '227 patent teaches that detecting electrical current is well-known (Ex. 1001, 3:45-50), Cox disclosed a current sensor connected to treadmill 30's electric motor and configured to detect engagement of the user. (See claim 8, *supra*.) Cox further explained that its “ESA analyze[d] these *small perturbations [in current and voltage]* and matche[d] them to their source.” (Cox, 3:51-53.)

Cox also noted that walking on the treadmill “*produced dramatic variations in the magnitude of the electric current. For this reason, all additional analysis efforts focused on the current signals.*” (Cox, 5:33-38.) To detect user engagement, Cox's software identified “methods ... to *extract useful details (signatures) from the electric current data.*” (Cox, 5:41-44.) For example, raw electrical current data could be rectified and analyzed to build a stride profile to calculate exercise metrics, such as stride frequency—see bottom panel of Figure 8. (Cox, 5:56-67.)

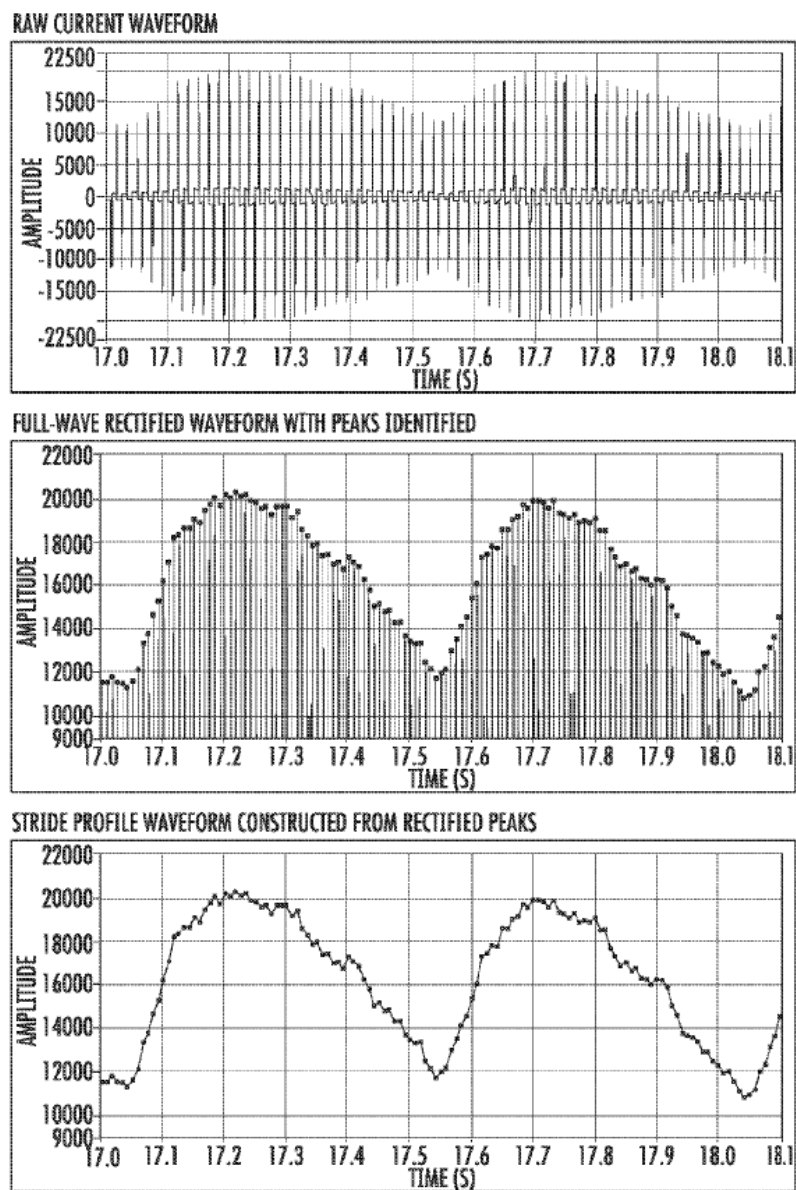


FIG. 8

A POSITA, considering the disclosure of Cox, would understand that Cox's fluctuations in the sensed current data indicated whether or not a user is engaged with treadmill 30, such as whether the user was walking or running, or was walking

with an impaired leg, based on variations in the sensed electrical current. (Cox, 2:1-8, 5:39-45, Table 2.) (Rawls, ¶¶ 246-248.)

4. Claim 20

This claim is rendered obvious by Morris, Cox and Ray. Morris taught or suggested a pressure sensor, as explained in connection with claim 12, *supra*, and an optical sensor. (Morris, [0033].) Cox used a current sensor (see claim 10, *supra*), and Ray disclosed determining user's engagement via various sensor types, including as a camera (*see* limitation 1[d], *supra*), a temperature sensor and a blood pressure sensor. (Ray, 16:1-10.) It was well-known and obvious that a treadmill could include various sensors to detect various parameters of the exercising user. (Rawls, ¶¶ 64-83, 250.) (*See also* "Motivation to Combine" in Section VI.B, *supra*.)

C. Ground 3: Claims 1-6 and 14-20 are Obvious over Ray in View of Applicant Admitted Prior Art (AAPA).

Ray disclosed a treadmill that validated exercise data when a user was exercising on a treadmill and reported that exercise data to a third party. Ray's Figures 1-3 clearly depicted a treadmill, but the specification assumed that certain components of that treadmill—like a base, motor, belt, and a controller—were so essential and well-known that they didn't warrant an explicit explanation. (Ray, 12:36-43.)

Indeed, the '227 patent itself cites U.S. Patent No. 6,638,198 (Ex. 1008) as prior art disclosing “**a conventional exercise apparatus** that can provide exercise use data.” (Ex. 1001, 1:36-37; Ex. 1008, 7:7-14). The '227 patent further acknowledges that conventional exercise equipment included an operating member and a controller that collected exercise use data and reported it to the user:

The conventional exercise apparatus comprises **an operating member and a controller** associated with the operating member. When the user drives the operating member to operate the exercise apparatus, the **controller associated with the operating member creates exercise use data**. Thereafter, the controller **records the exercise use data and reports the exercise use data** to the user.

(Ex. 1001, 1:40-47; Ex. 1008, 4:57-64, 6:31-62.) (Rawls, ¶¶ 43-56.)

The '227 patent further admitted that a treadmill with a motor-driven belt was conventional: “[c]urrently, if the controller is set to record exercise use data on an exercise apparatus **with motor-driven operating member, such as a treadmill operating member (a motor-driven running belt)** ... it would be easy to falsify exercise use data on the exercise apparatus.” (Ex. 1001, 1:58-63; *see also id.*, 2:6-14.)

In addition, during the prosecution of the related '375 patent, in response to an Office Action (dated January 10, 2020), Applicant admitted that prior art teaches “that distance, time and speed may be displayed on a display unit ... while a user is on the belt [] and exercising.” (Ex. 1009, 39.)

Petitioner therefore relies on AAPA, the general knowledge of a POSITA, and common sense to supply the missing treadmill components in Ray. The following components constitute AAPA and would have been known and obvious to a POSITA: (1) motors and motor-driven belts on treadmills, (2) controllers that generate exercise data such as time and distance, and (3) reporting exercise data. (Rawls, ¶¶ 251-255.)

Ray described examples where its validation and motivation features (software and a camera) were implemented on a portable device (e.g., a tablet) that communicated with the treadmill’s controller to receive exercise data and other information. (Ray, 12:59-67, 13:20-36, 14:31-40, Figures 1-3.) Ray further explained that its invention can be “easily and affordably” merged into the treadmill itself. (Ray, 9:55-57.) The below invalidity grounds rely on Ray’s “integrated” embodiment, where the electronic device’s relevant functionalities are merged into the treadmill. (Rawls, ¶ 256.)

1. Claim 1

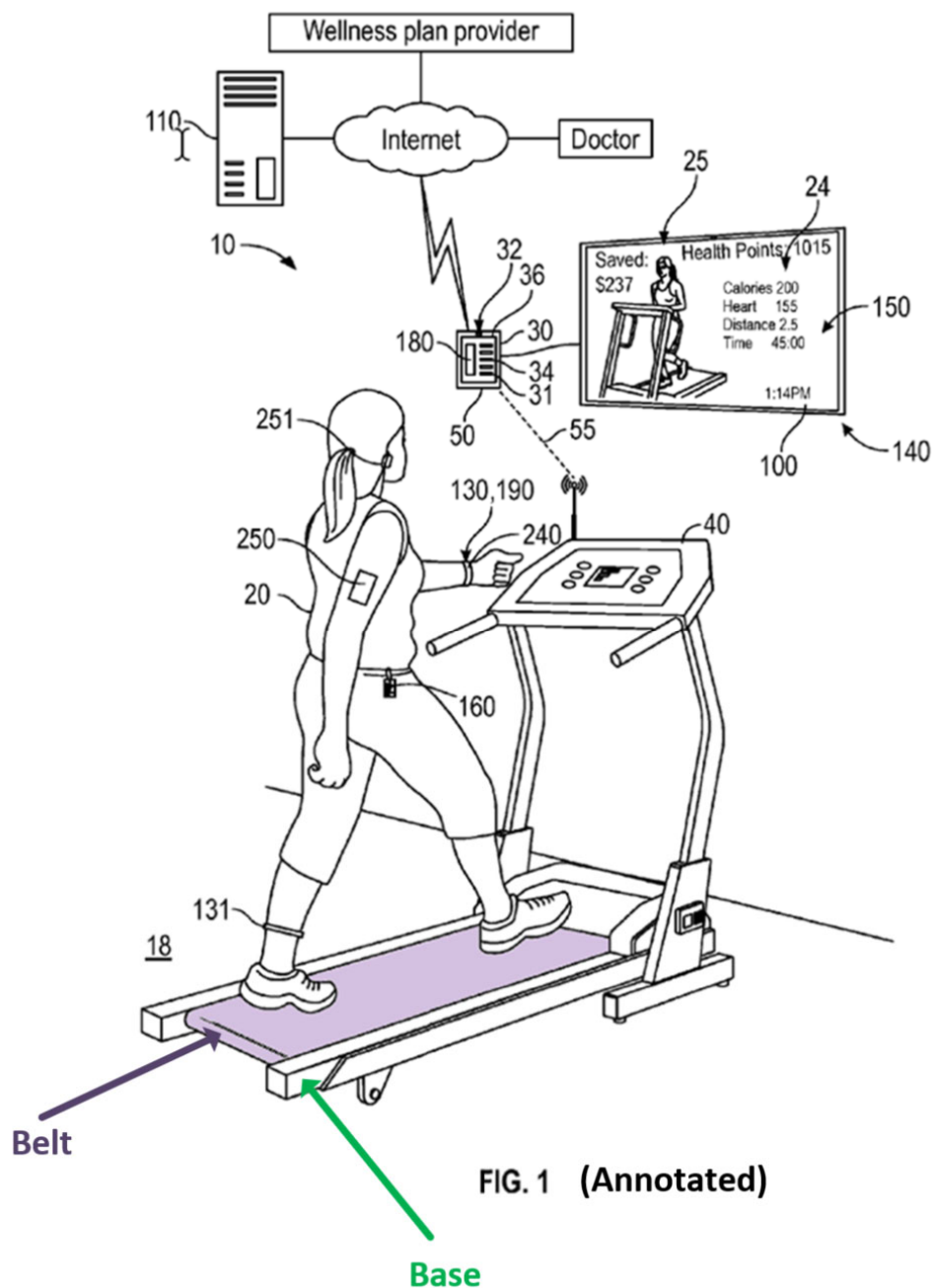
1[pre] “An exercise apparatus comprising:”

1[a] “a base;”

1[b] “an operating unit ...;”

1[c] “a motor ...;”

As explained above, limitations 1[pre]-1[c] were known to a POSITA per AAPA. Additionally, Ray disclosed these limitations because it described implementing its user and exercise validation process “with a treadmill” (exercise apparatus.) Ray, 5:23-26, Ray’s Figures 1-3 clearly depicted user 20 exercising on exercise machine 40—a treadmill. (Ray, 5:23-29; Figs. 1-3.) Treadmills had a belt (operating unit) so the user could walk or run on it, as shown in Ray’s annotated Figure 1 (below). The treadmill’s belt moved with respect to a stationary base as also illustrated below.



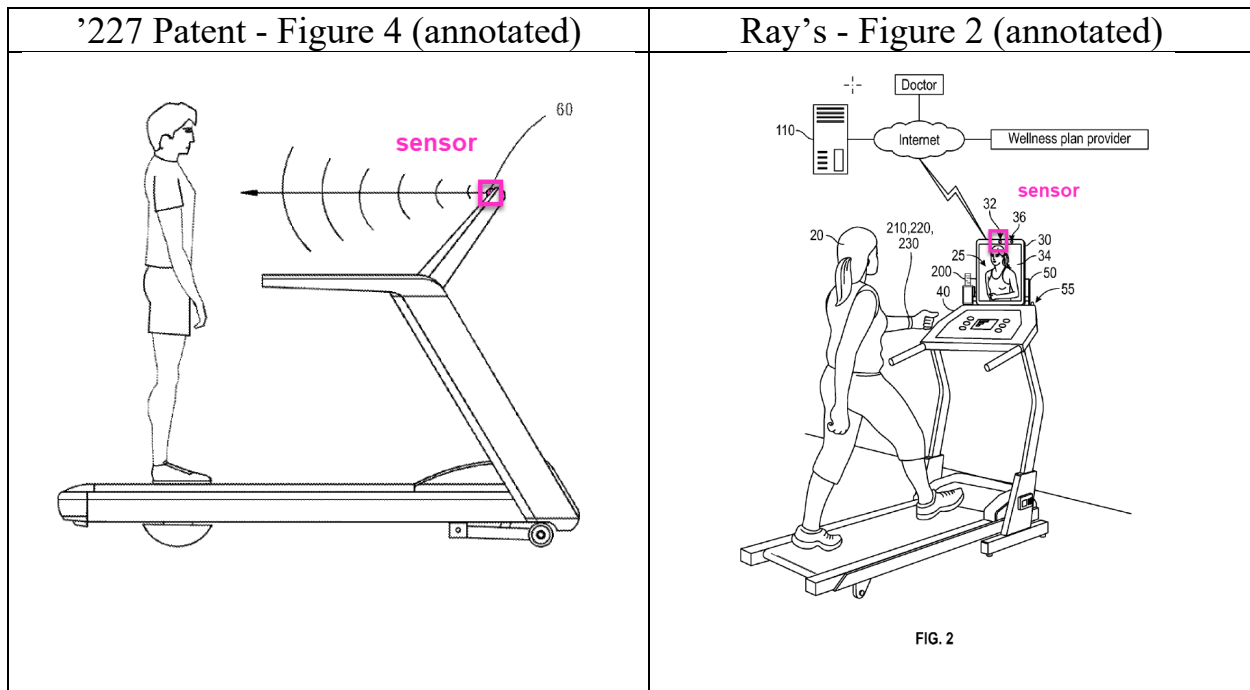
As noted earlier, it was well-known, the '227 patent admits, and it would have been obvious to a POSITA that the treadmill's belt would be motor driven. (Ex. 1001, 1:35-50.) Indeed, the “faked” exercise data problem of the prior art that

the '227 patent allegedly solves is admittedly unique to “motor-driven ... exercise apparatus”—including treadmills. (*Id.*, 1:45-2:19.) The '227 patent admitted that the “motor-driven operating member” was the “treadmill operating member (a motor-driven running belt)” and conventional in the art long before 2014. (*Id.*, 1:58-60; *see also* Section VI.C’s discussion of AAPA.) (Rawls, ¶¶ 35-63, 257-258.)

1[d] “a sensor ...;”

See Ray’s Sensor explanation for limitation 1[d] in Section VI.A.2, *supra*.

Further, Ray’s Figure 2 illustrated a camera as part of a tablet connected to the treadmill directly via USB port (Ray, 10:39-42), allowing “[t]he exercise data from the user’s workout routine on the exercise machine such as speed, duration and calories burned [to be] automatically entered into the computer device from the exercise machine.” (Ray, 10:47-50.) Therefore, the tablet was effectively integrated into the treadmill. Also, in Ray’s integrated embodiment all relevant functionalities could be “easily and affordably merged” into the exercise machine. (Ray, 9:55-56.) (Rawls, ¶¶ 259-261.)



1[e] “a controller ...”

See Section VI.C, *supra*, explaining why the ‘227 patent admitted, and a POSITA would have understood that a motorized treadmill, like the one in Ray, included a controller that communicated with the drive motor to run the belt, and that a conventional treadmill-generated and reported exercise data.

A POSITA would have found it obvious that Ray’s electronic device also included a controller or a processor because it performed “robust image capturing, processing and analysis” (Ray, 4:66-67), and could be a tablet, a cell phone or a laptop (Ray, 12:65-67), which were well-known examples of electronic devices with microprocessors or controllers. In Ray’s integrated embodiment, treadmill operations and those associated with the electronic device would be performed by a

single controller (treadmill's processor). It would have also been obvious to a POSITA that the treadmill could include multiple processors for performing its operations (treadmill's processor and a secondary processor dedicated to the image capture, processing and analysis, which collectively constitute the claimed controller). (*See also* VI.C, *supra*.)

The controller was in communication with the belt (operating unit) per AAPA (*see* Section VI.C, *supra*), and with the camera (sensor) to capture images (Ray, 4:66-5:3, 11:1-7; 14:6-14) and “computer-implemented instructions resident in the non-volatile storage medium ...cause[d] the camera 32 to record a still or video image or [to] produce a live feed of the patient or exercising user.” (Ray, 13:20-24.) (Rawls, ¶¶ 262-264.)

1[f] “a communication interface ...,”

See Ray's Communication Interface explanation for limitation 1[f] in Section VI.A.2, *supra*. (Rawls, ¶ 265.)

1[g] “wherein the controller is configured to generate a non-validated exercise use data ...,”

The '227 patent admits that it was already known that treadmills could generate (non-validated) exercise data automatically and could continue generating such data when left unattended. (Ex. 1001, 1:51-2:19.) Therefore, a POSITA, based on Ray and AAPA, would have found it obvious that Ray's controller would

generate data that merely related to the treadmill functions, such as elapsed time, when the treadmill was turned on initially, or left unattended after the user finished exercising, but such data (non-validated exercise use data) would not be reported out, and would not be subject to the user identity verification of Ray.

Additionally, or alternatively, continuing to generate or not continuing to generate treadmill-related information, in the absence of the user were the only two known alternatives in this situation, and thus selecting one or the other would have been an obvious endeavor. In tipping the scale, a POSITA would have found it advantageous to continue generating, and showing on the screen, information such as elapsed time because it would notify the user that the treadmill is still running so the user could use caution in getting back onto the treadmill, or to slow it down before resuming his/her exercise. (Rawls, ¶¶ 266-267.)

1[h] “wherein the controller is further configured to generate a validated exercise use data ...”

See Ray’s Validated Exercise Use Data explanation for limitation 1[h] in Section VI.A.2, *supra*.

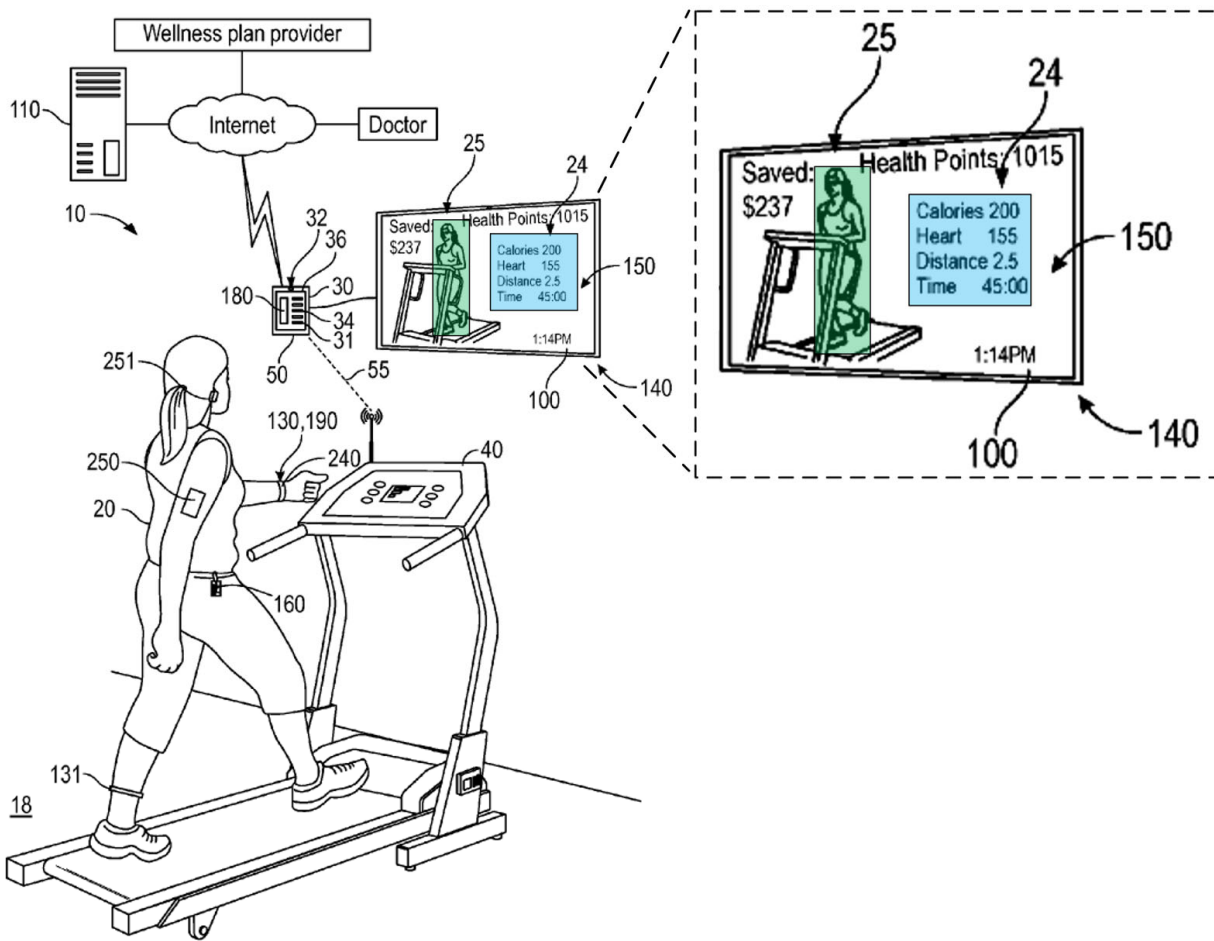


FIG. 1 (Annotated and Display Area Enlarged)

As noted in Section VI.A.2, *supra*, a POSITA would have understood that Ray's exercise use data (motivational image and other exercise data) was validated exercise use data because it was produced in response to detecting an exercising user and the movement of the belt. The validated exercise use data was reported to e.g., the doctor or wellness trainer in real time (Ray, 5:49-51, 7:4-10, Figs. 1-3) or to a remote server for storage (Ray, 3:47-51, 7:4-10, 8:1-8, Figs. 1-3).) Once the user

was no longer exercising on the treadmill, the generation and reporting of the user's image would have stopped. (Ray, 6:55-57.)

In addition, Ray also explained that “[u]sing the *validation process* of the invention, the patient's identity *and exercise routine [were] confirmed* simultaneously.” (Ray, 8:26-28; *see also, id.*, 13:24:30.) Therefore, Ray provided an additional level of validation of the exercise use data on validation of the identity of the user. (Rawls, ¶¶ 268-273.)

1[i] “wherein the controller transmits the validated exercise use data ...”

See limitation 1[i], in Section VI.A.2, *supra* explaining how Ray taught or suggested this limitation.

2. Claim 2

As explained in connection with limitation 1[g], *supra*, it would have been obvious that certain exercise data, such as the elapsed time, would be generated even when the user was not being detected. Therefore, information generated by the exercise machine (e.g., elapsed time) or obtained by camera (e.g., pictures showing a stationary user, user's heartrate obtained via the camera while user is not moving (Ray, 15:47-41)) would not be reported and would be non-validated exercise data.

Ray explained that its camera would be triggered based on the movement of the exercise machine (Ray, 14:6-11), and would continue recording, generating and

transmitting the motivational image as long as the user was detected exercising on the treadmill. (Ray, 14:11-14, 14:35-40.) Therefore, a POSITA would have found it obvious that, upon a determination that captured image(s) indicated a user was present and exercising, the user's virtual images and associated exercise data would be recorded (e.g., at the cloud-based server or sent in real time to the doctor (Ray, 7:4-10, 8:1-8)), and would thus be validated exercise use data. (Rawls, ¶¶ 275-276.)

3. Claim 3-5

See claims 3-5 in Sections VI.A.4 to VI.A.6, *supra*.

4. Claim 6

Ray's thinner/healthier-looking image was generated in *real time* by a computer system, was produced *via the treadmill interfacing with the computer system* and was *displayed on the screen as the user was exercising*. (Ray, 4:67-5:14, 5:23-29, 10:59-67; Fig. 1.) (Rawls, ¶ 280.)

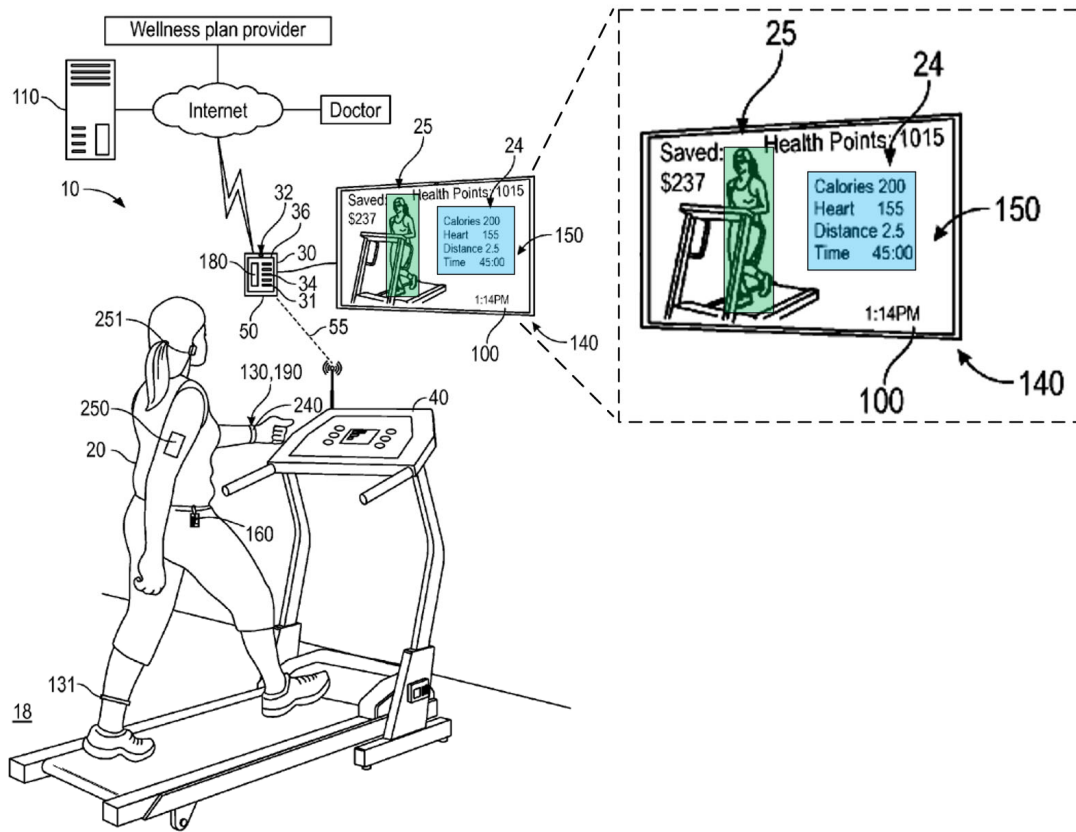


FIG. 1 (Annotated and Display Area Enlarged)

5. Independent Claim 14

14[pre] “an exercise apparatus comprising:”

14[a] “a base;”

14[b] “an operating unit ...;”

14[c] “a motor ...;”

14[d] “a sensor ...”

Ray, in view of AAPA, taught or suggested these limitations. *See* limitations 1[pre]-1[e], *supra*.

14[e] “a controller ...”

See limitation *I[e]*, *supra*. A POSITA would have understood that a motorized treadmill, like the one in Ray, included a controller that communicated with the drive motor to run the belt, and that a conventional treadmill generated and reported exercise data. (Rawls, ¶¶ 43-47, 50-56, 282.)

14[f] “a communication interface ...”

See claim limitation *I[ff]*, *supra*.

14[g] “wherein the controller is configured to generate a validated exercise use data ...”

See claim limitations *I[h]* and *I[i]*, *supra*.

6. Claims 15

See claim 2, *supra*.

7. Claim 16-18

See claims 3-5, respectively, in Sections VI.A.4 to VI.A.6, *supra*.

8. Claim 19

See claim 6, *supra*.

9. Claim 20

See claim 20 in Section VI.A.18, *supra*.

D. Ground 4: Claims 10-11 and 20 are Obvious over Ray, AAPA and Cox.

1. Motivation to Combine

See Section VI.B, *supra*. A POSITA would also be motivated to combine the teachings of Ray and Cox. Like Ray, Cox was concerned with detecting a user on a

treadmill—although by analyzing variations in current the tread motor (Cox, 5:33-38)—and providing feedback to the user, as well as reporting exercise data to insurance companies. (Cox., 2:56-3:9, 3:30-37; Ray, 9:27-47.) Both Ray and Cox, therefore, were directed to the same goal of providing feedback to a user to improve their exercise regimen, and their combination would have augmented the treadmill's functionalities with known features yielding predictable results.

A POSITA would be motivated to combine Ray and Cox because they would recognize that Cox's current sensor can be used to provide redundancy and accuracy of user detection when used in conjunction with Ray's camera sensor, and it provided an improved motivational image to the user of the exercise apparatus disclosed in Ray, including an image that can help correct and improve a user's exercise form, as recognized in Cox. Further, in the combination, the use of sensed current signals of Cox would have allowed a more accurate assessment of how intensely the user was exercising, and thus would have enabled a more realistic thinning of the user's image to be displayed.

Apart from camera 32, Ray disclosed the benefits of other sensors, such as a stretch resistance foot band sensor, to gather data, which is then analyzed by electronic device 30 so that feedback can be provided to a user. (Ray, 10:24-35, 11:21-55, 16:1-43.) Therefore, a POSITA would have understood that augmenting Ray's treadmill with Cox's current sensor of Cox could be done with a reasonable

expectation of success. Cox similarly described that its current sensor could be fully integrated into a standard treadmill (Cox, 4:32-39), did not require restrictive or sophisticated instrumentation and it posed no risks to users of a treadmill (Cox, 1:54-61), further informing a POSITA that the current sensor and the associated analysis software could be readily integrated into Ray's treadmill with a reasonable expectation of success and would have produced predictable results.

Additionally, Cox described gait analysis techniques that was essential in physical medicine and a fundamental tool for physical therapists. (Cox, 3:9-13, 3:19-21.) Therefore, the addition of Cox's sensor and associated software that enabled user gait analysis would have enhanced the treadmill's compatibilities, thus providing an additional motivation for the combination.

In the combination, the current sensor of Cox would be positioned between the power source and the treadmill motor to sense the current (Cox, Figure 1), and the analysis software would be incorporated into the controller(s) of Ray. (Rawls, ¶¶ 291-295.) (*See also* Section VI.C.1, limitation 1[e]'s explanation of Ray's controller in its integrated embodiment.)

2. Claims 10-11

These claims are rendered obvious based on the same rationale discussed in Sections VI.B.2-3, when the current sensor of Cox is implemented into Ray's treadmill.

3. Claim 20

Cox described a current sensor (*see* claim 20 in Section VI.A.18, *supra*), and Ray used various types of such as camera (*see* limitation 1[d], *supra*), a temperature sensor and a blood pressure sensor. (Ray, 16:1-10.) Using multiple sensors that interfaced with a treadmill to detect various parameters of the exercising user was well-known and obvious to a POSITA. (Rawls, ¶ 297.)

E. Ground 5: Claims 7-9 and 12 are Obvious over Ray, AAPA and Daly.

1. Motivation to Combine

Section VI.D, *supra* explains why a POSITA would understand that the current sensor in Cox could be incorporated into Ray's treadmill to reinforce its sensor capabilities and improve its ability to detect a user. The same argument applies here. Just like the current sensor, a POSITA would understand that a pressure sensor could be added to Ray's treadmill to enhance and improve its user detection functionalities.

A POSITA would have been motivated to combine the teachings of Ray, and Daly. Like Ray, Daly related to an exercise apparatus—specifically, a treadmill—that included a sensor to gather data concerning a user's exercise regimen, analyze that data, and provide feedback to the user in the form of exercise metrics. (Ray, 4:65-5:7, 5:40-55, 7:39-54, 13:20-30, 13:50-67; Daly, 2:65-3:12, 3:40-51, 4:11-32.)

Daly described a sensor (e.g., a pressure sensor, or a piezoelectric sensor array), disposed under the treadmill's deck 104. (Daly, 6:37-54.) Daly's sensors detected the deformation of deck 104 caused by the user's impact on the deck; the signals were analyzed by a control system, which calculated user exercise metrics and determined whether the user was engaged with the treadmill (or if the treadmill should enter standby mode). (Daly, 6:32-54, 7:39-54.) Thus, like Ray, Daly was concerned with detecting a user on an exercise apparatus (by detecting their load) and providing feedback to the user, such as cadence, stride, heartrate, etc. (*Id.*, 4:11-32, 5:61-67; 7:39-50.) Daly's feedback could be provided via a display showing an image of a person, to motivate the user to continue exercising and improving their exercise form. (*Id.*, 3:41-44, 3:64-4:10, 18:46-56.) Ray and Daly, therefore, were directed to the same goal of providing feedback to a user concerning their exercise metrics and providing motivation to encourage exercise. (Rawls, ¶¶ 298-300.)

In the combination, Daly's pressure sensors and associated analysis software would be incorporated into Ray's treadmill to augment its user detection technique and to enhance the validation feature of Ray by enabling a more accurate morphing of the virtual image based on sensors that detected the actual impact of the user's feet on the treadmill. The combination would have provided additional advantageous such as footstep counter and stride information to further motivate the user and provide motivation and training feedback to the user (Daly, 3:41-44, 4:11-33.)

Therefore, a POSITA would have been motivated to make this combination, with a reasonable expectation of success. (Rawls, ¶ 301.)

2. Claim 7

As Mr. Rawls explains, a POSITA would understand that Ray's treadmill belt could be modified to incorporate Daly's pressure/piezoelectric sensors (Daly, 8:57-61), to detect a user and determine the user's cadence, stride, heartrate and other exercise metrics. (Rawls, ¶ 302.)

Daly's Figure 1 showed a sensor array that determined the rate of exercise of the user. (Daly, 6:39-61.) Daly's control system 206 received a load detection signal from its piezoelectric sensor array and used it to control the speed, inclination angle or stiffness of the treadmill. (Daly, 14:4-25.)

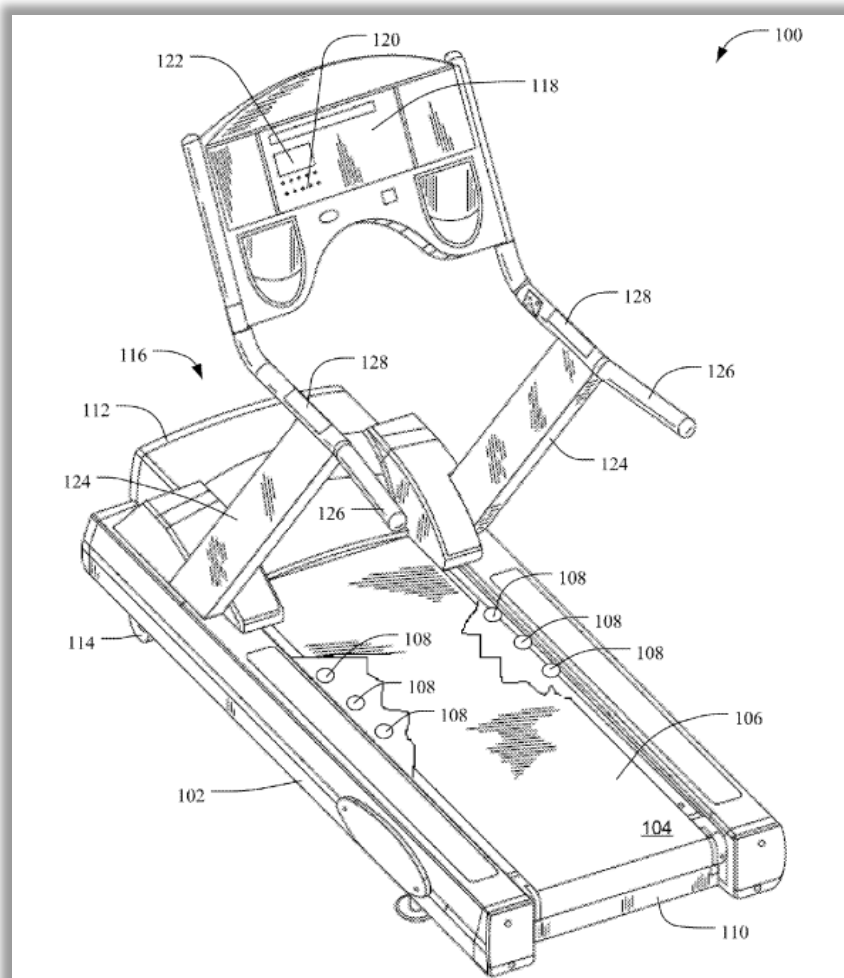
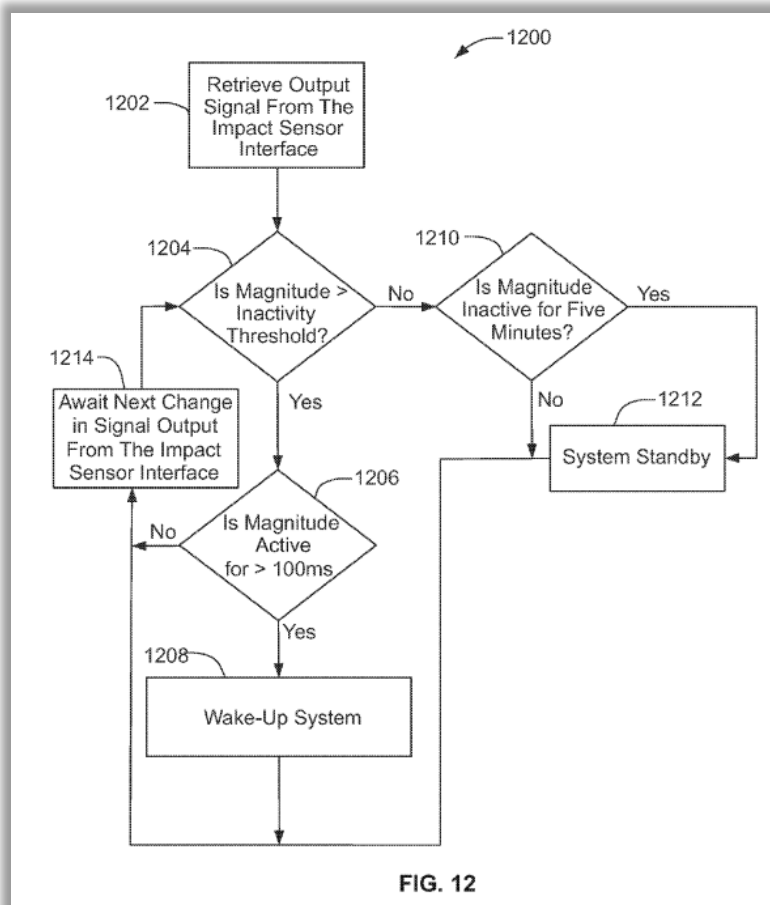


Figure 1 - Daly's Array of Piezoelectric Sensors under Treadmill Belt

Daly's piezoelectric sensor array detected user interactions with belt 104. Specifically, Daly's control system 206 received a signal from the deflection sensor interface 224 (step 1202 in Figure 12), which correlated to the force that the user imparted on the deck 104. (Daly, 21:32-40.) Control system 206 next determined whether the output signal is greater than an "inactivity threshold value" (step 1204). If yes, then control system 206 determined whether the output signal is active for a predetermined period (step 1206), i.e., continued to validate that a user is engaged

with the treadmill to activate the treadmill from standby status (step 1208). (Daly, 21:40-55.) If the force was less than the threshold (step 1210), control system 206 directed device controller 226 to inactivate the treadmill (step 1212) while it awaited engagement of the user (step 1214). (Daly, 21:40-22:11.)



Moreover, Daly explained that its pressure/piezoelectric sensor array detected the force exerted by an exerciser to adjust the speed of the belt and the metabolic cost equation to accurately reflect the user's exercise metrics. (Daly, 15:6-13.) If no output signal indicating the user's presence user was received for a period of time,

an inactivity flag was set. (Daly, 16:6-30.) This indicated “if a user [wa]s present on the treadmill.” (Daly, 5:62-67.) Daly, therefore, taught a pressure sensor and controller that analyzed data from the pressure sensor to ascertain whether a user is engaging the operating unit. In the combination, Daly’s pressure sensor data would be used to augment Ray’s user detection, to provide redundancy and accuracy by producing the morphed virtual images of the exercising user more accurately based on the actual footstep data obtained from Daly’s pressure sensors. (Rawls, ¶¶ 302-305.)

3. Claim 8

Daly’s Figure 1 treadmill included “[a] belt **106**, on which a user may walk, jog, and/or run” which moved over deck 104. (Daly, 6:44-46.) (Rawls, ¶ 306.)

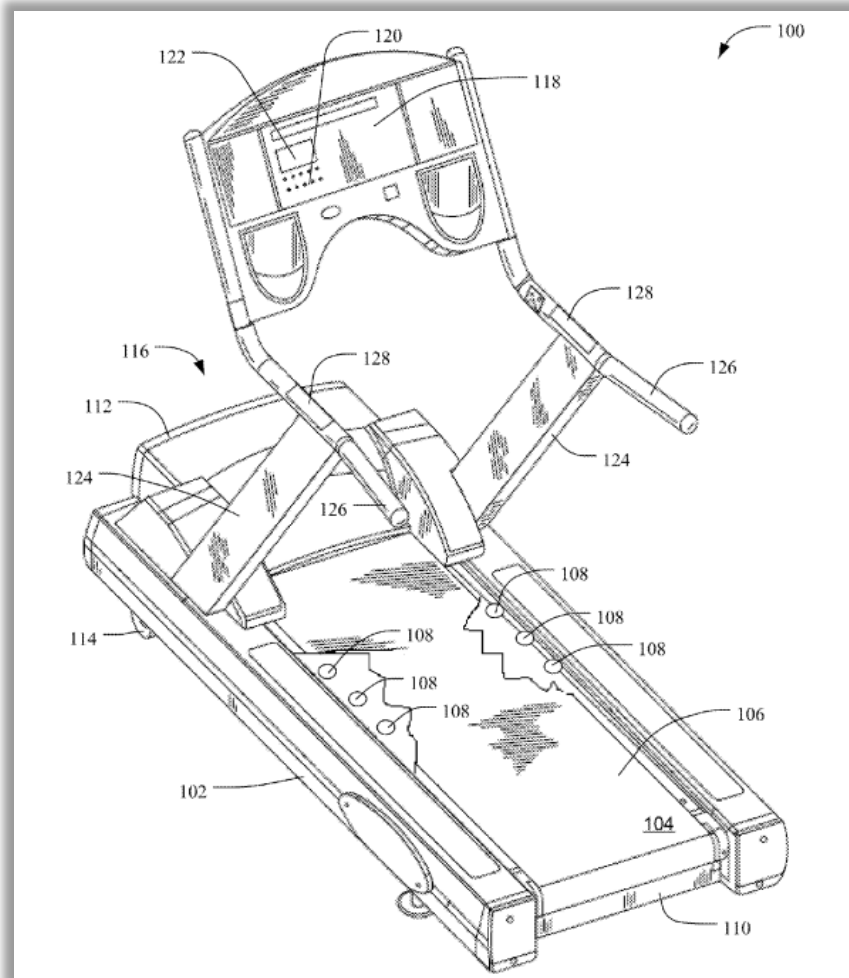


Figure 1

4. Claim 9

Daly’s sensor 108 could be a “pressure sensor” (Daly, 8:56-62), and could include “for example, a plurality of sensors.” (Daly, 6:46-48; Fig. 1, elements 108.) (Rawls, ¶ 307.)

5. Claim 12

12[pre] “A motorized treadmill comprising:”

12[a] “a base;”

12[b] “an endless belt ...”

12[c] “a motor ...”

For limitations, 12[pre]-12[c], see claim 1, *supra*.

12[d] “a sensor ...”

See limitation 1[d], *supra*, for Ray’s camera sensor. In the combination, Daly’s pressure sensor output would be used to help morph Ray’s images more accurately based on footstep detections on the treadmill. Daly’s pressure sensors would have also provided a backup and redundant user detection scheme. (Rawls, ¶ 309.)

12[e] “a controller configured to record validated exercise use data ...,”

See limitation 1[h], *supra*, for how Ray produced validated exercise use data. In the combination, Daly’s pressure sensor would have provided input for morphing the images and also provided a backup/redundant detection scheme.

12[f] “... including an amount of user exercise time...”

See claim 4, *supra*.

12[f] “wherein the sensor includes a pressure sensor ...”

See claim 7 and 8, *supra*.

F. Ground 6: Ray, AAPA, Daly and Cox Render Claim 13 Obvious.

Daly’s treadmill already included “a current sensor ... configured to obtain the electrical current draw values of, for example, the drive member **208** or motor.”

(Daly, 9:31-35.) In the combination, Cox’s analysis of the electric current drawn by the motor to detect the user’s presence would have augmented the Ray-Daly detection technique that was based on sensing pressure. This addition would have improved the reliability and accuracy of user detection by providing redundancy and backup, such as when pressure sensor malfunctioned or did not produce predictable values. The addition of Cox’s analysis software would not have required any hardware changes to the Ray-Daly treadmill, and the software code of Cox could have been readily implemented into the treadmill to produce predictable results with a reasonable expectation of success. (Rawls, ¶ 313.)

In the combination, claim 13 limitations were rendered obvious by Cox, as discussed in Section VI.B.2, *supra*.

VII. THE BOARD SHOULD NOT DECLINE REVIEW UNDER §314(A) OR §325(D)

A. §314(A)

Consistent with the Director’s June 21, 2022 guidance, Petitioner agrees, and will file a stipulation, not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB in the parallel district court litigation if the Petition is instituted.

B. §325(D)

The Board should not exercise its discretion under 35 U.S.C. §325(d) under the two-step framework established in *Advanced Bionics, LLC v. MED-EL*

Elektromedizinische Geräte GmbH, No. IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020) (precedential). All prior art in this petition, are entirely new references that were not cited or considered during the original examination. Further, this Petition is neither cumulative, nor provides overlapping arguments with those in the original examination because during prosecution, all claims, but one, were allowed without any discussion on merits (*see* Section II.B, *supra*), and the references used in this Petition show all claim limitations are obvious.

Additionally, this Petition is accompanied by the expert testimony of Mr. Rawls, which the Office lacked during the original prosecution.

VIII. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

The '227 patent is available for IPR and Petitioner is not barred or estopped from challenging it.

B. Overview of Challenge and Requested Relief

Petitioner requests cancelation of claims 1-20 under AIA 35 U.S.C. § 103.

1. Identification of Prior Art

Petitioner relies on the following references:

Prior Art	Exhibit No.
U.S. Patent No. 9,785,827 (“Ray”)	1004
U.S. Patent No. 7,736,273 (“Cox”)	1005
U.S. Pub. No. 2010/0160115A1 (“Morris”)	1006

U.S. Patent No. 8,574,131 (“Daly”)	1011
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Cox, Morris and Daly are prior art under 35 U.S.C. §102(a)(1). Ray is at least prior art under 35 U.S.C. §102(a)(2). This Petition also relies on Mr. Rawls’ Declaration (“Rawls” (Ex. 1002)), and exhibits listed in Exhibit Table.

2. Grounds for Challenge

Ground	Claims Challenged	35 U.S.C. §	References
1	1-9, 12, 14-20	103	Morris, Ray
2	10-11, 13, 20	103	Morris, Ray, Cox
3	1-6, 14-20	103	Ray, AAPA
4	10-11, 20	103	Ray, AAPA, Cox
5	7-9, 12	103	Ray, AAPA, Daly
6	13	103	Ray, AAPA, Daly, Cox

IX. MANDATORY NOTICES

A. Real Party-in-Interest

Peloton Interactive, Inc. is the real party-in-interest for this Petition.

B. Related Matters

Patent Owner asserted that Petitioner infringes the ’227 patent along with U.S. Patent Nos. 11,227,340 (“the ’340 patent”) and 10,796,375 (“the ’375 patent”) in a district court lawsuit captioned *Johnson Health Tech Co., v. Peloton Interactive, Inc.*, No. 3:22-cv-606 (W.D. WI.) on October 20, 2022. Petitioner will file petitions

for *inter partes* review challenging the '340 patent (IPR2023-01165) and the '375 patent (IPR2023-01164).

C. Notice of Counsel and Service Information

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Petitioner consents to electronic service. All services and communications to the attorneys listed above may be sent to **PerkinsPelotonIPRs@perkinscoie.com**.

A Power of Attorney is concurrently filed with this Petition.

X. CONCLUSION

Petitioner requests institution of an IPR and cancelation of challenged claims.

Dated: August 2, 2023

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APPENDIX: CLAIMS LISTING FOR '227 PATENT

1[pre]	An exercise apparatus comprising:
1[a]	a base;
1[b]	an operating unit movable relative to the base;
1[c]	a motor coupled to the operating unit;
1[d]	a sensor operable to detect engagement of a user with the operating unit;
1[e]	a controller in communication with the operating unit and the sensor; and
1[f]	a communication interface in communication with the controller,
1[g]	wherein the controller is configured to generate a non-validated exercise use data in response to movement of the operating unit relative to the base and the sensor does not detect engagement of the user with the operating unit,
1[h]	wherein the controller is further configured to generate a validated exercise use data in response to movement of the operating unit relative to the base and the sensor does detect engagement of the user with the operating unit, and
1[i]	wherein the controller transmits the validated exercise use data to the communication interface.

2	The exercise apparatus of claim 1, wherein to generate the validated exercise use data the controller records the non-validated exercise use data as validated exercise use data for a portion of time that the operating unit moves relative to the base and the sensor does detect engagement of the user with the operating unit.
3	The exercise apparatus of claim 1, wherein the validated exercise use data includes a distance traveled by the user while the sensor detects engagement of the user with the operating unit.
4	The exercise apparatus of claim 1, wherein the validated exercise use data includes a time spent exercising while the sensor detects engagement of the user with the operating unit.
5	The exercise apparatus of claim 1, wherein the communication interface is an internet interface for transmitting the validated exercise use data to a website storage device.
6	The exercise apparatus of claim 1, wherein the communication interface is a display device for directly showing the validated exercise use data to the user.
7	The exercise apparatus of claim 1, wherein the sensor includes a pressure sensor, and wherein the controller is configured to analyze data from the pressure sensor to ascertain whether the user is engaging the operating unit.

8	The exercise apparatus of claim 7, wherein the operating unit includes an endless belt that defines a user contact surface, and the pressure sensor is configured to detect an amount of pressure on the user contact surface.
9	The exercise apparatus of claim 8, wherein pressure sensor includes a plurality of sub pressure sensors.
10	The exercise apparatus of claim 1, wherein the sensor includes a current sensor operably connected to the motor, the current sensor is configured to detect an input current into the motor during operation of the operating unit, and wherein the controller is operable to analyze the input current to detect engagement of the user with the operating unit.
11	The exercise apparatus of claim 10, wherein the controller is configured to analyze a fluctuation in the input current.
12[pre]	a motorized treadmill comprising:
12[a]	a base;
12[b]	an endless belt movable relative to the base;
12[c]	a motor operably coupled to the endless belt;
12[d]	a sensor configured to detect engagement of the endless belt by a user; and

12[e]	a controller configured to record validated exercise use data in response to the sensor detecting of engagement of the endless belt by the user,
12[f]	the validated exercise data including an amount of user exercise time, the amount of user exercise time being generated by an amount of time that the sensor detects engagement of the endless belt by the user,
12[g]	wherein the sensor includes a pressure sensor configured to detect an amount of pressure on a portion of the endless belt and generate a pressure data, and the controller is configured to analyze the pressure data to detect engagement of the endless belt by the user.
13	The motorized treadmill of claim 12, wherein the sensor includes a current sensor operably connected to the motor, the current sensor is configured to detect an input current of the motor during operation of the endless belt, and the controller is configured to detect engagement of the endless belt by the user in response to a fluctuation in the input current
14[pre]	An exercise apparatus comprising:
14[a]	a base;
14[b]	an operating unit movable relative to the base;
14[c]	a motor coupled to the operating unit;

14[d]	a sensor operable to detect engagement of a user with the operating unit;
14[e]	a controller in communication with the operating unit and the sensor; and
14[f]	a communication interface in communication with the controller,
14[g]	wherein the controller is configured to generate a validated exercise use data in response to the operating unit moving relative to the base and the sensor detecting engagement of the user with the operating unit, and wherein the controller transmits the validated exercise use data to the communication interface.
15	The exercise apparatus of claim 14, wherein to generate the validated exercise use data the controller records a non-validated exercise use data as validated exercise use data for a portion of time that the operating unit moves relative to the base and the sensor detects engagement of the user with the operating unit.
16	The exercise apparatus of claim 14, wherein the validated exercise use data includes a distance traveled by the user while the sensor detects engagement of the user with the operating unit.
17	The exercise apparatus of claim 14, wherein the validated exercise use data includes a time spent exercising while the sensor detects engagement of the user with the operating unit.

18	The exercise apparatus of claim 14, wherein the communication interface is an internet interface for transmitting the validated exercise use data to a website storage device.
19	The exercise apparatus of claim 14, wherein the communication interface is a display device for directly showing the validated exercise use data to the user.
20	The exercise apparatus of claim 14, wherein the sensor is one of a current sensor, an optical sensor, a pressure sensor, and a thermal sensor.

CERTIFICATE OF WORD COUNT UNDER 37 CFR §42.24(d)

Under 37 C.F.R. §42.24(d), the undersigned certifies that the word count for this Petition for Inter Partes Review totals 13,991, excluding the parts exempted by 37 C.F.R. §42.24(a).

The word count was made using the built-in word count function in the Microsoft® Word software used to prepare this document.

Dated: August 2, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that true copies of this **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,032,227** and supporting materials (**Exhibits 1001-1006, 1008-1011 and Power of Attorney**) have been served by FedEx® delivery service on Patent Owner at the correspondence address for the attorney of record for the '227 Patent shown in USPTO records:

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790 N WATER ST, SUITE 2500
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