UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIFECORE FITNESS, INC.
d/b/a ASSAULT FITNESS
Petitioner,

v.

WOODWAY USA, INC.
Patent Owner.

U.S. Patent No. 9,039,580 to Bayerlein et al.

Case No.: IPR2023-00836

PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 311 *ET SEQ.* AND 37 C.F.R. § 42.100 *ET SEQ.*
(U.S. PATENT NO. 9,039,580)

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List of Exhibits

Exhibit #	Description
1001	U.S. Patent No. 9,039,580 ("the '580 Patent")
1002	U.S. Patent No. 9,039,580 File History ("the '580 File History")
1003	Declaration of Robert Giachetti, Ph.D. P.E. ("Giachetti")
1004	Robert Giachetti, Ph.D. P.E. Curriculum Vitae ("Giachetti CV")
1005	Complaint, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, Filed April 11, 2022 ("Complaint") (Ex. 1005 at 1-8) Waiver of Service (April 13, 2022) (Ex. 1005 at 9-10)
1006	Amended Complaint, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, Filed October 24, 2022 ("Amended Complaint")
1007	Treadmills: Supplier Guide © 2010. Trade Practices (Consumer Product Safety Standard) (Treadmills) Regulations 2009 ("ACCC Product Safety Supplier Guide")
1008	U.S. Patent No. 641,424 to Ziebell ("Ziebell")
1009	U.S. Patent No. 1,211,765 to Schmidt ("Schmidt")
1010	U.S. Patent No. 4,614,337 to Schonenberger ("Schonenberger")
1011	U.S. Patent No. 5,897,461 to Socwell ("Socwell")
1012	U.S. Patent No. 5,538,489 to Magid ("Magid")
1013	U.S. Patent No. 3,637,206 to Chickering ("Chickering")
1014	U.S. Patent No. 3,642,279 to Cutter ("Cutter")
1015	U.S. Patent No. 6,042,514 to Abelbeck ("Abelbeck")
1016	Power Transmission Handbook, (Power Transmission Distributors Association 1993) ("PT Handbook")
1017	Neil Sclater and Nicholas P. Chironis, Mechanisms & Mechanical Devices Sourcebook, Third Ed., (McGraw-Hill 2001) ("Sclater") (available at https://catalog.loc.gov/vwebv/holdingsInfo?searchId=26&recCount=25&recPointer=0&bibId=12308523)
1018	Mechanical Clutches and Torque Overload Devices, (Emerson Industrial Automation, 2001) ("Emerson")
1019	Standard Specification for Motorized Treadmills, (ASTM, 2005) ("ASTM Standard")

Exhibit #	Description
1020	Stationary Training Equipment – Part 6: Treadmills, additional specific safety requirements and test methods. (ISO, 2005) ("ISO Standard")
1021	U.S. Patent No. 8,986,169 File History ("the '169 File History")
1022	Responsive Claim Constructions, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, Filed January 5, 2022
1023	United States District Courts – National Judicial Caseload Profile, December 2022
1024	Inhabitat, "HUMAN-POWERED GYMS in Hong Kong" (March 8, 2007) (available at https://inhabitat.com/human-powered-gyms-in-hong-kong/)
1025	Minute Order, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, March 30, 2023.
1026	U.S. Patent No. 10,561,884 File History ("the '884 File History")
1027	Claim Construction Brief, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, March 1, 2023
1028	Responsive Claim Construction Brief, *Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492-JO-BLM, Southern District of California, March 14, 2023
1029	U.S. Patent No. 4,635,771 to Shoji ("Shoji")

Mandatory Notices under 37 C.F.R. § 42.8

Real Party-In-Interest – 37 C.F.R. § 42.8(b)(1)

Petitioner certifies LifeCore Fitness, Inc. d/b/a Assault Fitness ("Petitioner," "LifeCore") is the real party-in-interest.

Related Matters – 37 C.F.R. § 42.8(b)(2)

Petitioner identifies this related judicial matter: *Woodway USA, Ind., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness*, Case No. 3:22-cv-00492 (S.D. Cal.), served April 13, 2022. The '580 Patent is being asserted in this proceeding, along with three other patents within the same family: U.S. 10,561,884, U.S. 10,799,745, and U.S. 11,465,005.

Petitioner is also aware that the '580 Patent was at issue in *Woodway USA, Inc. v. Samsara Fitness, LLC et al*., Case No. 2-15-cv-00956 DWI), and *Chapco, Inc. et al v. Woodway USA, Inc*. Case No. 3-15-cv-01665 (DCT).

Lead and Back-Up Counsel – 37 C.F.R. § 42.8(b)(3)

Petitioner appoints the following lead and back-up counsel:

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An appropriate Power of Attorney is filed concurrently herewith.

Service Information – 37 C.F.R. § 42.8(b)(4)

Service information for lead and back-up counsel is provided in the designation of lead and back-up counsel above. Petitioner hereby consents to service by email at the following email address: LCF0112IPR@brookskushman.com.

Fees – 37 C.F.R. § 42.15(a)

The filing fees associated with this Petition are being charged to Deposit Account 023978. The Board is authorized to charge any additional fees or credit any refunds pertaining to this Petition to Deposit Account 023978.

I. Introduction and Technology Overview

Petitioner ("LifeCORE") requests *inter partes* review of claims 1-12, 14, 15, 18, and 25 of U.S. Patent No. 9,039,580 ("the '580 Patent"; Ex.1001). The supporting Declaration of Dr. Robert Giachetti is filed as Exhibit 1003.

The '580 Patent is one of four related patents Patent Owner ("Woodway") asserted against Petitioner in litigation. (Ex.1005, served on April 13, 2022, *id*. at 9-10, Ex.1006[1].) Patent Owner contends these patents teach "revolutionary" "manual treadmills that are self-propelled and allow a runner or walker to control his/her/their speed without the use of any motor" and this "treadmill was the first of its kind when it was introduced in 2009." (Ex.1005, ¶9.) Patent Owner's manual treadmill technology was actually well-known in the art. For example, U.S. Patent Nos. 1,211,765 to Schmidt (Ex.1009), 3,637,206 to Chickering (Ex.1013), 5,897,461 to Socwell (Ex.1011), 5,538,489 to Magid (Ex.1012), and Patent Owner's own patent, U.S. 4,614,337 to Schonenberger (Ex.1010), describe such manual treadmills. (Ex.1003, ¶¶52-57, 69.)

By the late 1900's lightweight belts and electric motors were widely available and motorized treadmills began to be offered. (Ex.1003, ¶¶54-55.)

[1] US 11,465,005 was first asserted on October 24, 2022. (Ex. 1006.)

However, manual treadmills were still in use because they reduce cost, complexity, and electricity consumption as compared to motorized treadmills. (Ex.1003, ¶¶57, 52-57.)

Treadmills have safety concerns, users may be injured by falling off while mounting or dismounting, or while using it. (Ex.1003, ¶71.) Falls may be caused by the treadmill belt moving in an unexpected direction or in such a way that the user loses equilibrium. (Ex.1003, ¶¶72-73, 75; Ex.1013, 1:24-39; Ex.1011, 1:28-41; 2:45-55.) Professional organizations have produced standards regarding treadmill safety. *See* ASTM Standard, Ex.1019, ISO Standard, Ex.1020, and ACCC Product Safety Supplier Guide, Ex.1007. For example, ASTM provides guidance regarding treadmill stability and requires treadmills to have handrails and footrails. (Ex.1019 at 3-4.) The '580 Patent claims start with the well-known manual treadmill, and then adds common features also well-known before 2009, such as a curved running surface, bearing rails having bearings, one-way bearings/clutches, etc. (Ex.1003, ¶96.)

Grounds 1 and 4 demonstrate how and why it would have been obvious to modify a manual treadmill with a curved running surface to include a one-way clutch to prevent the belt from moving forward. Grounds 2, 3, 5, and 6 also demonstrate how and why a POSA would have substituted a sprag-type one-way bearing assembly for a ratchet-type one-way clutch.

II. Requirements under 37 C.F.R. § 42.104

A. Grounds for Standing – 37 C.F.R. § 42.104(a)

Pursuant to 37 C.F.R. § 42.104(a), Petitioner certifies the '580 Patent is available for IPR and they are not barred or estopped from requesting IPR.

B. Challenged Claims – 37 C.F.R. § 42.104(b)(1)

Petitioner requests *inter partes* review for claims 1-12, 14, 15, 18, and 25 of the '580 Patent and requests the Patent Trial and Appeal Board ("PTAB") find those claims unpatentable.

C. Prior Art Relied Upon

The '580 Patent is not entitled to the March 17, 2009 priority benefit of its earliest-filed provisional but, even if so, the following are all 35 USC § 102(b) prior art:

- Chickering – US 3,637,206 (Ex.1013) issued January 25, 1972
- Magid – US 5,538,489 (Ex.1012) issued July 23, 1996
- Socwell – US 5,897,461 (Ex.1011) issued April 27, 1999
- Sclater – Mechanisms and Mechanical Devices Sourcebook 3rd Edition, McGraw-Hill (2001) (Ex.1017)

Sclater is not cited on the '580 Patent. Chickering, Magid, and Socwell are cited on the '580 Patent, but the Examiner did not apply any of these references during prosecution.

D. Grounds of Challenge – 37 C.F.R. § 42.104(b)(2)

The grounds of unpatentability presented in this petition are as follows:

Ground	Basis[2]	References	Claims Challenged
1	§ 103	Chickering and Magid	1-5, 10-11, 14, 18, and 25
2	§ 103	Chickering, Magid, and Sclater	6-9 and 12
3	§ 103	Chickering, Magid, and Sclater	1-12, 14, and 18
4	§ 103	Socwell and Magid	1-5, 10-11, 14, 15, 18, and 25
5	§ 103	Socwell, Magid, and Sclater	6-9 and 12
6	§ 103	Socwell, Magid, and Sclater	1-12, 14-15, 18 and 25

There is a reasonable likelihood that at least one Challenged Claim is unpatentable as explained herein. Petitioner requests institution on all Grounds.

[2] Pre-AIA Sections 102, 103 and 112 apply.

SAS Institute Inc. v. Iancu, 138 S. Ct. 1348 (2018).

III. Person of Ordinary Skill in the Art (POSA)

A person of ordinary skill in the art (POSA) of the ’580 Patent would have had a bachelor’s degree in mechanical engineering and at least one year of machine design experience related to power transmission equipment and a demonstrated understanding of exercise biomechanics, including anthropometry (*i.e.*, the study of human proportion). (Ex.1003, ¶¶48, 44-49.) This description is approximate and additional development experience could make up for less education and vice versa. (*Id.*)

IV. The Challenged ’580 Patent

A. Effective Filing Date

The ’580 Patent matured from U.S. Application 14/656,942 that was filed on March 13, 2015. The ‘580 Patent is part of a patent family that claims priority back to Provisional application No. 61/161,027, which was filed on March 17, 2009. A graphic of the ’580 Patent Family is provided below, with the ’580 Patent highlighted in yellow and the related asserted patents shaded in gray. (Ex.1003, ¶99.)

PRV	61/161,027 - 17MAR2009		
PCT	PCT/US2010/027543 -16MAR2010 WO2010/107840 - 23SEPT2010		
CIP	CIP - Abandoned 13/235,065 - 16SEPT2011 US2012/0010053 - 12JAN2012		
	14/243,716 - 2APRIL2014 US8,986,169	14/076,912 - 11NOV2013 US9,114,276	
	14/656,942 - 13MAR2015 US9,039,580 - 26MAY2015	14/832,708-21AUG2015 US10,265,566	
		15/958,339 - 20APRIL2018 US10,561,884 - 18FEB2020	15/957,721-19APRIL2018 US10,561,883
		16/792,426 - 17FEB2020 US10,799,745 - 13OCT2020	16/792,444-17FEB2020 US10,850,150
			17/247,101-30NOV2020 US11,465,005-11OCT202

The ‘580 Patent Family

B. Overview

The ’580 Patent relates to manually operated treadmills and mechanisms for controlling the motion of a running belt of the treadmill. (Ex.1001, Abstract.) The ’580 Patent discloses a manual treadmill 10 with “a running belt 16 that extends substantially longitudinally along a longitudinal axis 18” of a base 12. (Ex.1001, 5:21-23; Ex.1003, ¶92.)

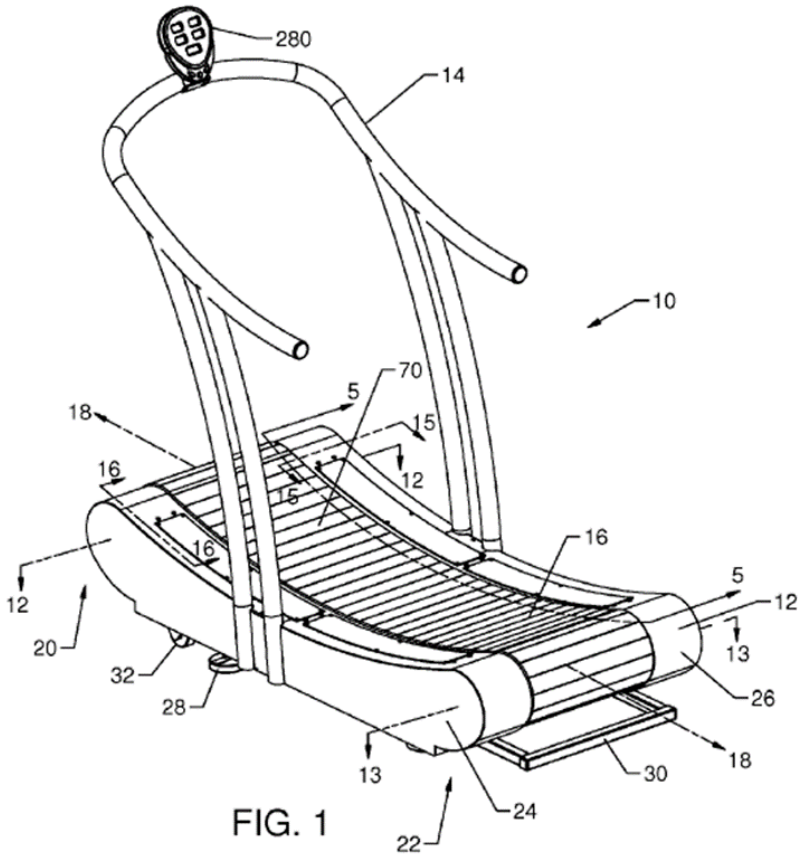
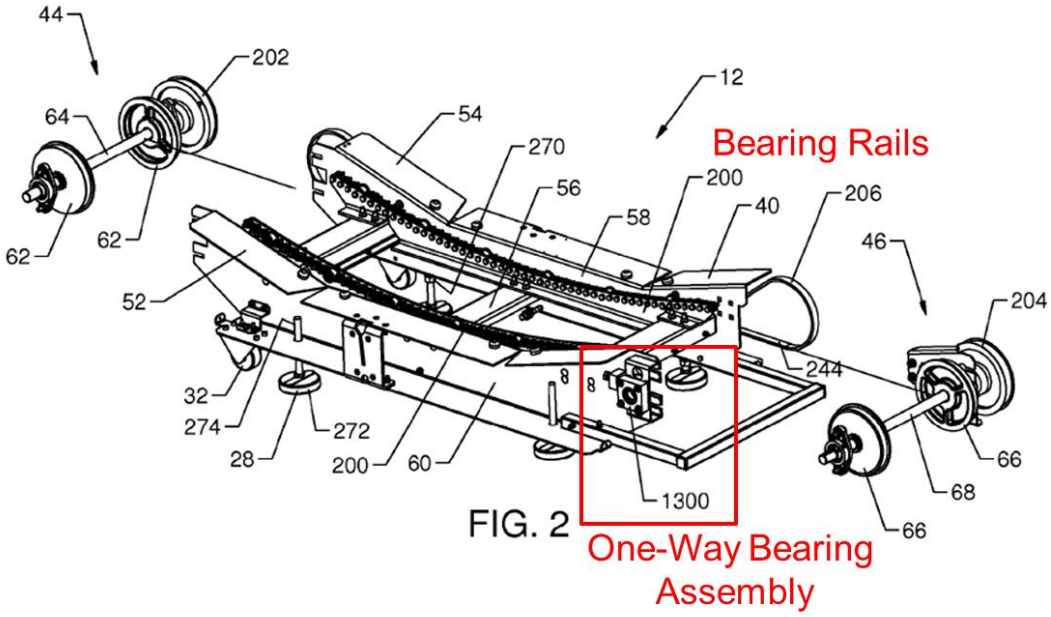


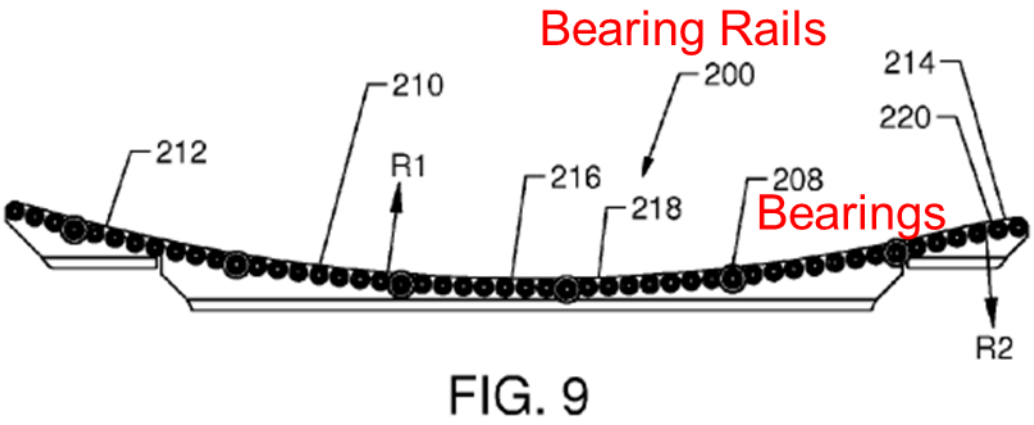
FIG. 1

Ex.1001, Fig.1

The treadmill includes bearing rails 200 that include a plurality of bearings 208. (Ex.1001, 11:41-44.) "[T]he running belt 16 moves substantially along the top profile 210 of the bearing rails 200." (Ex.1001, 11:56-58.) "Accordingly, the running surface 70 has a shape that substantially corresponds to the shape of the top profile 210 of the bearing rails 200." (Ex.1001, 12:3-5.)



Ex.1001, Fig.2[3]



Ex.1001, Fig.9

As illustrated in Figure 2 above, and Figure 36 below, the treadmill 12

[3] Annotations added in color.

includes a "safety device shown as a one-way bearing assembly 1300 … that is configured to permit rotation of at least one of the front and rear shaft assemblies 44, 46 (and hence the running belt 16) in only one direction." (Ex.1001, 27:11-15.)

The '580 Patent further discloses that "[t]he one-way bearing assembly 1300 comprises a housing 1302 which supports an inner ring 1304 that cooperates with the rear shaft 68 and supports an outer ring 1306 fixed relative to the housing 1302." (*Id.*, 27:18-21.) The one-way bearing assembly includes a "plurality of sprags (not shown) [that] are disposed between the inner ring 1304 and the outer ring 1306." (*Id.*, 27:21-23.) (Ex.1003, ¶94.)

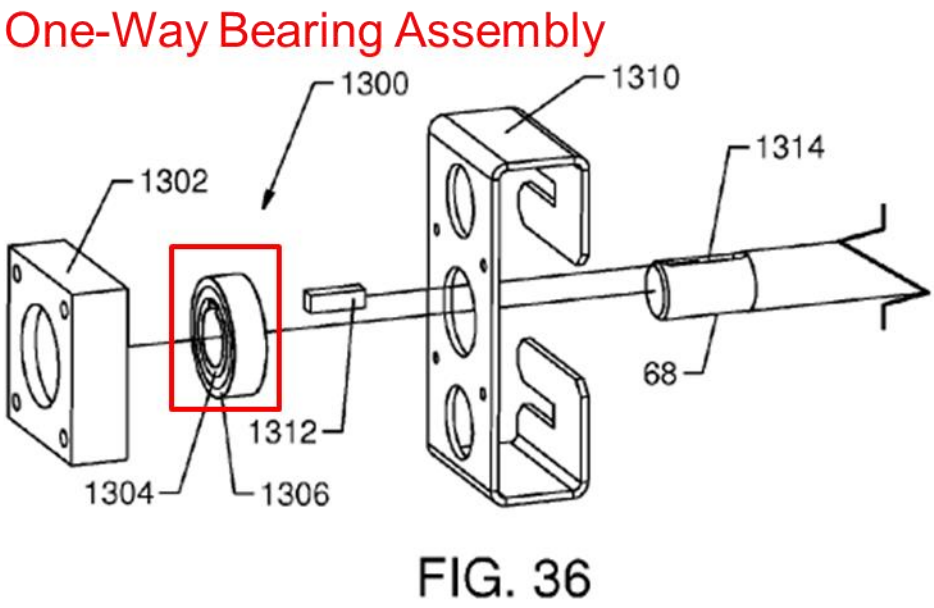


FIG. 36

Ex.1001, Fig.36

The '580 Patent provides scant detail on the one-way bearing design. For example, it does not illustrate the sprags, nor explain their interaction with the

inner and outer rings 1304, 1306. Instead, the ’580 Patent simply states that each sprag has an “asymmetric” shape to “provide for motion in one direction and prevent rotation in the opposite direction.” (Ex.1001, 27:23-25.) And that the “sprags become wedged between the inner ring 1304 and the outer ring 1306, preventing the counterclockwise rotation of the inner ring and key 1312 disposed therein.” (Id., 27:56-58) (Ex.1003, ¶94.)

Independent claims 1, 11, and 25 of the ’580 Patent are directed to a common manual treadmill topology that includes a belt supported by bearing rails to provide a curved running surface. The running belt is disposed about rotatable front and rear shafts and constrained by a safety device so that it moves in only one direction. (Ex.1003, ¶¶95-97.) Independent claim 1 is representative and reproduced below:

> 1. A **manually powered treadmill**[4] comprising:
>
> a frame having a front end and a rear end positioned opposite the front end;
>
> a front shaft rotatably coupled to the frame at the front end;
>
> a rear shaft rotatably coupled to the frame at the rear end;

[4] All emphasis added by Petitioner unless indicated otherwise.

> **a first bearing rail having a plurality of bearings**, the first bearing rail attached to a left side of the frame;
>
> a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;
>
> **a running belt** supported by the first bearing rail and the second bearing rail and disposed about the front shaft and the rear shaft, wherein the running belt **follows a curved running surface**; and
>
> **a safety device** coupled to at least one of the front shaft and the rear shaft, wherein the safety device is structured **to substantially prevent rotation** of at least one of the front shaft and the rear shaft **in a first rotational direction while permitting rotation** of the at least one of the front shaft and the rear shaft **in a second rotational direction** opposite the first rotational direction.

The technology of the challenged independent claims was well-known in the art by March 2009. (Ex.1003, ¶96.) The "*manually powered treadmill*"[5] with a "*running belt* [that] *follows a curved running surface*" has been around since at least 1917 (*see e.g.*, Ex.1009, Fig.1). The use of a "*bearing rail having a plurality of bearings*" to support the belt of a manual treadmill is also old and well known (Ex.1003, ¶96; *see e.g.*, Ex.1013, Fig.1; Ex.1010, Fig.7; Ex.1012, Fig.8.)

The need to limit treadmill belt movement for stability and safety was also

[5] Petitioner uses italics to indicate claim language.

well known. (*See*, e.g., Ex.1013, 1:24-39; Ex.1011, 1:28-41.) (Ex.1003, ¶97.) Using a "*safety device*," such as a one-way clutch, to permit only unidirectional belt movement dates back to at least 1996. (Ex.1012, 4:46-60, Fig.5; Ex.1003, ¶97.)

The dependent claims add common features, *e.g.*, cross-members (claims 2, 3), one-way bearings (claims 6, 7), key-keyway interfaces (claims 8, 9), handrails (claim 10), and elevation adjustment structures (claim 14). (Ex.1003, ¶98.)

C. Prosecution History

The '580 Patent prosecution history is brief and better understood in view of the parent application that issued as U.S. 8,986,169 ("the '169 Patent").

1. The '169 Patent File History

U.S. Application No. 14/243,716 ("the '716 Application") issued as the '169 Patent. The '716 Application was filed on April 2, 2014 with a request for accelerated examination under Track 1. (Ex.1021 at 1-114.) The application as filed included independent claims 1, 10, and 14, with many similar limitations as those in the '580 Patent. (*Id.* at 54-59.) For example, independent claims 1, 10, and 14 included "*one way bearing*" limitations that permit a shaft to rotate in one direction but prevent rotation in an opposite direction. (*Id.* at 54, 55 and 57.) Dependent claim 16 required a "*bearing rail having a plurality of bearings… having a concave curve… wherein the running surface of the running belt is*

supported by the top profile of the at least one bearing rail." (*Id.* at 58.)

The USPTO rejected original claims 1-11 as obvious over US 2006/0287165 to Pasqualin in view of US 3,642,279 to Cutter (Ex.1014) and US 5,538,489 to Magid (Ex.1012). (Ex.1021 at 125-130.) The Examiner also rejected claims 14-18 as obvious over US 1,211,765 to Schmidt (Ex.1009) in view of Magid (Ex.1012). The Examiner relied on Cutter and Schmidt for satisfying the "*curved*" running surface limitations, Magid's disclosure of control means for satisfying the "*one-way bearing*" claim limitations, and Schmidt's disclosure with reference to Figure 6 for satisfying the "*bearing rail*" limitation of claim 16. (Ex.1021 at 126, 132.)

Patent Owner argued against the Examiner's rationale for combining Magid with Pasqualin and Cutter. (*Id.* at 149-172.) Patent Owner argued that: 1) Magid's disclosure of two-belts "teaches away from the use of a single, wide belt"; and 2) combining Magid with a curved running surface reference like Cutter would render Magid inoperable because "a curved running surface would add difficultly walking for uncoordinated, thereby rending Magid unsatisfactory for its intended purpose." (*Id.* at 160-163.) (Ex.1003, ¶105.)

Patent Owner also amended claim 16 to require that the bearings are "*<u>rotatably coupled</u> to the at least one bearing rail;*" and argued that Schmidt did not teach the claim as amended. (Ex.1021 at 154, 169-170.)

In response, the Examiner issued a final office action rejecting all of Patent

Owner's rationale to combine arguments regarding combining Magid with Cutter or Schmidt. (*Id.* at 202-203.) The Examiner rejected Patent Owner's teaching away and inoperability arguments stating:

> Magid does not explicitly reject using the safety device on a single-belt treadmill. As discussed above, there is a need for a safety device to prevent the user from accidently or unexpectedly propelling the belt the wrong direction. By Applicant's own admission, Applicant acknowledges this risk.

Id. at 202-203. (Ex.1003, ¶106.)

The Examiner allowed a few dependent claims, including claim 16 with the bearings "*rotatably coupled to the at least one bearing rail*" limitation.

On January 16, 2015, Patent Owner amended the independent claims to include the allowable subject matter of dependent claims, including amending independent claim 1 to include "s*ynchronization*" limitations not at issue here, and amending independent claim 14 to include the allowable "*bearing rail*" limitations of claim 16. (Ex.1021 at 209, 211-212.) A notice of allowance was issued and the '169 Patent issued on March 24, 2015. (*Id*. at 223-225, 245.) (Ex.1003, ¶107.)

2. The '580 Patent File History

U.S. Patent Application No. 14/656,942 ("the '942 Application") was filed on March 13, 2015 with a request for accelerated examination under Track 1. ('580 File History, Ex.1002 at 1-111.) During an April 7, 2015, Applicant/Examiner

interview, they discussed pending claims 11 and 26, along with "SCHMIDT AND MAGID." (Ex.1002 at 191; Ex.1003, ¶108.) The Examiner did not explain the discussion of Magid. (Ex.1002 at 191.) Instead, the Examiner issued a Notice Of Allowance on April 16, 2015, with an Examiner's Amendment amending the independent claims to include the bearing rails limitations. (Ex.1002 at 185-190.) The Examiner indicated Schmidt (Ex.1009) was the closest prior art, but that Schmidt does not disclose "a pair of bearing rails supporting the running belt" and a "safety device." (Ex.1002 at 185-190.) (Ex.1003, ¶¶109-111.)

V. Claim Construction — 37 C.F.R. § 42.104(B)(3)

In an IPR proceeding, the claims are construed "in accordance with the ordinary and customary meaning of such claim 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); *Phillips v. AWH Corp*., 415 F.3d 1303, 1312–13 (Fed. Cir. 2005).

The related litigation is in early stages and the parties are pursuing multiple claim construction positions, shown in Ex.1022. The Markman Hearing is scheduled for April 24, 2023, after this Petition is filed. (Ex.1025.) Accordingly, Petitioner is pursuing the following alternate claim construction positions for Grounds 3 and 6 only.

A. "*substantially prevent*[]"

In the related litigation, Patent Owner proposed that "*substantially*

prevent[]" movement in one direction be construed under its plain and ordinary meaning; and provided the following examples: "entirely/largely/mostly/generally though not necessarily entirely." (Ex.1022 at 5.) During prosecution of the related '884 Patent, Patent Owner disavowed this broad construction by arguing that "*substantially prevent*[]" means only allowing unidirectional movement to distinguish over prior art that merely resisted but did not stop movement in the one direction. (*See e.g.*, Ex.1026 at 243; Ex.1027 at 5-6; Ex.1028 at 6-7.)

Accordingly, Petitioner asserts "*substantially prevent*[]" means "prevent any movement after allowing no or minimal movement;" and proposes the same construction here for claims 1, 7, 11, and 25. (*See* Ex.1028 at 6-7.) Regardless, the cited art teaches both constructions.

B. "*safety device*"

Patent Owner proposed construing "*safety device*" as a "device that permits movement in only one direction." (Ex.1022 at 5.)

Petitioner proposed that "*safety device*," in claims 1, 11, and 25 be construed as a means-plus-function term because it is expressed by its function rather than by structure that performs that function. *See Williamson v. Citrix Online, LLC,* 792 F.3d 1339, 1347 (Fed. Cir. 2015). The specification identifies in detail structure needed to fulfill this function as being one-way bearing assemblies having inner and outer rings and sprags. (Ex.1001, 27:16-29; Figs.2, 36.) The specification also

mentions: "Other safety devices to help prevent undesirable forward rotation of the running belt 16 may include cam locking systems, which may be particularly well-suited for use in conjunction with track systems 700, 800, and 900. Also, taper locks, a user operated pin system, or a band brake system with a lever may be utilized." (Ex.1001, 29:23-28.) Magid does not expressly disclose Petitioner's proposed construction, but Sclater does. Accordingly, Petitioner poses alternate Grounds to address the construction.

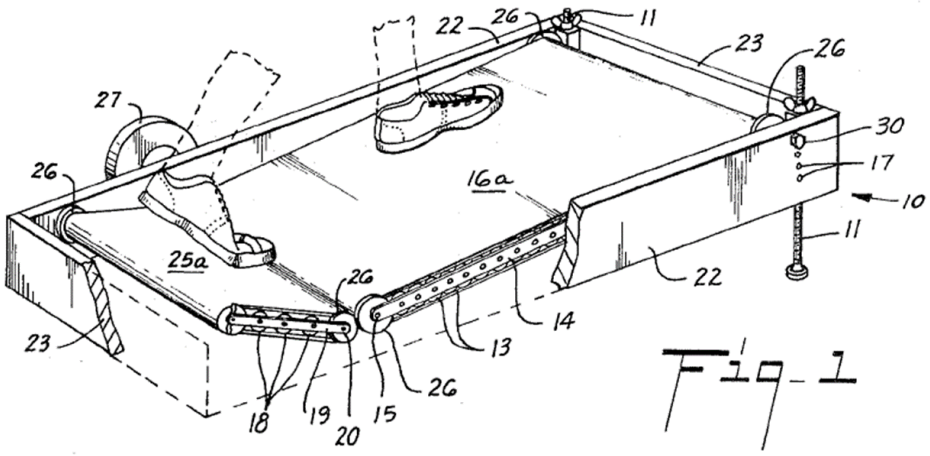
C. "*shaft*"

Petitioner asserts "*shaft"* should be construed to mean "a rotating element used to transmit power from one part to another" while Patent Owner asserts a "hollow or solid element/part/rod/tube/member/piece." (Ex.1022 at 4.) The cited art teaches both.

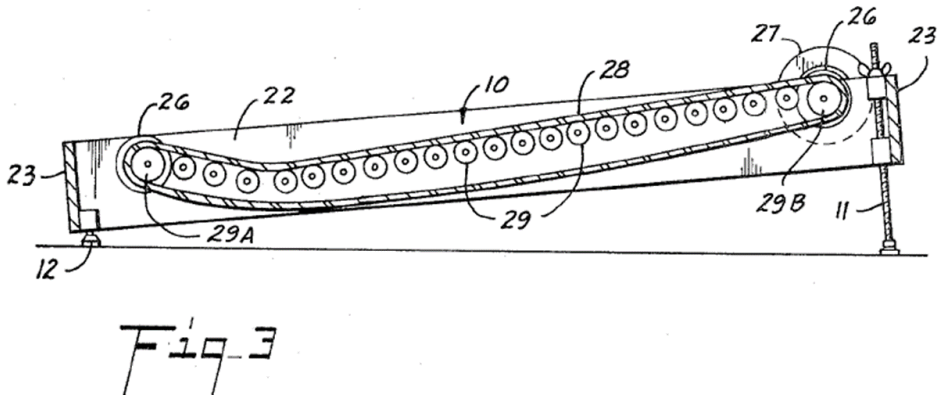
VI. Prior Art Overview

A. U.S. Patent No. 3,637,206 (Chickering")

Chickering discloses a manual treadmill with a belt supported by a plurality of rollers to form a curved running surface. (Ex.1013, Fig.3; 2:73-3:10.) Chickering further discloses that each end of the rollers is rotatably mounted to a support arm which is mounted to the frame. (Ex.1013, 1:72-2:12, Fig.1.) (Ex.1003, ¶118.)



Ex.1013, Fig.1



Ex.1013, Fig.3

B. U.S. Patent No. 5,538,489 ("Magid")

Magid discloses a manual treadmill with a belt supported by a plurality of rollers or a flat bearing surface. (Ex.1012, Figs.8, 1.) Magid also discloses a one-way clutch with a ratchet-and-pawl mechanism coupled to a front shaft or a rear shaft to permit only unidirectional belt movement. (Ex.1012, Fig.5, 4:46-60; Ex.1003, ¶120.)

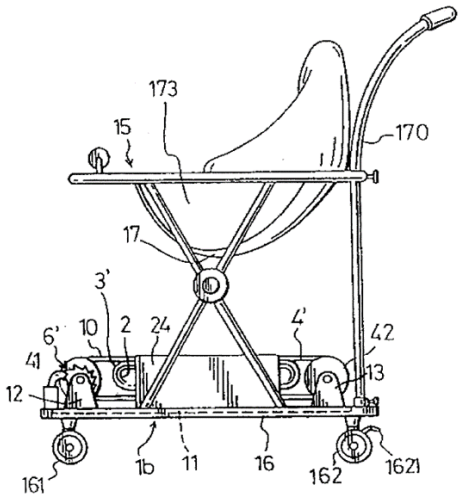


FIG. 5

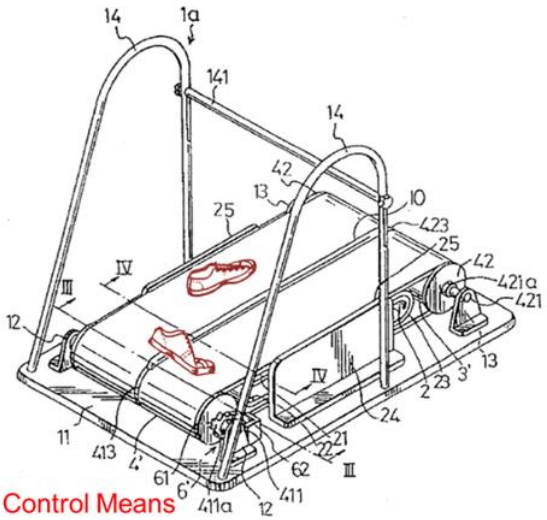


FIG. 2

Ex.1012, Figs.2,5

C. Neil Sclater, Mechanisms & Mechanical Devices Sourcebook, Third Ed. (McGraw-Hill 2001) ("Sclater")

Sclater is a reference sourcebook that "contains drawings and descriptions of more than 2000 different mechanisms and mechanical devices that have proven themselves in modern products, machines, and systems." (Ex.1017, Back Cover.) Sclater describes different types of coupling, clutching, and braking devices in Chapter 9, including ratchet clutches and one-way bearing assemblies that include sprags. (Ex.1017, 311-312; Ex.1003, ¶122.)

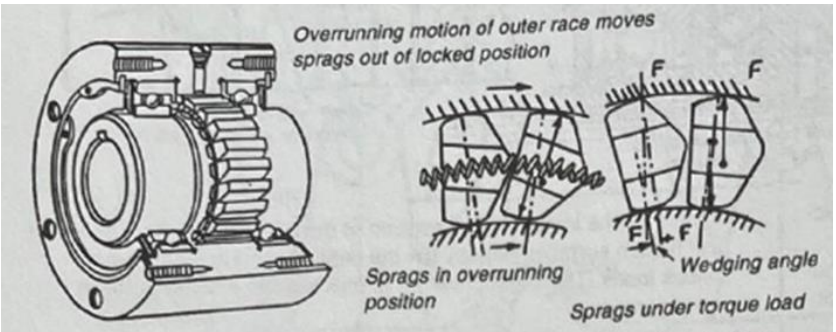


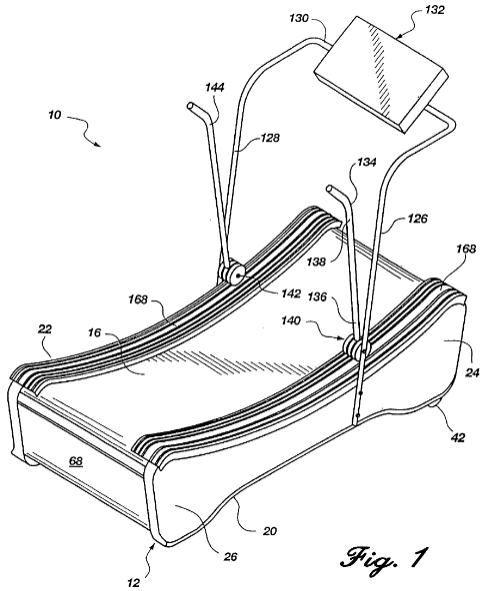
Fig. 1 Precision sprags act as wedges and are made of hardened alloy steel. In the formsprag clutch, torque is transmitted from one race to another by the wedging action of sprags between the races in one direction; in the other direction the clutch freewheels.

Ex.1017, 318

Sclater explains deficiencies of ratchet clutches as compared to roller and friction-type clutches, such as sprag-type one way bearings, including noise and speed limitations. (Ex.1017, 302-303, 316; Ex.1003, ¶123.)

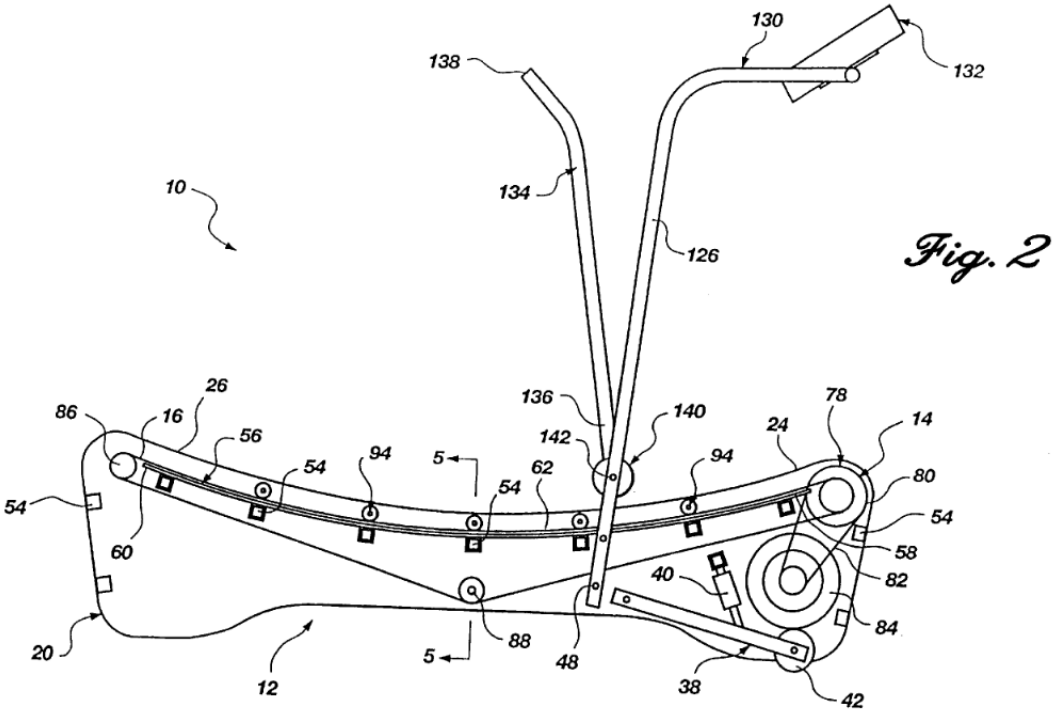
D. U.S. Patent No. 5,897,461 ("Socwell")

Socwell discloses a manual curved treadmill. (Ex.1011, 11:52-60.)



Ex.1011, Fig.1

The belt is looped around front and rear rollers, is supported by a curved deck, and is maintained in the curved shape by upper rollers positioned along the left and right sides of the belt. (Ex.1011, 3:30-36, 5:20-45, 7:31-42, 10:17-31.) The rollers are arranged curvilinearly to match the belt curvature. (Ex.1003, ¶126.)



Ex.1011, Fig.2

The bearings are mounted to the sides of the frame by cover members that are elongated and extend longitudinally. The cover members are bolted to the frame. (Ex.1011, 10:49-60, 11:15-33.) Socwell discloses adjustable support feet to adjust inclination of the running surface. (Ex.1011, 9:29-56; Ex.1003, ¶¶127-128.)

VII. Unpatentability Grounds

The references below render the challenged claims unpatentable under 35

U.S.C. §103 and the Petitioner therefore has a reasonable likelihood of prevailing as to each of the following grounds of unpatentability. 35 U.S.C. § 314(a); 37 C.F.R. § 42.104(b)(4).

A. Ground 1: Claims 1-5, 10-11, 14, 18, and 25 are Obvious over Chickering in View of Magid

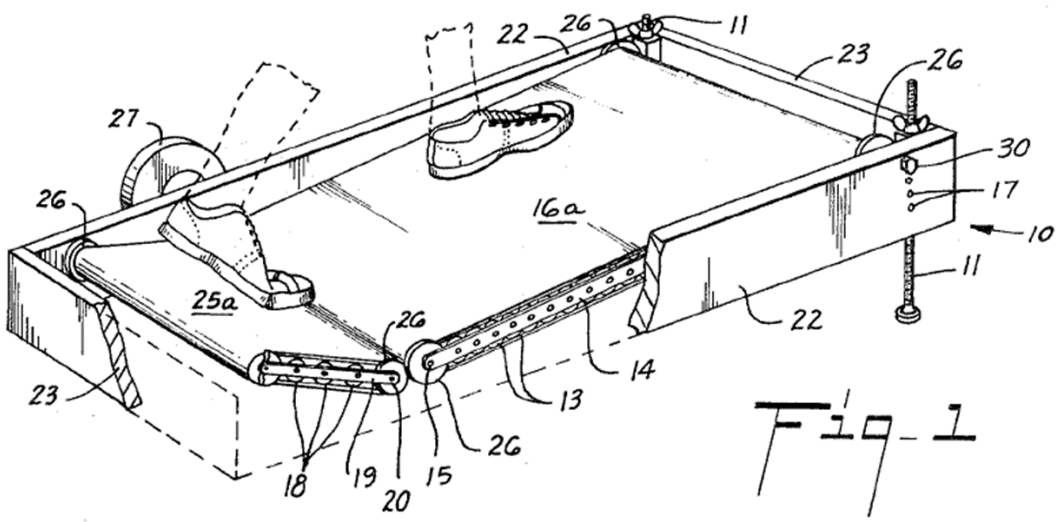
1. Independent Claims 1, 11, and 25[6]

… ***[1.0]/[11.0] A manually powered treadmill comprising:***

… ***[25.0] A method, comprising: providing a manually powered treadmill,***

Chickering discloses a "treadmill" having an adjustable inclination angle such that "[w]hen a faster pace is desired, the inclination of the tread surface 16a is increased…A slower pace is attained by reversing these operations." (Ex.1013, 2:43-48; *see also* 1:1-7.) A POSA would have understood this as a "*manually powered treadmill*." (Ex.1003, ¶¶130-133, 196, 219.)

[6] Appendix A includes a listing of all challenged claims and Appendix B includes a table comparing claims that are treated together.

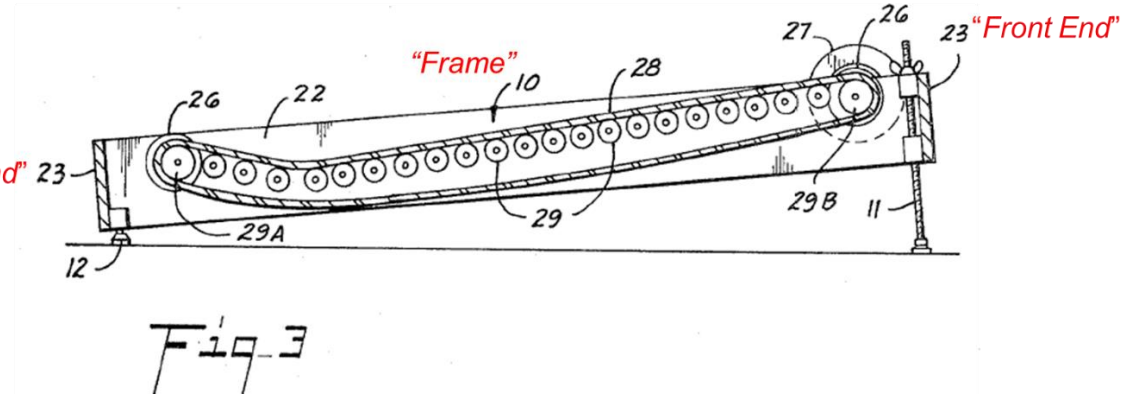


Ex.1013, Fig.1

… ***[1.1]/[11.1] a frame having a front end and a rear end positioned opposite the front end;***

… ***[25.1] the manually powered treadmill having a frame with a front end and rear end;***

Chickering discloses that the exercising device has a base 10 ("*frame*") "which comprises an inclined rectangular frame having two sidewalls 22 and two end walls 23" ("*a front end and a rear end*"). (Ex.1013, 1:65-68; Ex.1003, ¶¶134-135, 197, 219.)

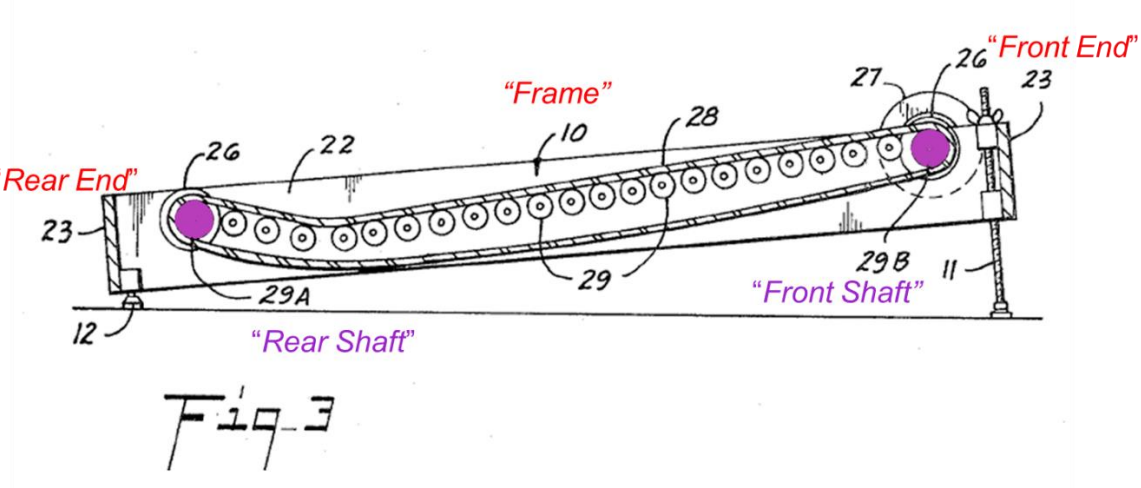


Ex.1013, Fig.3

… ***[1.2]/[11.2] a front shaft rotatably coupled [attached] to the frame at the front end;***

… ***[1.3]/[11.3] a rear shaft rotatably coupled [attached] to the frame at the rear end;***

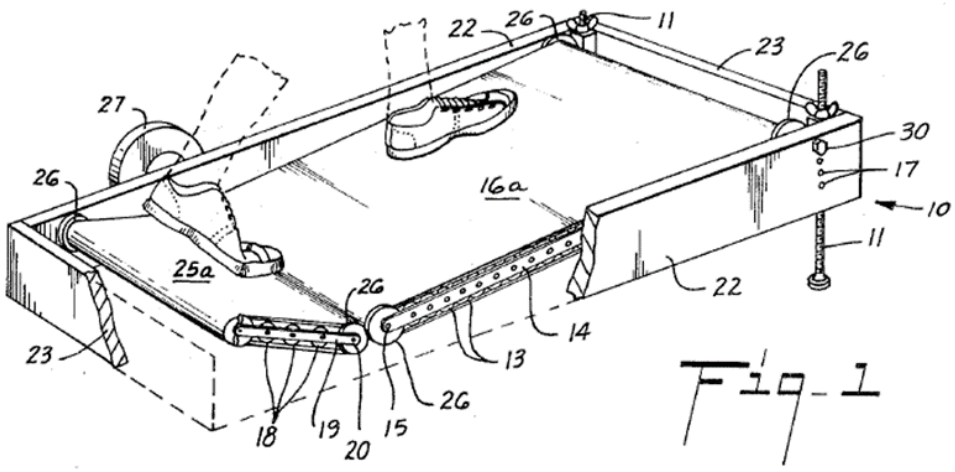
Chickering discloses front and rear end rollers 29b, 29a ("*front shaft*," "*rear shaft*") coupled/attached to a front and rear end of the base 10 ("*frame*"). "When a single belt is used … it may also be desirable to provide larger end rollers as at 29a and 29b to give a larger turning radius for the belt." (Ex.1013, 3:11-16; Ex.1003, ¶¶136, 198-199, ¶¶140, 200-202.)



Ex.1013, Fig.3

Chickering discloses that "rollers 29 are provided journaled in the sidewalls 22 of base 10." (Ex.1013, 2:75-3:2.)

Referencing Figures 1 and 2, Chickering also discloses rollers 13, 18 "journaled in [support] arms" 14, 19. (Ex.1013, 2:14-18.) The support arms 14, 19 are "pivotally connected at [15 and] 20 to each sidewall 22" of the base 10 ("*frame*"). (Ex.1013, 2:2-10.) A journal or sleeve bearing is a plain bearing in which a journal shaft rotates. (Ex.1016, at 2-1, 2-2; Ex.1003, ¶¶137, 141.)

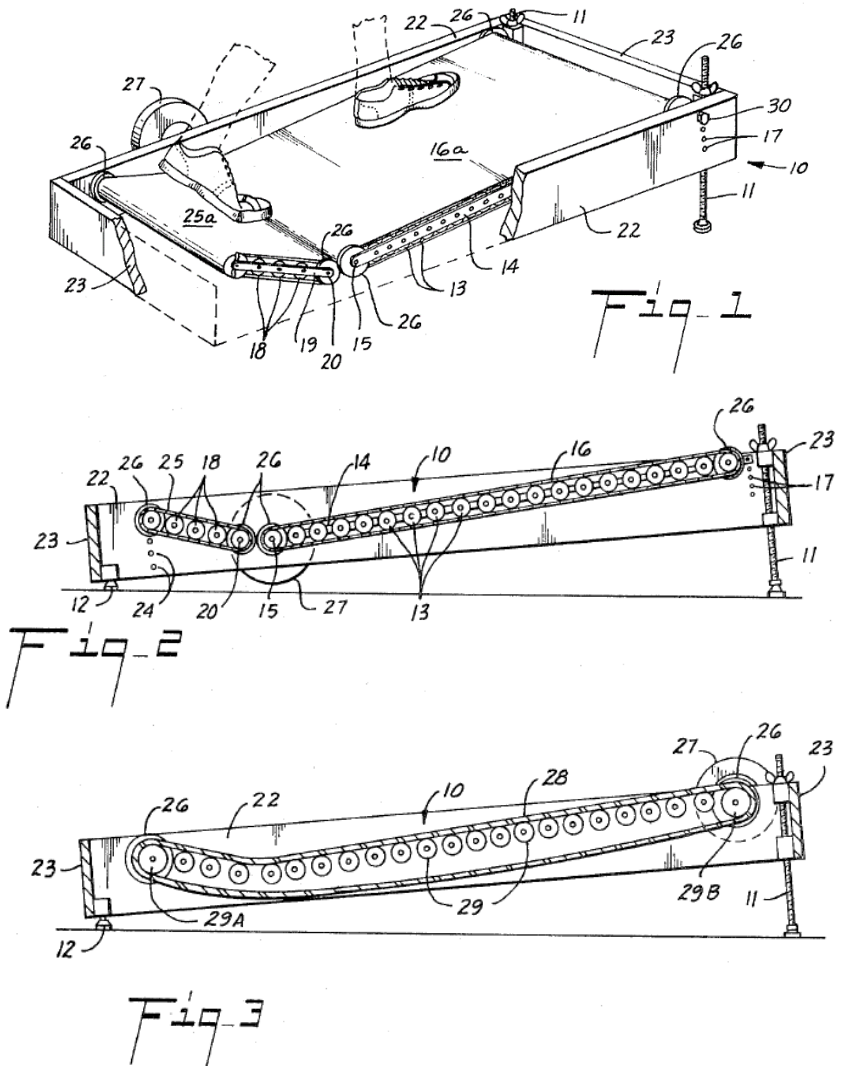


Ex.1013, Fig.1

As described below with reference to claim limitations [1.4]-[1.5], a POSA would have been motivated to modify Chickering's single belt treadmill to include the support arms 14, 19 of the two belt treadmill, such that the rollers, including front and rear end rollers 29b, 29a ("*front shaft*," "*rear shaft*"), are journaled to support arms 14, 19, which are pivotally connected to base 10 ("*frame*"). (Ex.1003, ¶¶138-139, 142-142.)

> … ***[1.4]/[11.4] a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;***
>
> … ***[1.5]/[11.5] a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;***
>
> … ***[25.2] [a] providing a first bearing rail and a second bearing rail, the first and second bearing rails each comprising a plurality of bearings and [b] extending longitudinally on the frame, [c] wherein the first and second bearing rails define a curved top profile;***

Chickering discloses a single belt treadmill embodiment (Figure 3) and a two-belt treadmill embodiment (Figures 1 and 2). Chickering describes the advantages and disadvantages of each, and claims both. (Ex.1013, 3:18-37, claim 1, claim 6; Ex.1003, ¶¶144, 203, ¶¶156, 204, ¶220.)



Ex.1013, Figs.1,2,3

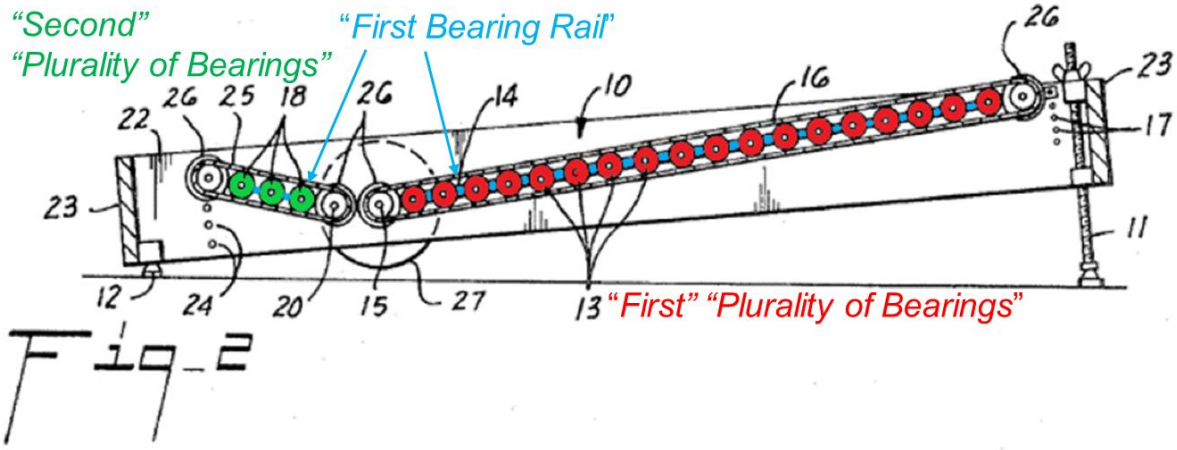
Chickering discloses pairs of support arms 14, 19 ("*bearing rails*") that support rollers ("*bearings*") and are connected to opposing sidewalls 22 of base 10

("*frame*"):

> In the embodiment as illustrated in FIGS 1 and 2 a first and second series of such transverse parallel rollers are carried by the base preferably as follows: Two elongate **support arms 14** are provided, one such arm being pivotally mounted at 15 to the inside of each sidewall 22 of base 10.
>
> * * *
>
> Two other … shorter **support arms 19** are carried by base 10, one arm 19 being pivotally connected at 20 to each sidewall 22.

(Ex.1013, 1:74-2:9.)

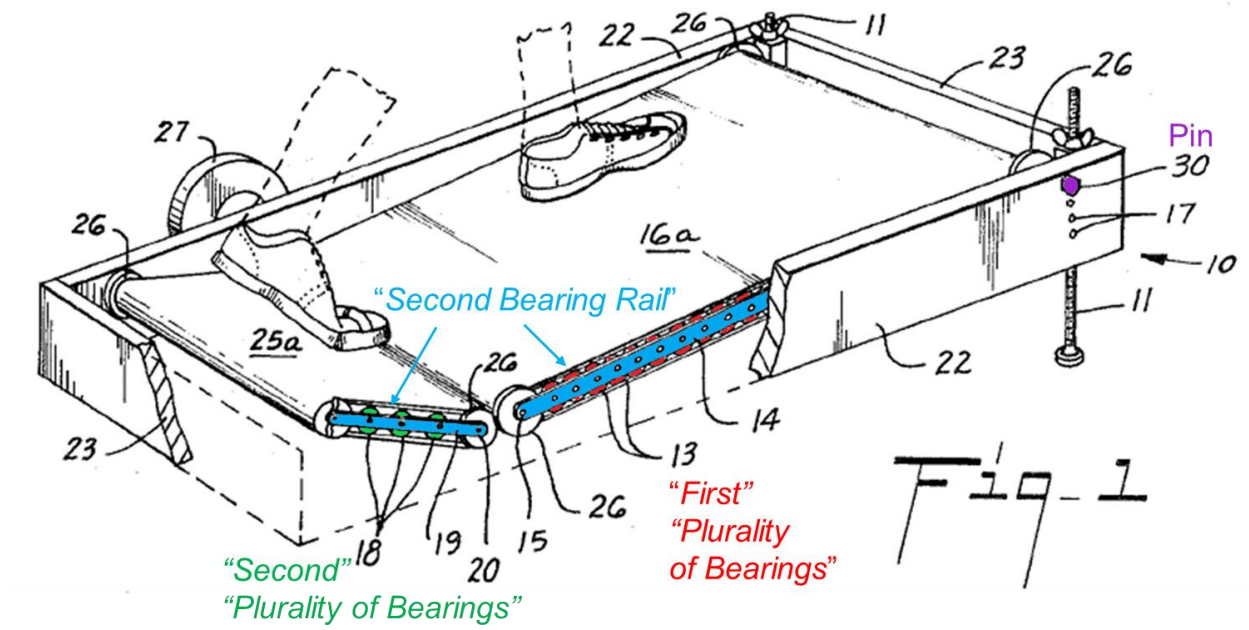
Chickering's left front and rear support arms 14, 19, as illustrated below, collectively satisfy the "*first bearing rail*" claim limitation. Chickering's rollers 13 (red) satisfy the associated "*plurality of bearings*" claim limitation.



Ex.1013, Fig.2

Chickering's right front and rear support arms 14, 19 collectively satisfy the

"*second bearing rail*" claim limitation. Chickering's rollers 18 (green) satisfy the associated "*plurality of bearings*" claim limitation.

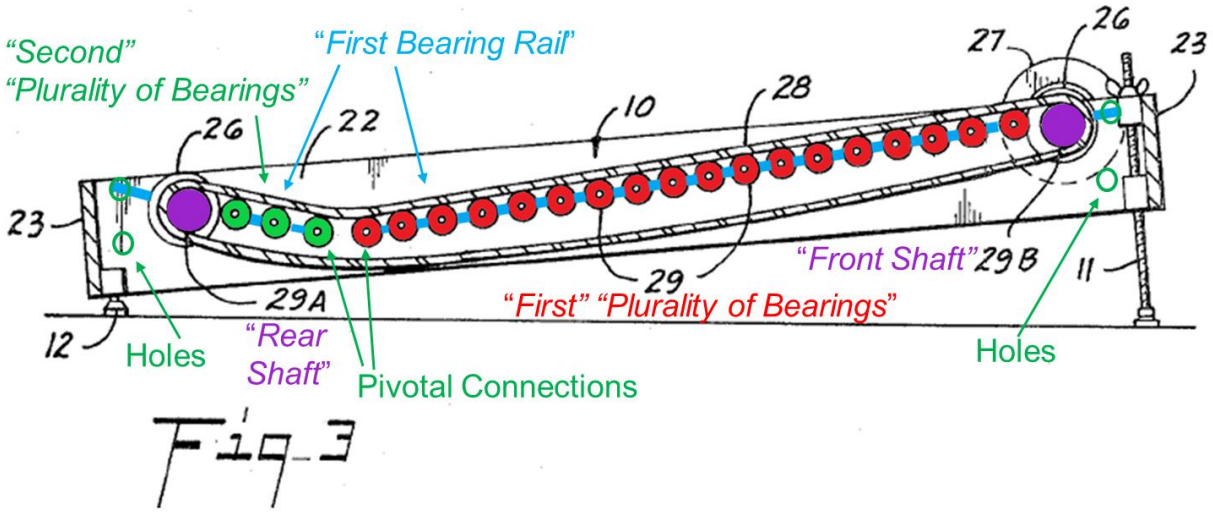


Ex.1013, Fig.1

Chickering discloses that support arms 14, 19 ("*bearing rails*" (blue)) are pivotally connected to a central portion of base 10 at pivotal connections 15 and 20 for adjusting the inclination of the belt. (Ex.1013, 1:74-2:4.) The forward ends of front support arms 14 and the rearward ends of rear support arms 19 are connected to the frame 10 by pins 30 that extend through holes 17, 24 at different adjustment positions. (Ex.1013, 2:4-2:12; 2:27-31; Figs.1,2.)

A POSA would have been motivated to modify Chickering's single belt embodiment of Figure 3 to include support arms 14, 19 ("*bearing rails*" ((blue)) to

allow a user to adjust the tread surface inclination, as taught with reference to Figure 1. (Ex.1003, ¶¶153, 203; ¶¶156, 204.) Adjusting the inclination is one way to adjust running speed on a manual treadmill. "When a faster pace is desired, the inclination of the tread surface 16a is increased by moving pins 30 into one of the upper holes 17 … [and a] slower pace is attained by reversing these operations." (Ex.1013, 2:44-49.) The modification would include the roller ends being journaled in the support arms ("*bearing rails*") rather than the frame. (Ex.1013, 2:14-18.)



Ex.1013, Fig.3

The modification would also include pivotally connecting the central rollers to base 10 as shown above (labelled in green as "pivotal connections"). A front pin (not shown) would extend through one of the front holes (shown in green) of the frame to couple the front roller 29b to the frame, and a rear pin (not shown) would

extend through one of the rear holes (also in green) of the frame to couple the rear roller 29a to the frame.

> … ***[25.2] the first and second bearing rails … [b] extending longitudinally on the frame, [c] wherein the first and second bearing rails define a curved top profile;***

Regarding the additional limitations of Claim [25.2][b]-[c], as illustrated in Figure 3 above, Chickering discloses that support arms 14, 19 ("*first and second bearing rails*") are pivotally connected to a central portion of base 10 ("*frame*") at pivotal connections and extend longitudinally between front and rear end rollers 29b, 29a ("*front shaft*," "*rear shaft*"). (Ex.1013, 1:74-2:4; Fig.1; Ex.1003, ¶¶221-222.) Chickering also discloses that belt 28 ("*running belt*") is placed on the rollers ("*bearings*") supported by support arms 14, 19 ("*first and second bearing rails defin[ing] a curved top profile*") such that the belt follows their curved profile. (Ex.1013, 2:73-3:10.) (Ex.1003, ¶¶223-225.)

> … ***[1.6] a running belt supported by the first bearing rail and the second bearing rail and disposed about the front shaft and the rear shaft, wherein the running belt follows a curved running surface; and***

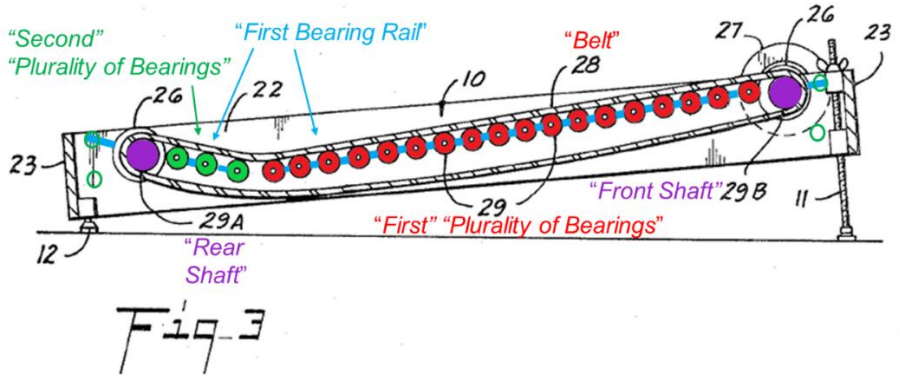
> … ***[11.6][a] a running belt at least partially disposed about the front shaft and the rear shaft and at least partially supported by the first bearing rail and the second bearing rail,***

… ***[25.3] disposing a running belt on the plurality of bearings of the first bearing rail and the second bearing rail such that the running belt follows a top curved running surface corresponding to the curved top profile of the first and second bearing rails;***

Chickering discloses an "**endless belt 28**" ("*running belt*") disposed about front and rear rollers 29b, 29a ("*front shaft*," "*rear shaft*" (purple)) and on rollers 29 ("*bearings*" (red and green)), to follow their curved contour:

> Thus, when **the endless belt 28** is placed about the rollers, it follows their contour and provides a forward accelerating area and a rear decelerating area which are **inclined from the horizontal** with each being lowest at their point of nearest proximity.

(Ex.1013, 2:73-3:10.)



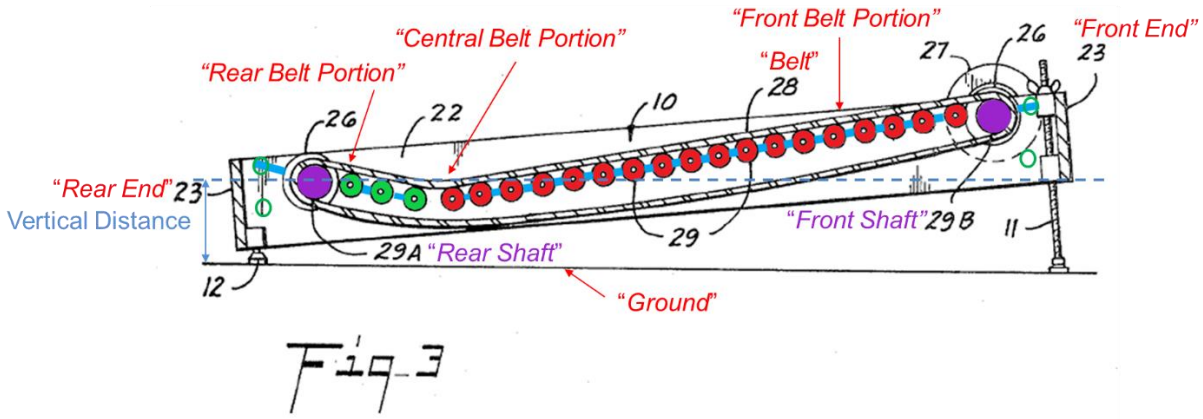
Ex.1013, Fig.3

As described above for claim limitations [1.4] and [1.5], Chickering's single belt embodiment is modified to include the support arms ("*bearing rails*") that support the rollers and running belt 28 and collectively form the curved running

surface. (Ex.1003, ¶¶161-164, 205, 226-228.)

> … ***[11.6][b] wherein the running belt includes a front belt portion proximate the front end, a rear belt portion proximate the rear end, and a central belt portion intermediate the front and rear belt portions, wherein the central belt portion is positioned vertically closer to a ground surface supporting the frame than the front and rear belt portions such that the running belt follows a curved running surface; and***

As shown below, Chickering discloses that belt 28 includes a "*front belt portion*" proximate the "*front end*" wall 23, a "*rear belt portion*" proximate the "*rear end*" wall 23, and a "*central belt portion*" between front and rear end walls 23. The "*central belt portion*" is positioned vertically closer to a "*ground surface supporting the frame*" (base 10) than the "*front and rear belt portions*," as depicted by the blue vertical distance annotation, such that belt 28 follows a "*curved running surface*." (Ex.1003, ¶206.)



Ex.1013, Fig.3

… ***[1.7] [a] a safety device coupled to at least one of the front shaft and the rear shaft,***

Magid discloses an exercise apparatus with a ("*safety device*") "unidirectional **control means** 6, 6' installed to permit only unidirectional movement of the left and right foot belts 4, 4'." (Ex.1012, 4:46-49; Ex.1003, ¶¶165-169.)

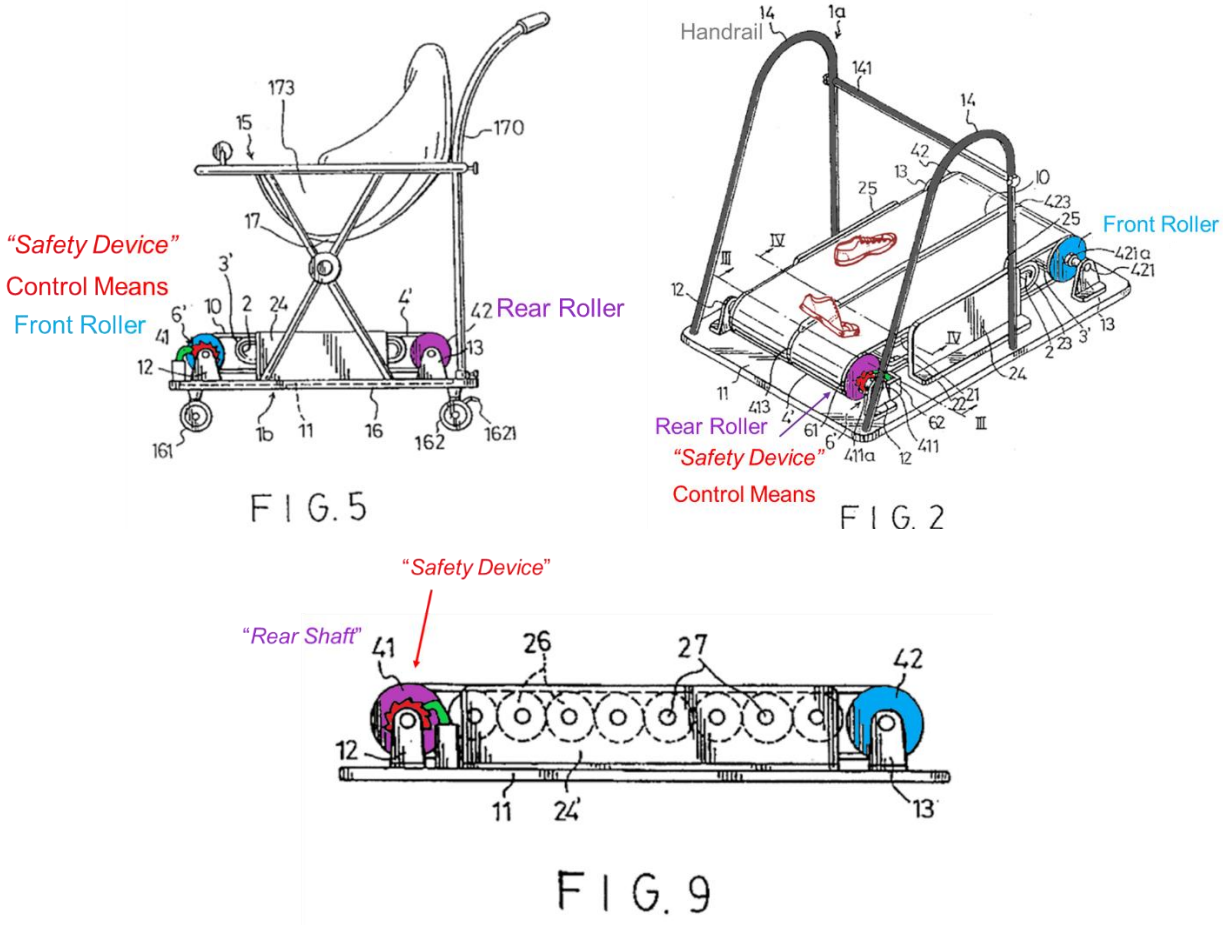


FIG. 5 FIG. 2 FIG. 9

Ex.1012, Figs.2,5,9

As illustrated above, control means 6, 6' may be attached to the front rollers 41 (Fig.5) or the rear rollers (Figs. 2, 9). Magid discloses that the "unidirectional

control means 6,6' … permit only unidirectional rotation of the front rollers 41." (Ex.1012, 4:46-59, Fig.5; Ex.1003, ¶166.) Magid also discloses that "ratchet gears may be attached to the rear rollers 42 to achieve the same result." (Ex.1012, 4:58-59, Fig. 2; Ex.1003, ¶166.) Therefore, although Magid mislabels the front and rear rollers with the wrong reference numerals in Figures 2 and 9, a POSA would have understood from this statement, along with the orientation of the handrail 14 and ratchet gear 61, that the control means 6, 6' are mounted to the rear rollers in Figures 2 and 9. (Ex.1003, ¶¶167-168.)

> … ***[1.7] [b] wherein the safety device is structured to substantially prevent rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.***
>
> … ***[11.7] a safety device for substantially preventing rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.***
>
> … ***[25.4] permitting movement of the running belt in a first direction; and***
>
> … ***[25.5] substantially preventing movement of the running belt in a second direction opposite the first direction.***

Magid discloses that "unidirectional control means 6,6' … permit only unidirectional rotation of the front rollers 41, thereby preventing bidirectional movement of the foot belts 4, 4'. (Ex.1012, 4:46-59; Ex.1003, ¶170.) As shown below, Magid further discloses "the control means 6, 6' includes a pair of ratchet gears 61 [red] attached to outer ends of the front rollers 41 and mounted rotatably on the first shaft 411, and a pair of pawls 62 [green] secured to the base 11 and engaging one of the ratchet gears 61 [red]." (Ex.1012, 4:46-59; Ex.1003, ¶¶171-172.)

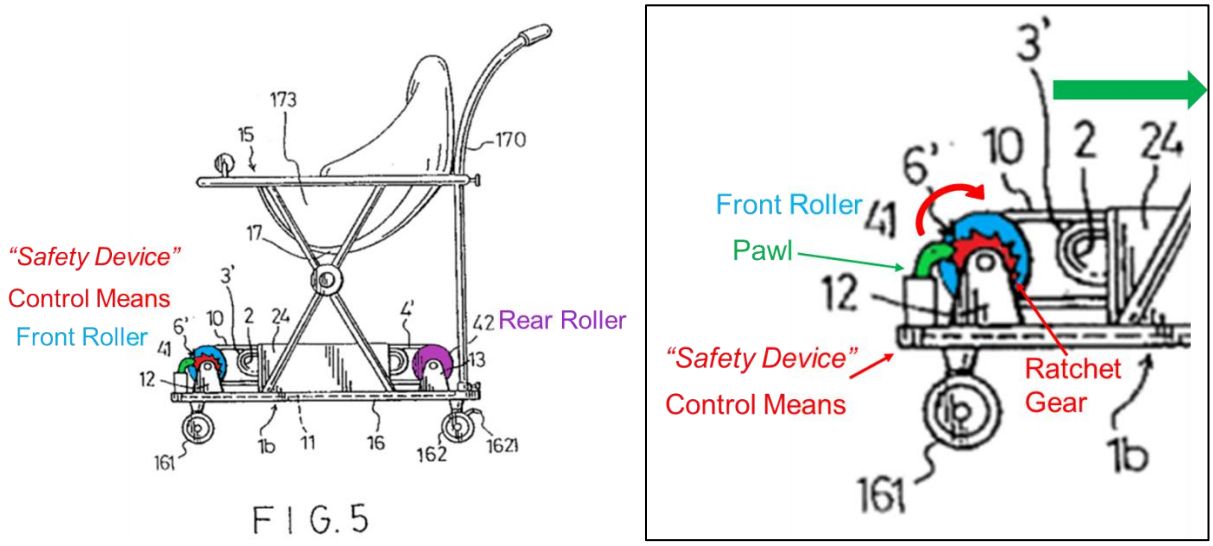


FIG. 5

Ex.1012, Fig.5

The above figures illustrate how the ratchet gear / pawl interface permits front roller 41 (blue) to freewheel clockwise (red arrow) which allows the running surface 10 to move rearward (green arrow). The figures also illustrate how the ratchet gear/pawl interface prevents counterclockwise rotation of front roller 41

(blue) to prevent the belt 10 from moving forward (to the left in image). (Ex.1003, ¶173.)

Magid also discloses that "ratchet gears may be attached to the rear rollers 42 to achieve the same result." (Ex.1012, 4:58-59.) With reference to Figure 2 below, Magid discloses control means 6, 6' with ratchet gears 61 (red) attached to the outer ends of the rear rollers and a pawl 62 (green) secured to base 11 to engage each ratchet gear 61 (red). (Ex.1012, 4:46-59; Ex.1003, ¶172.)

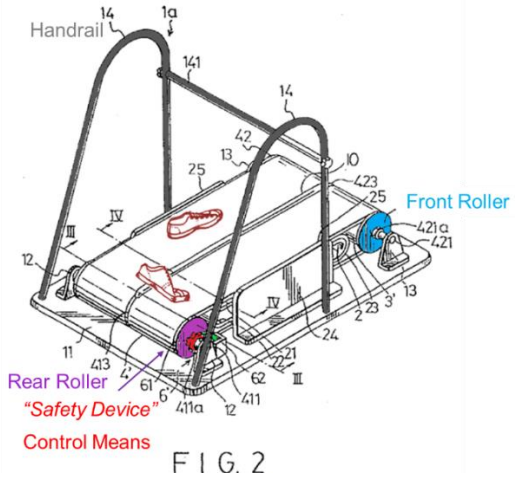
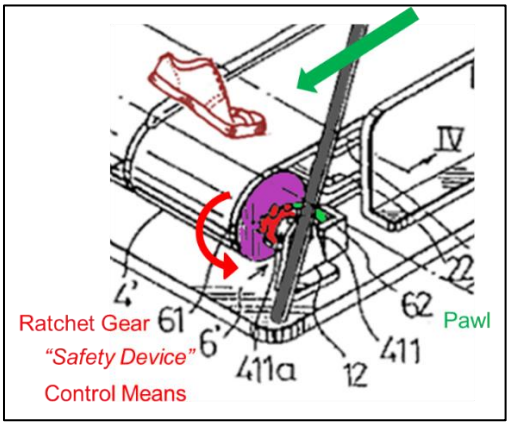


FIG. 2



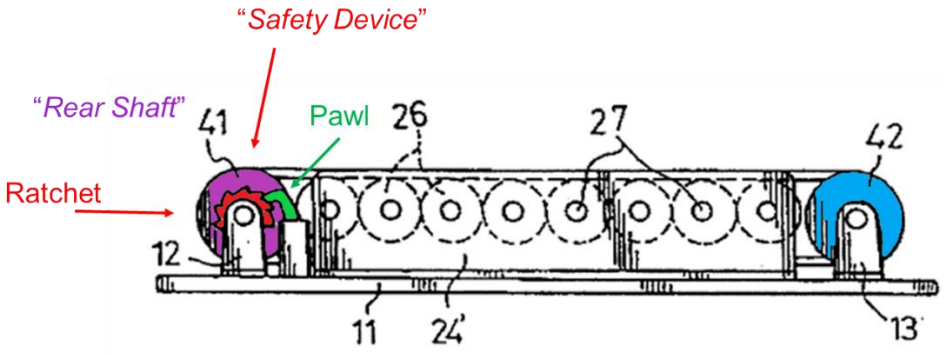


FIG. 9

Ex.1012, Figs.2,9

The above figures illustrate how the ratchet gear/pawl interface permits rear roller 41 to freewheel counterclockwise (red arrow), which allows the running surface to move rearward (green arrow). The figures also illustrate how the ratchet gear/pawl interface prevents clockwise rotation of the rear roller 41 to prevent the belt from moving forward (to the right in image). (Ex.1003, ¶173.)

2. Rationale to Combine Chickering and Magid

It would have been obvious to a POSA to combine the manual curved treadmill disclosed in Chickering with the known technique of a one-way clutch to prevent belt motion in a forward direction as disclosed in Magid. (Ex.1003, ¶¶230-243.)

Chickering and Magid are from the same field – manual treadmills for exercise (Ex.1013, 1:1-7; Ex.1012, 1:53-55; 3:23-27) – and both disclose a running belt supported by rollers. (Ex.1013, 2:73-3:6, Fig.3; Ex.1012, 6:46-53, Fig.8; Ex.1003, ¶231.)

It has long been recognized that users may be injured by falling off a treadmill while mounting or dismounting, or using it:

> A person exercising on this type of treadmill is likely to lose his balance because the frictionless surface offers no resistance to the movement of his feet, and he is therefore unable to obtain the leverage necessary for proper balance. Also, the user is likely to run off the

> lower end of the treadmill because the faster he runs the faster the belt accelerates and moves beneath his feet, carrying him to the rear.

(Chickering, Ex. 1013, 1:30-37.)

> In particular, if the rollers supportably disposed in relation to the endless belt are so easily moveable, the user may potentially lose his equilibrium or balance and fall from the exercise treadmill resulting in possible injuries.

(Socwell, Ex. 1011, 1:32-36.)

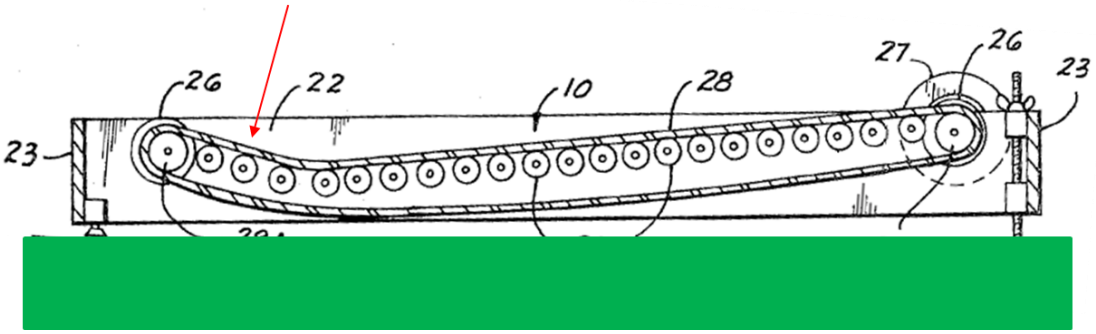
> Another meaningful disadvantage of exercise treadmills of the prior art is the inherent danger associated with users tending to fall off the back end of the treadmill and become injured.

(Socwell, Ex. 1011, 2:45-48; Ex.1003, ¶232.)

Professional organizations have produced standards regarding exercise equipment safety generally, and for treadmill safety. *See* ASTM Standard, Ex.1019; ISO Standard, Ex.1020; and ACCC Product Safety Supplier Guide, Ex.1007. (Ex.1003, ¶¶232-233.)

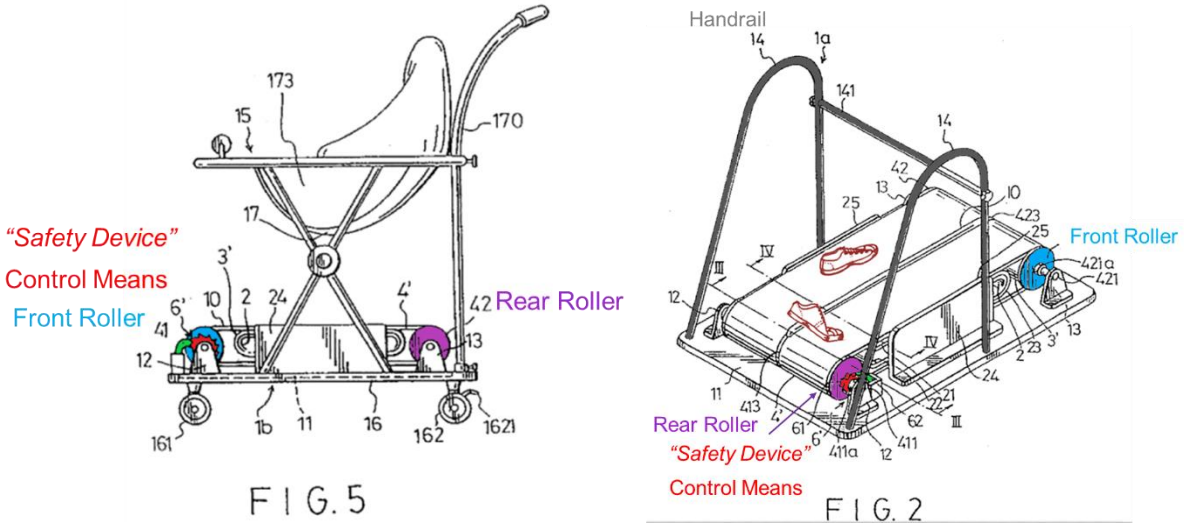
Chickering proposes a curved surface treadmill to address stability issues. (Ex.1013, 2:37-39; Ex.1003, ¶234.) However, Chickering does not expressly address the safety issue of the belt moving forward when a user steps onto the treadmill. For example, with a curved running surface, such as disclosed in Chickering, forward motion is likely to occur if a user were to step onto the

rearward end of the surface (red arrow), causing the foot to unexpectedly move towards the lower portion of the treadmill. Where a user adjusts the frame to a generally horizontal position using the front jackscrew, as depicted below, this unexpected motion would be exacerbated. (Ex.1003, ¶235.)



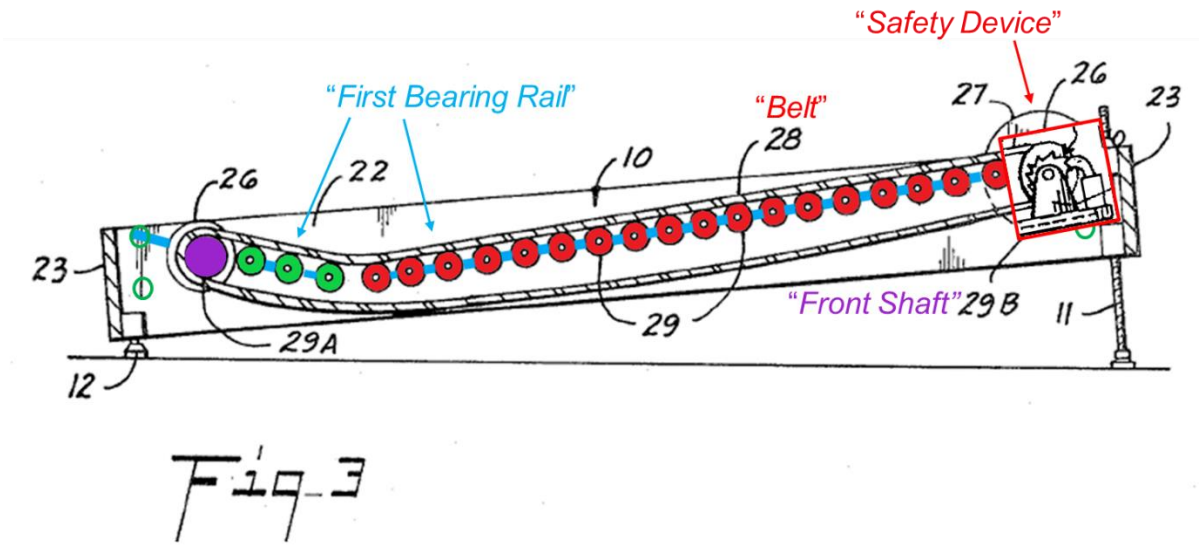
Ex.1013, Fig.3

Magid discloses a one-way clutch (control means 6, 6') operably coupled to a front shaft (Fig.5) or rear shaft (Fig.2) to permit only unidirectional belt movement. (Ex.1012, Fig.5, 4:46-59; Ex.1003, ¶238.)

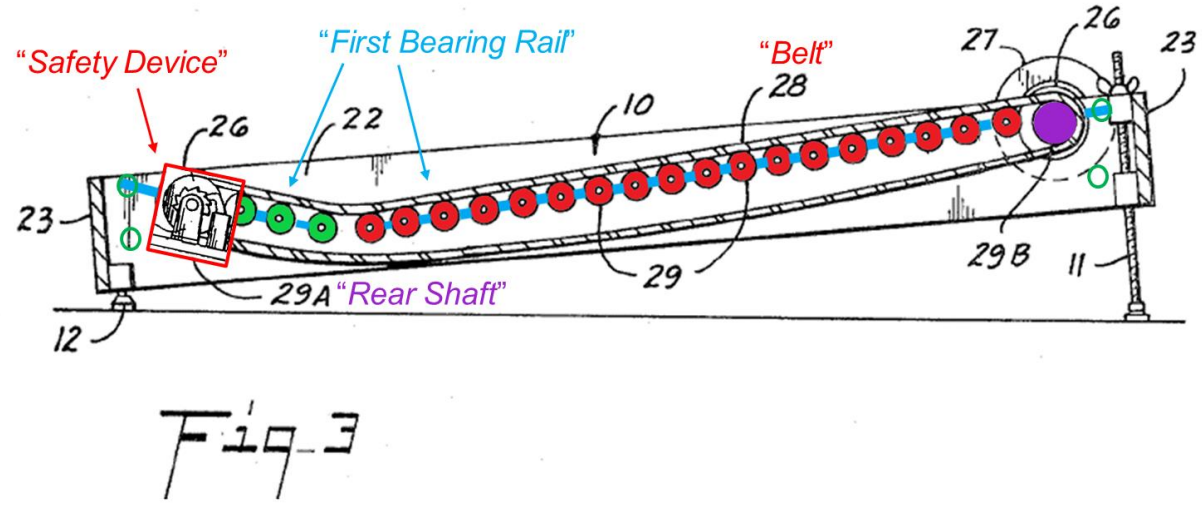


Ex.1012, Figs.2,5

A POSA would have been motivated to modify Chickering to include Magid's control means 6, 6' mounted to the front roller or the rear roller as shown below, to permit only unidirectional belt movement to reduce the risk of a user stepping onto the belt and losing their balance when the belt moves forward. (Ex.1003, ¶¶239-240.)



Ex.1013, Fig.3; Ex.1012, Fig.2



Ex.1013, Fig.3; Ex.1012, Fig.9

The modification would include mounting at least one one-way ratchet clutch to the front or rear roller. The rachet gear would be mounted coaxially with the roller and the pawl would be mounted adjacent the ratchet gear, as taught by Magid. For example, the pawl could be coupled to the support arm. (Ex.1003, ¶241.)

This modification would have been a simple combination of known elements in the prior art: Chickering's manual treadmill with a curved running surface and Magid's one-way ratchet clutch. As illustrated above in both figures, the pawl is arranged forward the ratchet gear and biased to engage the teeth. The ratchet gear teeth are swept forward to yield predictable results: 1) permitting the ratchet gear to overrun counterclockwise to allow rearward belt motion, and 2) provide a backstop by preventing the ratchet gear from rotating clockwise to prevent, or allow only minimal, forward belt motion. (Ex.1003, ¶242.)

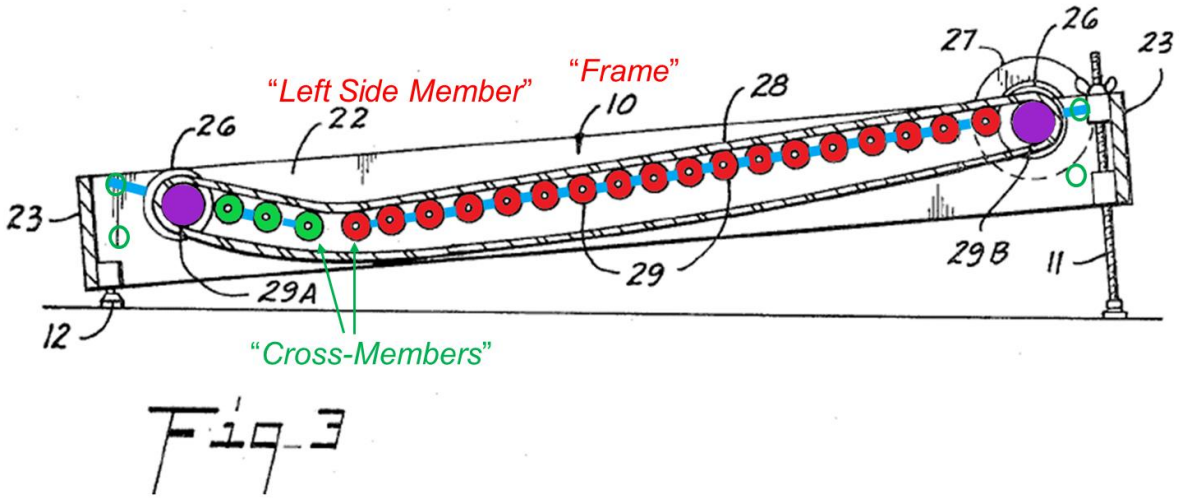
The modification would also be the use of a known technique, using a one-way clutch in a backstopping mode of operation, to improve similar devices, *i.e.*, treadmills, in the same way, *i.e.*, to provide unidirectional belt motion. (Ex.1012, 4:48-54; Ex.1003, ¶243.)

B. Dependent Claims 2-5, 10, 14, and 18

… ***[2] The manually powered treadmill of claim 1, wherein the frame includes at least one cross-member, a left side member, and a***

right side member; and wherein the at least one cross-member extends between the left side member and the right side member.

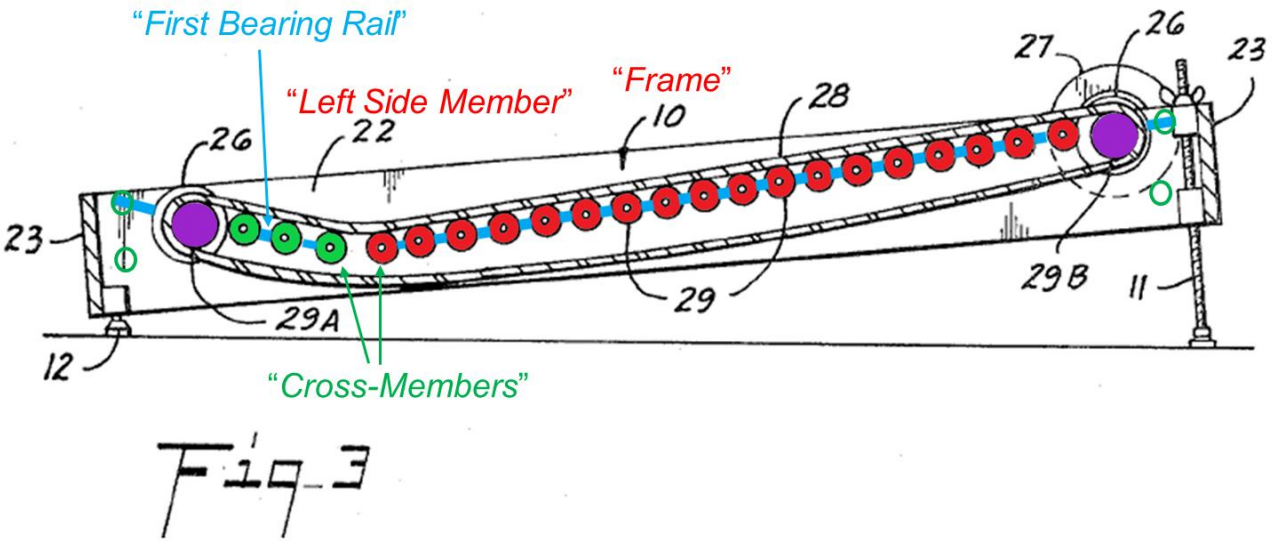
Chickering's single belt treadmill, modified to include "*bearing rails*," includes central rollers with pivotal connections ("*cross-member*") that extend between central portions of the sidewalls 22 of base 10 ("*left side member and right side mem*ber") to allow adjustment of the belt inclination. (Ex.1013, 1:74-2:12; Ex.1003, ¶¶177-180.)



Ex.1013, Fig.3

… ***[3] The manually powered treadmill of claim 2, wherein each one of the first and second bearing rails are coupled to at least one of the at least one cross-member.***

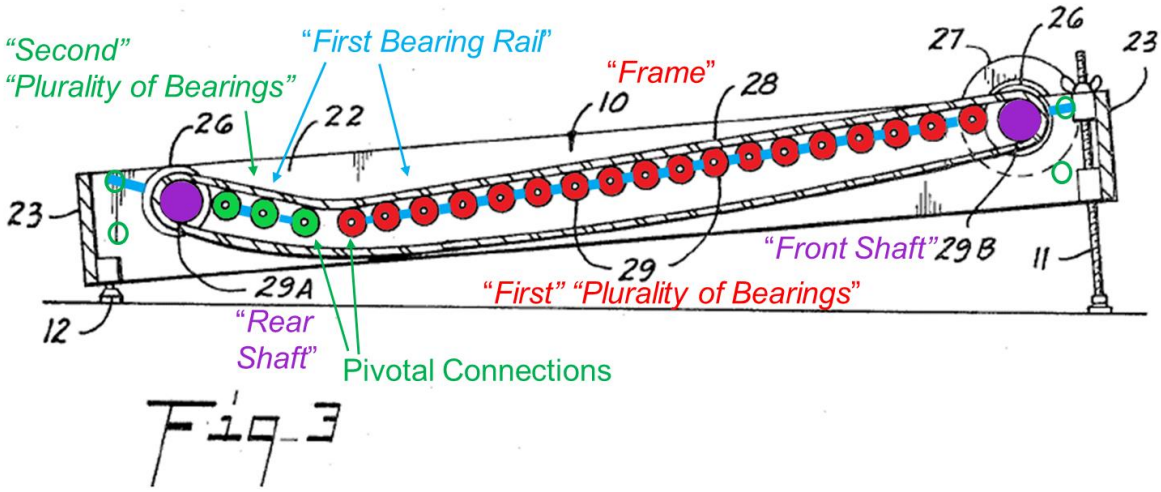
Chickering discloses that the central rollers with pivotal connections ("*cross members*") are coupled to the pairs of support arms 14, 19 ("*first and second bearing rails*"). (Ex.1013, 1:74-2:12; Ex.1003, ¶¶181-183.)



Ex.1013, Fig.3

… ***[4.]/[18.] The manually powered treadmill of claim 1 [claim 11], wherein each [one] of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.***

Chickering discloses support arms 14, 19 ("*first and second bearing rails*") pivotally connected to a central portion of base 10 ("*frame*") at pivotal connections 15 and 20 and extending longitudinally between front and rear end rollers 29b, 29a ("*front shaft*," "*rear shaft*"). (Ex.1013, 1:74-2:4; Fig.1; Ex.1003, ¶¶184-186, ¶¶215-216.)

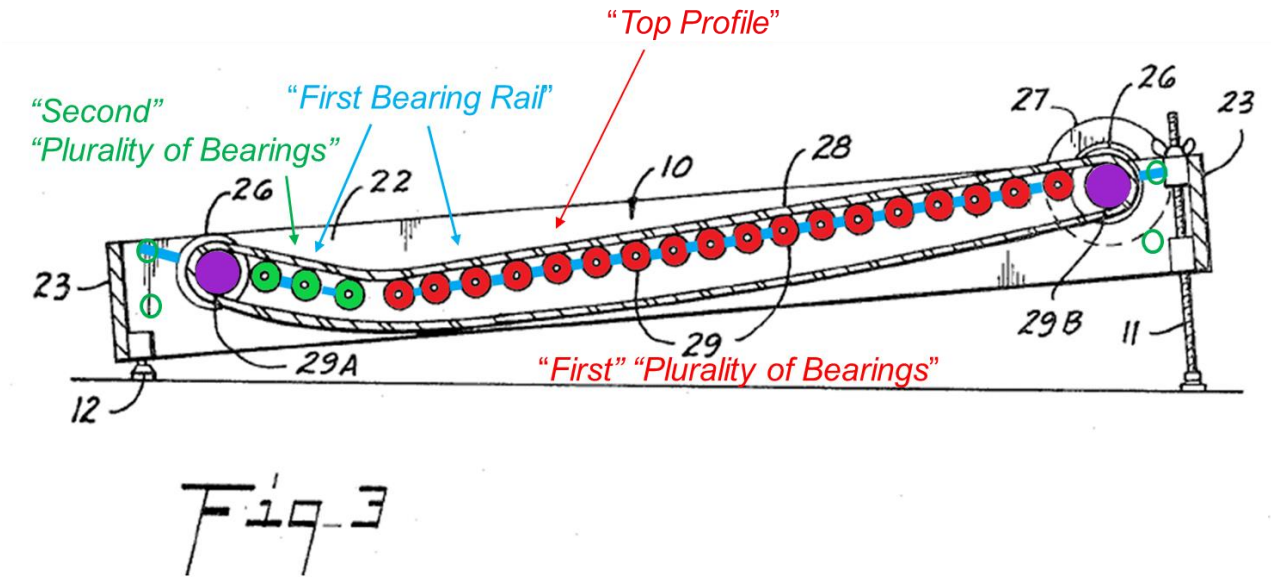


Ex.1013, Fig.3

… ***[5.] The manually powered treadmill of claim 1, wherein each one of the first bearing rail and the second bearing rail define in part a top profile corresponding to the curved running surface.***

Chickering discloses that "when the endless belt 28 ["*running belt*"] is placed about the rollers ["*bearings*"], it follows their contour and provides a forward accelerating area and a rear decelerating area which are inclined from the horizontal with each being lowest at their point of nearest proximity." (Ex.1013, 2:73-3:10.)

As illustrated below, the upper surfaces of the rollers 29 ("*bearings*") supported by the support arms ("*bearing rails*") define a "*top profile*" that engages belt 28 to form the "*curved running surface*." (Ex.1013, 2:2-9, Fig. 3.) (Ex.1003, ¶¶187-189.)



Ex.1013, Fig.3

… ***[10.] The manually powered treadmill of claim 1, further comprising a handrail attached to the frame and structured to provide a support structure for the user of the manually powered treadmill.***

Chickering discloses its treadmill may be provided with "handles, railings and the like." (Ex.1013, 3:38-41.) Magid discloses (see below), "a pair of handrails 14 mounted on opposite longitudinal sides of the base 11 to permit use of the walker apparatus as an exercise walker." (Ex.1012, 5:45-48.)

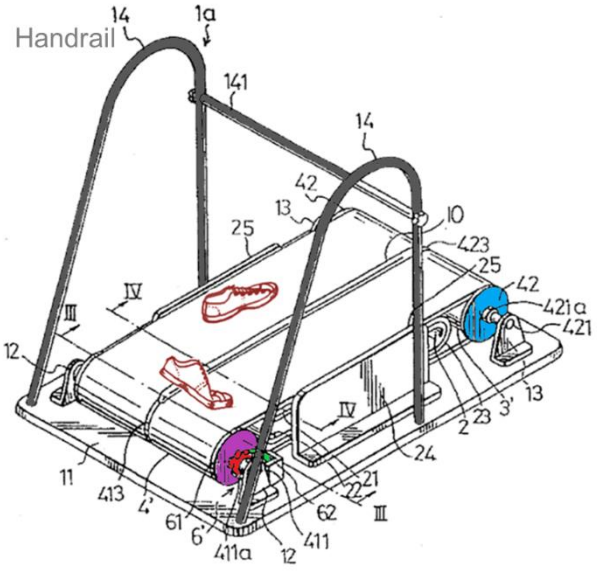


FIG. 2

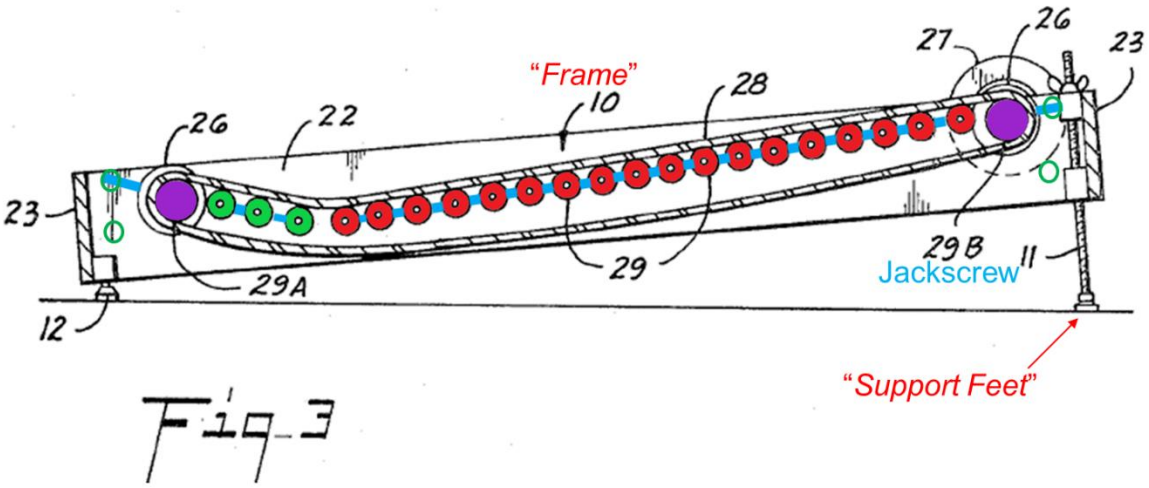
Ex.1012, Fig.2

Chickering provides express motivation to add a handrail, such as that disclosed in Magid. (Ex.1013, 3:38-41.) Further such handrails are required for safety by ASTM and ISO Standards. (Ex.1019, 4; Ex.1020, 8.) (Ex.1003, ¶¶190-193.)

> … ***[14.] The manually powered treadmill of claim 11, further comprising support feet coupled to the frame, wherein the support feet are vertically adjustable to adjust an incline of the manually powered treadmill relative to the ground surface.***

The Chickering treadmill includes "jackscrews 11 [that] are provided at the forward corners of base 10 for adjusting its angle of inclination. Leveling buttons 12 may be used on the rear corners to keep the base steady." (Ex.1013, 1:69-71.) As illustrated in Figure 3, the leveling buttons ("*support feet*") are attached at the

ends of the jackscrews 11 to couple to the base 10 ("*frame*"). (Ex.1003, ¶¶212-214.)

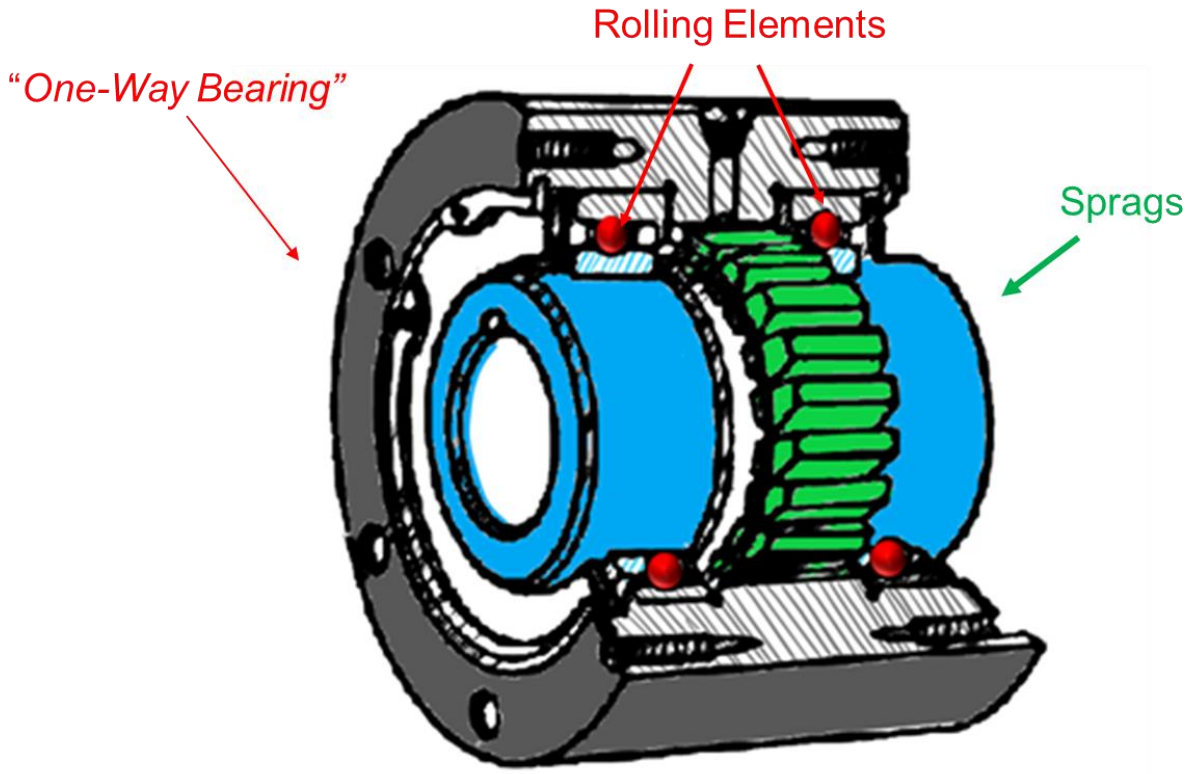


Ex.1013, Fig.3

C. Ground 2: Claims 6-9, and 12 are Obvious over Chickering and Magid in View of Sclater

… ***[6]/[12] The manually powered treadmill of claim 1, wherein the safety device includes a one-way bearing.***

Sclater discloses a one-way bearing assembly that includes sprags, combined with rolling elements, such as cylindrical rollers or balls, to provide one-way functionality. "Sprags [green] combined with cylindrical rollers in a bearing assembly can provide a simple, low-cost method for meeting the torque and bearing requirements of most machine applications." (Ex.1017, 312.) Sclater discloses this assembly functions as a one-way bearing by providing "one-direction only torque transmission in an overrunning clutch." (*Id*; Ex.1003, ¶248.)



Ex.1017 at 318

Sclater further discloses:

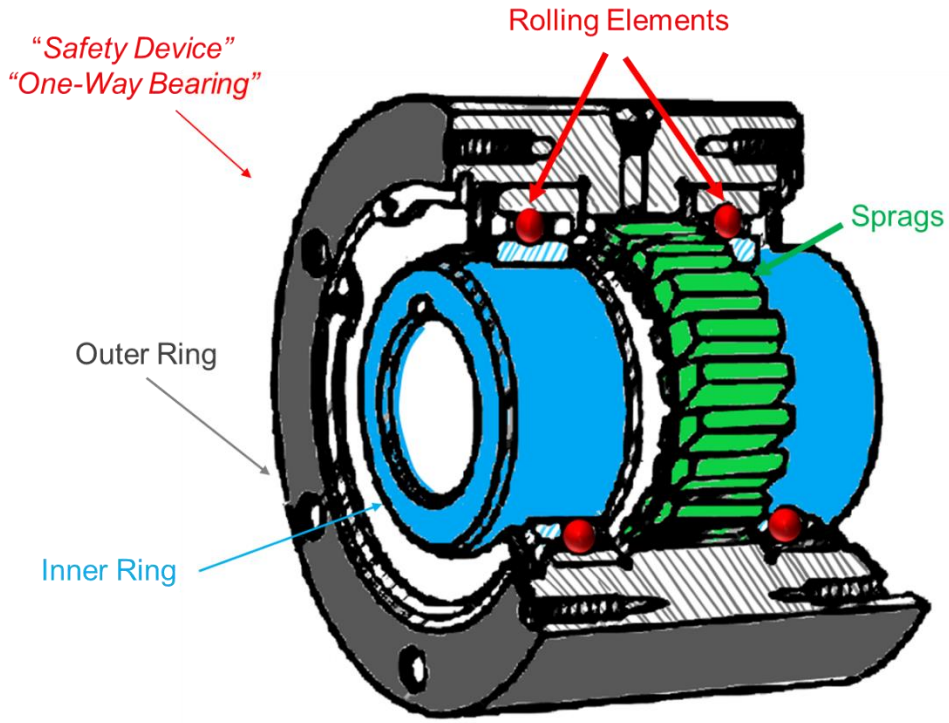
> Precision sprags act as wedges…. In the formsprag clutch, torque is transmitted from one race to another by the wedging action of sprags between the races in one direction; in the other direction the clutch freewheels.

(Ex.1017 at 318.) (Ex.1003, ¶¶249-250, 269-270.)

… ***[7][a] The manually powered treadmill of claim 6, wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring,***

Sclater discloses that sprag-type one-way bearing assemblies include sprags

disposed between inner and outer rings. (Ex.1003, ¶¶251-252.)

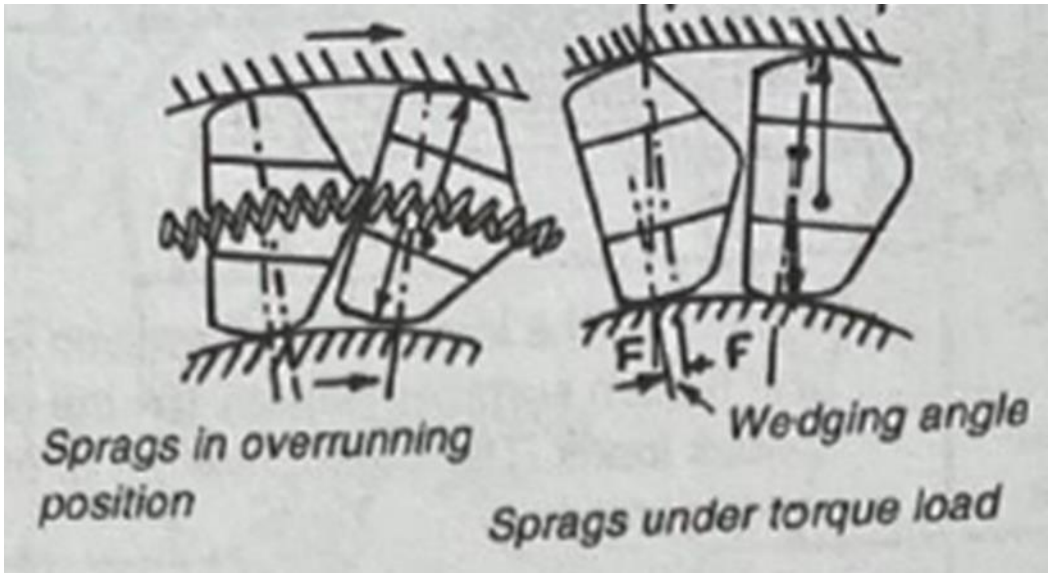


Ex.1017 at 318

… ***[7][b] wherein the plurality of sprags are asymmetric shaped to substantially prevent rotation of the inner ring in the first rotational direction while permitting rotation of the inner ring in the second rotational direction.***

Sclater discloses that the sprags have a "sprag profile, which is composed of two nonconcentric curves of different radius." ("*asymmetric shaped*" "*sprags*") and that a "a locking ramp is provided by the sprag profile." (Ex.1017 at 312.) As illustrated in the figure below on the left, Sclater discloses that when the inner ring rotates in a first direction relative to the outer ring, the sprags move out of the

locked position such that an overrun condition occurs. However, as illustrated below right, when the inner ring rotates in the opposite direction relative to the outer ring, the sprag profile causes the sprags to wedge into a locked position preventing relative rotation between the inner and outer rings. (Ex.1003, ¶¶253-255.)



Ex.1017 at 318

… ***[8] The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the rear shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the rear shaft in the first rotational direction while permitting rotation of the rear shaft in the second rotational direction***

Magid discloses, with reference to Figure 2, that the control means 6, 6' are attached to the rear roller ("*rear shaft*"). (Ex.1012, 4:46-59.)

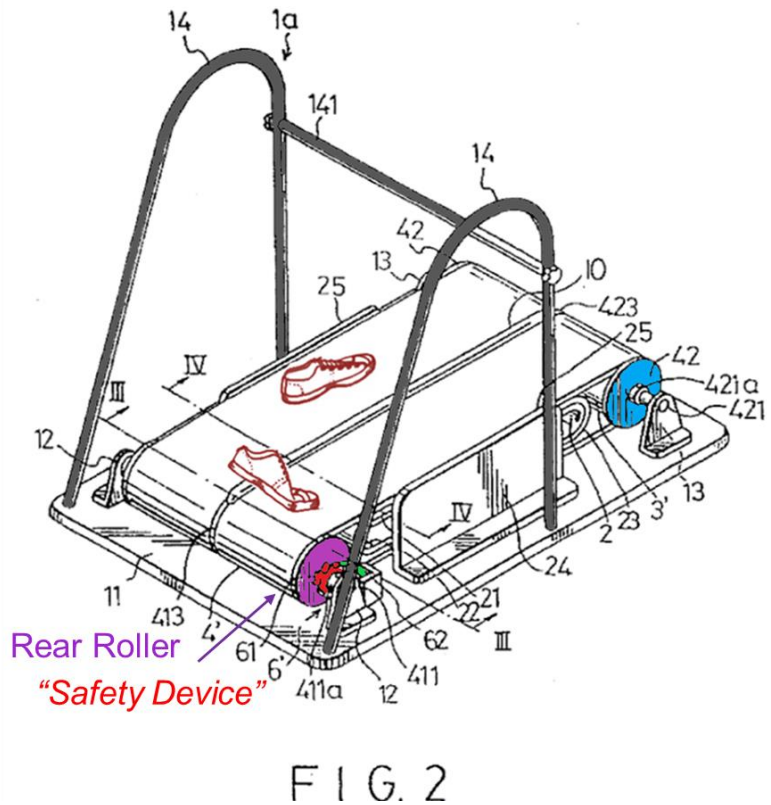


FIG. 2

Ex.1012, Fig.2

Chickering combined with Magid's control means 6, 6' is illustrated below:

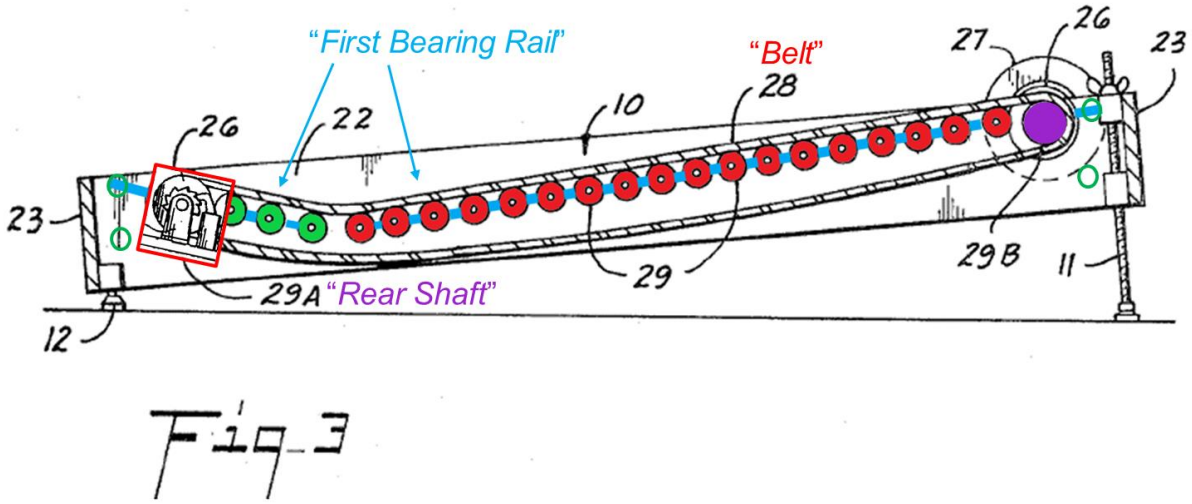
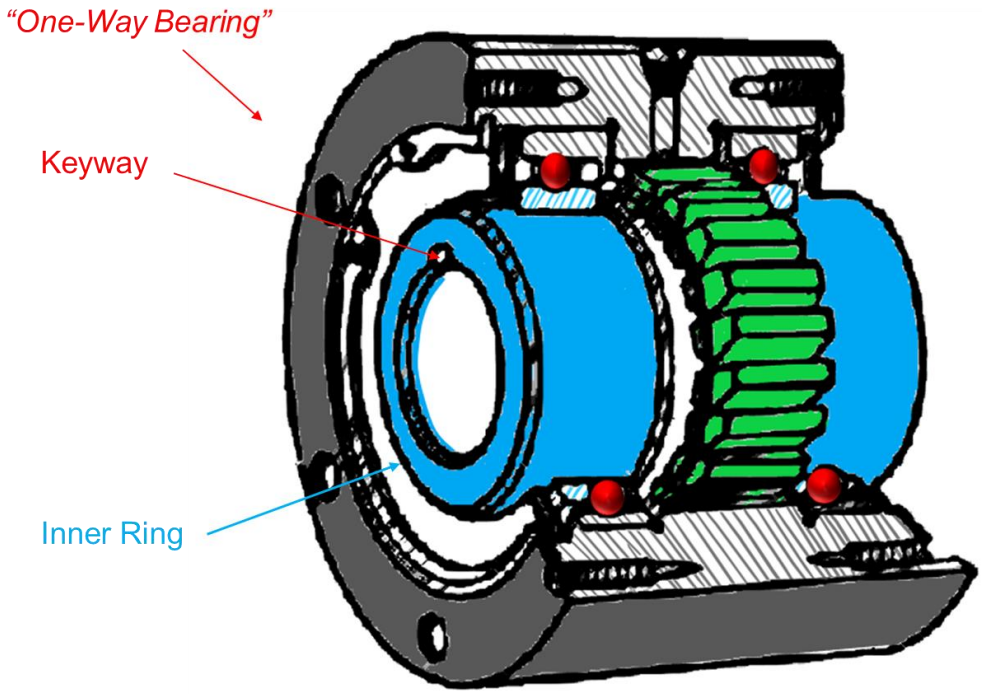


Fig. 3

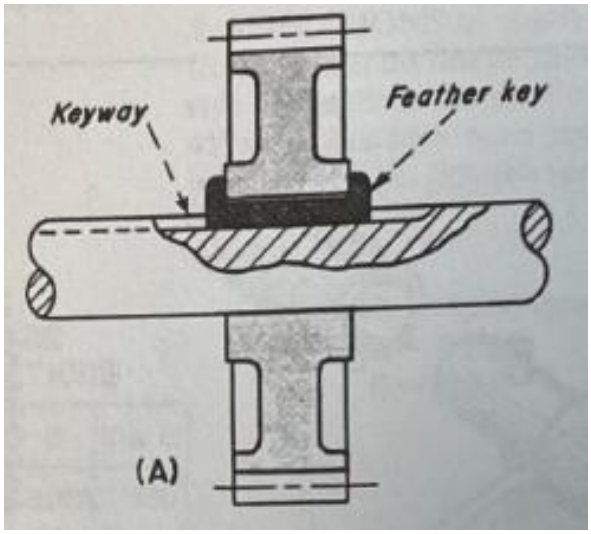
Ex.1013, Fig.3; Ex.1012, Fig.9

Sclater discloses a keyway formed into the inner ring of the one-way bearing. (Ex.1003, ¶258.)



Ex.1017 at 318

A POSA would have understood that the keyway formed in the inner ring of the bearing assembly is sized to receive a key, *i.e.*, such that the key "*is fixed relative to the inner ring and a keyway formed in the front shaft*." (Ex.1003, ¶¶260-261.) For example, Sclater discloses fourteen different ways to fasten hubs to shafts, including using a key-keyway interface. (Ex.1017, 420-421.) Sclater further discloses a key that is fixed to an inner diameter of a gear to engage a keyway that is formed in the corresponding shaft. (Ex.1003, ¶¶256-261.)



Ex.1017 at 420

… ***[9] The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the front shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the front shaft in the first rotational direction while permitting rotation of the front shaft in the second rotational direction.***

Magid discloses, as shown below, the control means 6, 6' attached to the front roller ("*front shaft*"). (Ex.1012, 4:46-59.)

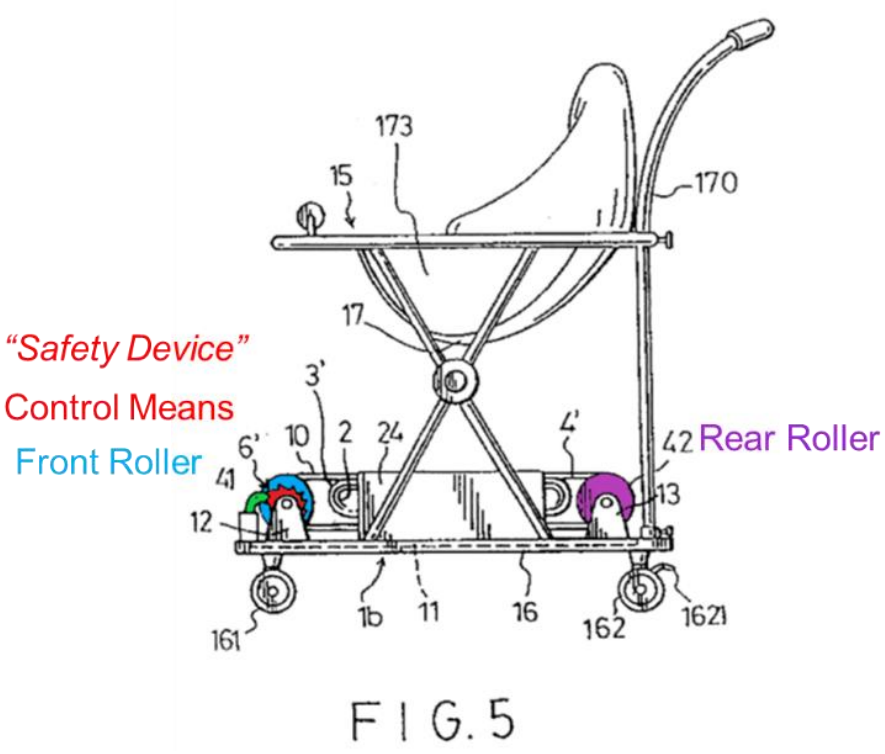
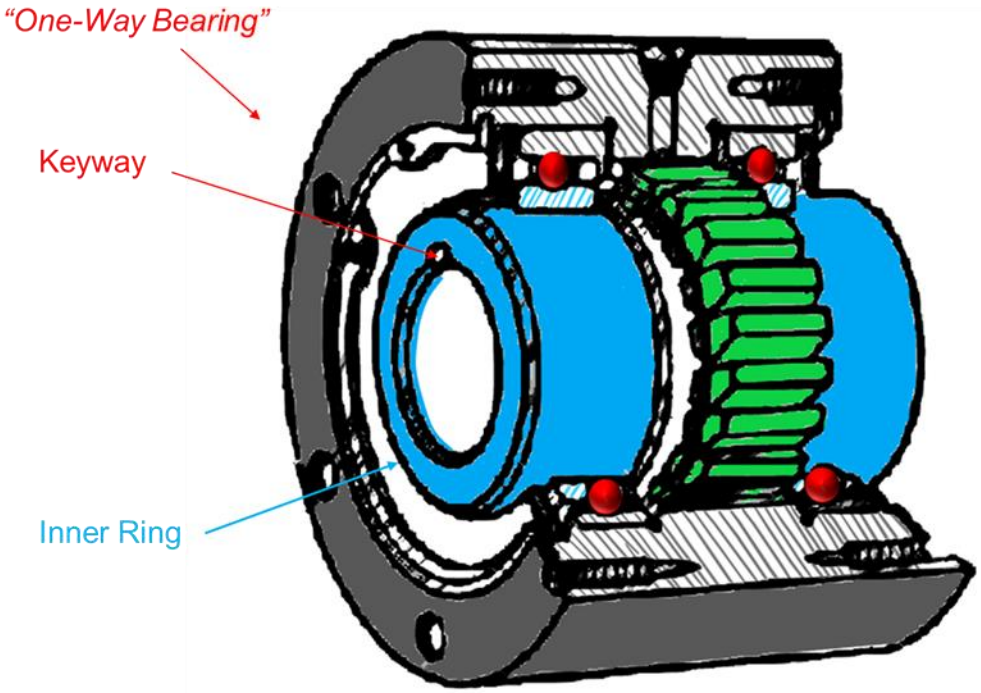


FIG. 5

Ex.1012, Fig.5

Sclater discloses a keyway formed into the inner ring of the one-way bearing. (Ex.1003, ¶263.)



Ex.1017 at 318

As discussed regarding limitation 8, a POSA would have understood that the keyway formed in the inner ring of the bearing assembly is sized to receive a key, *i.e.*, such that the key "*is fixed relative to the inner ring and a keyway formed in the front shaft*." (Ex.1003, ¶¶265-266.)

1. Rationale to Combine Checkering, Magid, and Sclater

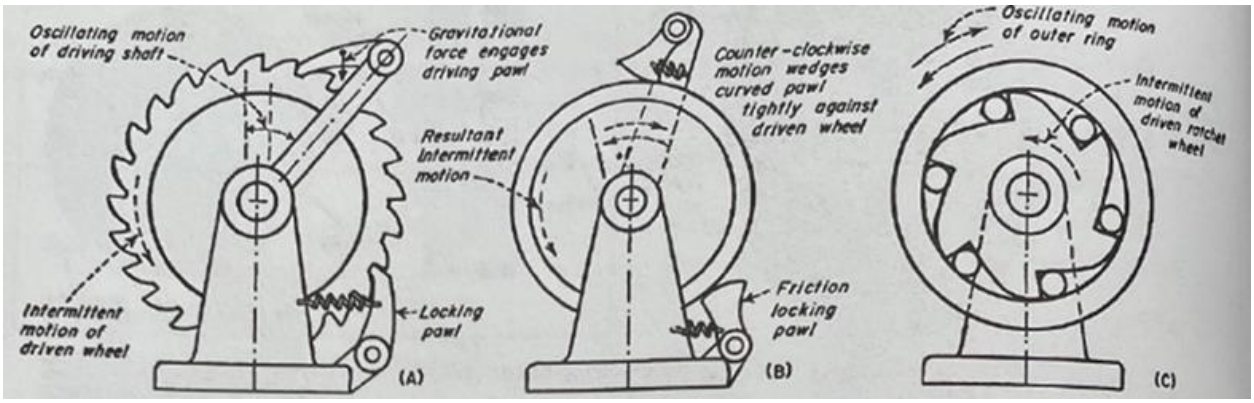
A POSA would have been motivated to substitute Sclater's one-way sprag-type bearing assembly for Magid's ratchet-and-pawl one-way mechanism. (Ex.1003, ¶271.)

Ratchet and pawl clutch mechanisms make noise during operation. For

example, the pawl engages each ratchet gear tooth and makes an audible "click" when passing over each tooth. (Ex.1003, ¶272.) Sclater teaches that a "friction-type clutch is quieter" than a ratchet-type clutch:

> (A) A ratchet and pawl mechanism converts reciprocating or oscillating movement to intermittent rotary motion. This motion is positive but limited to a multiple of the tooth pitch. (B) **A friction-type clutch is quieter**, but it requires a spring device to keep the eccentric pawl in constant engagement. (C) Balls or rollers replace the pawls in this device. Motion of the outer race wedges the rollers against the inclined surfaces of the ratchet wheel.

(Ex.1017 at 316.)



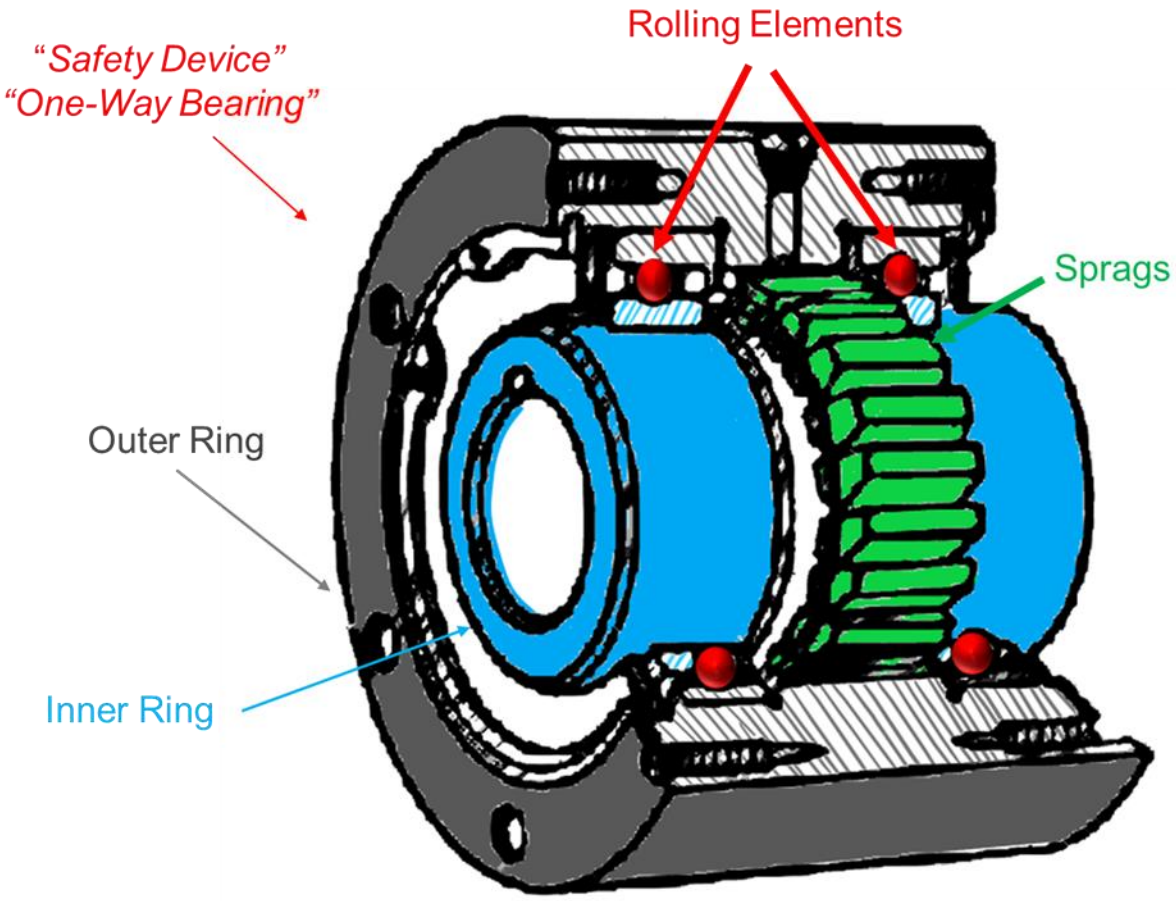
Ex.1017 at 316

Sclater further discloses that an "over-running clutch is better suited for higher-speed free-wheeling than a pawl-and-ratchet clutch." (Sclater, Ex. 1017 at 303.) This is because the pawl may skip past a few teeth before backstopping the ratchet gear, whereas the sprags are always in contact with the rings and do not need to find a discrete gear tooth to stop. Additionally, because there are multiple

sprags, they distribute the load over a larger surface area. (Ex. 1003, ¶273.)

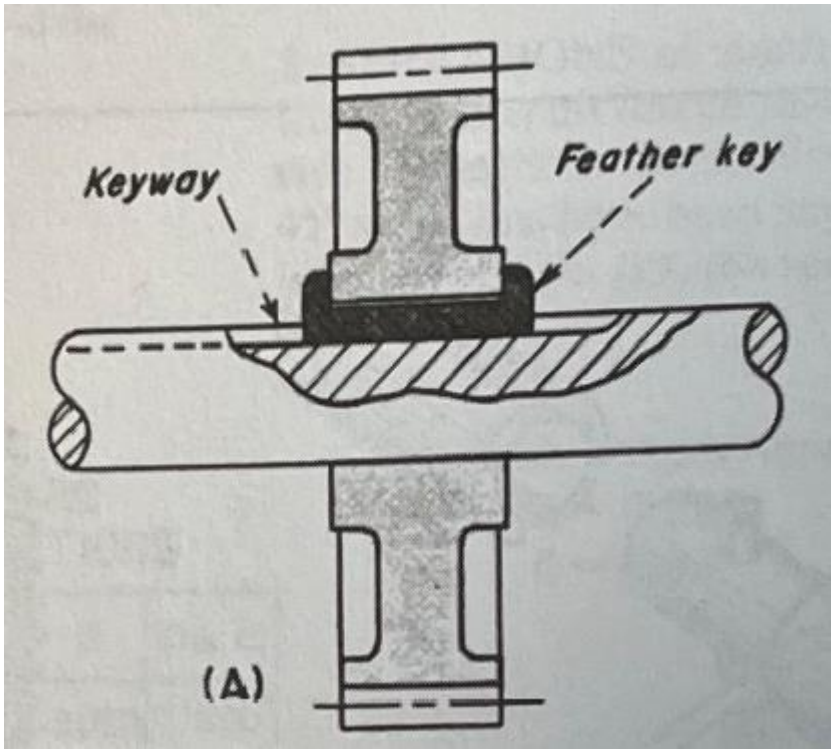
A POSA would have considered a sprag-type one-way clutch bearing for an exercise equipment application, such as a treadmill. For example, a 2001 Emerson bearing catalog describes its NSS Series sprag-type one-way clutch as an option for multiple "Field Applications," e.g., as "[e]xercise equipment." (Ex.1018, 52-53; Ex.1003, ¶275.)

A POSA would have known how to replace Magid's control means with Sclater's one-way bearing assembly. For example, the outer ring would be fixed relative to the control arms. Sclater illustrates below the outer ring including tapped holes for receiving fasteners for mounting the bearing to a bracket, and Emerson describes examples of commercially available brackets or torque arms. (Ex. 1018, 38-43; Ex.1003, ¶276.)



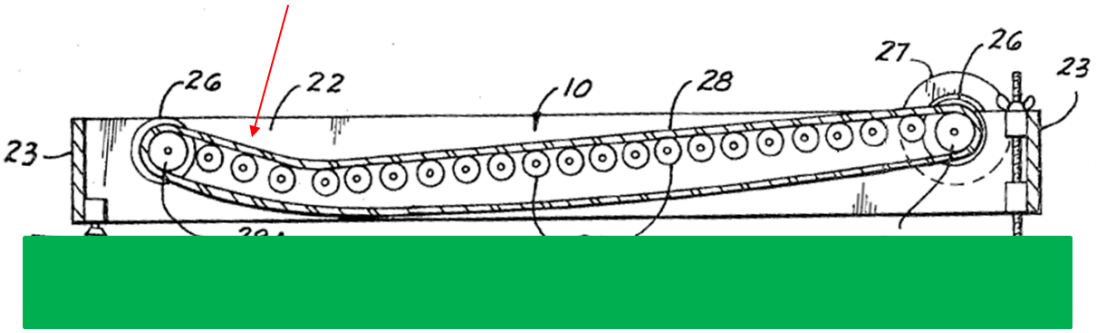
Ex.1017 at 318

The inner ring of the one-way bearing would be secured to the front roller or rear roller, *e.g.*, such as to the axle with a key/keyway interface, as disclosed by Sclater. (Ex.1017 at 420; Ex.1003, ¶277.)

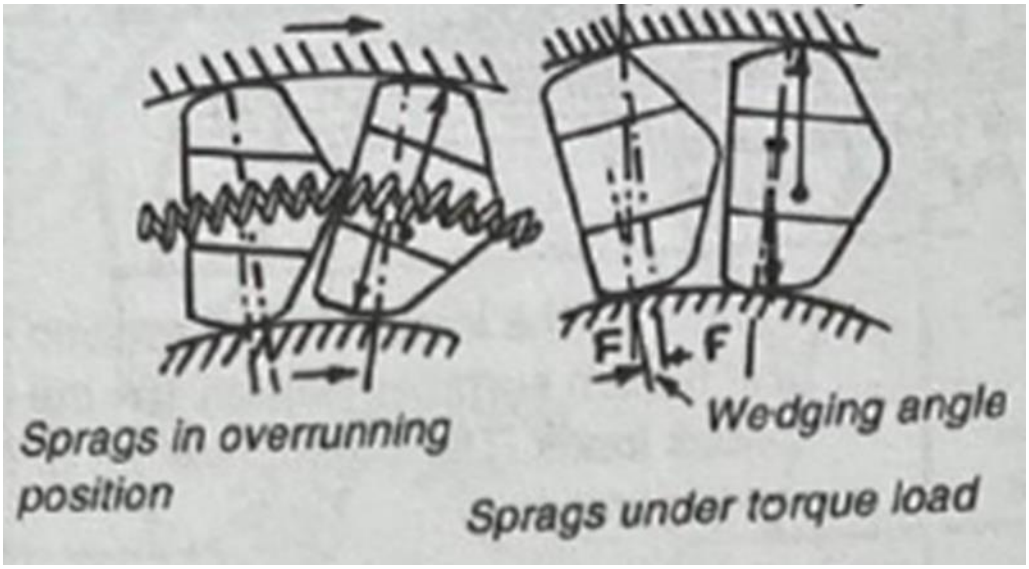


Ex.1017 at 420

With this arrangement, rearward motion of belt 28 would rotate the front/rear roller and inner ring so that the inner ring would overrun and move the sprags out of the locked position. Forward motion of belt 28 would rotate the inner ring the opposite direction and wedge the sprags into the locked position to prevent forward belt motion. (Ex.1003, ¶278.)



Ex.1013, Fig.3



Ex.1017 at 318

A POSA would have been motivated to substitute Sclater's one-way sprag-type bearing for Magid's ratchet-and-pawl one-way mechanism to obtain predictable results, *e.g.*, reduced noise and improved durability. (Ex.1003, ¶¶271-278.)

D. Ground 3: Claims 1-12, 14, and 18 are Unpatentable as Obvious over Chickering in View of Magid and Sclater

1. Independent Claims 1 and 11

For Ground 3, Petitioner proposes claim constructions for the terms: a) "*shaft*", b) "*safety device*" and c) "*substantially prevent*" which affects claims limitations: a) [1.2]/[11.2] and [1.3]/[11.3], b) [1.7][a]/[11.7][a], and c) [1.7][b]/[11.7][b]. The remaining limitations are taught by the combination of Chickering, Magid, and Sclater for the same reasons provided in Grounds 1 and 2.

a. "shaft"

… ***[1.2]/[11.2] and [1.3]/[11.3]***

Petitioner proposes construing the term "*shaft*" as "a rotating element used to transmit power from one part to another." Accordingly, claim limitations [1.2]/[11.2] should be interpreted as "*a front* [rotating element used to transmit power from one part to another] *rotatably coupled to the frame at the front end*." And claim limitations [1.3]/[11.3] should be interpreted as "*a rear* [rotating element used to transmit power from one part to another] *rotatably coupled to the frame at the rear end*."

The original limitations are taught by the combination of Chickering and Magid for the same reasons provided in Ground 1. (*See* Ex.1003, ¶¶284, 321, ¶¶289, 322.) Regarding the proposed claim construction, Chickering's front roller 29b and rear roller 29a are coupled to each other through the belt 28. Each roller 29b, 29a receives power from the user through the belt, and transfers the power to the other roller 29b, 29a through the belt. (*See* Ex.1003, ¶¶285-286, 321, ¶¶290-291, 322.)

b. "safety device"

… ***[1.7][a]/[11.7][a]***

Petitioner proposes construing "*safety device*" as a means-plus-function term requiring the structure disclosed in the '580 Patent for fulfilling this function. (*See*

Ex.1001, 27:15-29; 29:23-28; Figs.2,36.) Accordingly, claim limitation [1.7][a] should be interpreted as "*a* [one-way bearing assembly having inner and outer rings and sprags; b) a cam locking system; c) taper locks; d) a user operated pin system; or e) a band brake system with a lever] *coupled to at least one of the front shaft and the rear shaft*."

The proposed construction of the "*safety device*" in Claims [1.7][a]/[11.7][a] as a "one-way bearing assembly having inner and outer rings and sprags" is similar to the limitations of claim [7.][a], *i.e.*, "*wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring*," that are addressed in Ground 2. Therefore claims [1.7][a]/[11.7][a] are taught by the combination of Chickering, Magid, and Sclater for the same reasons provided for claim [7][a] in Ground 2. (*See* Ex.1003, ¶¶294-300, 325.)

c. "substantially prevent"

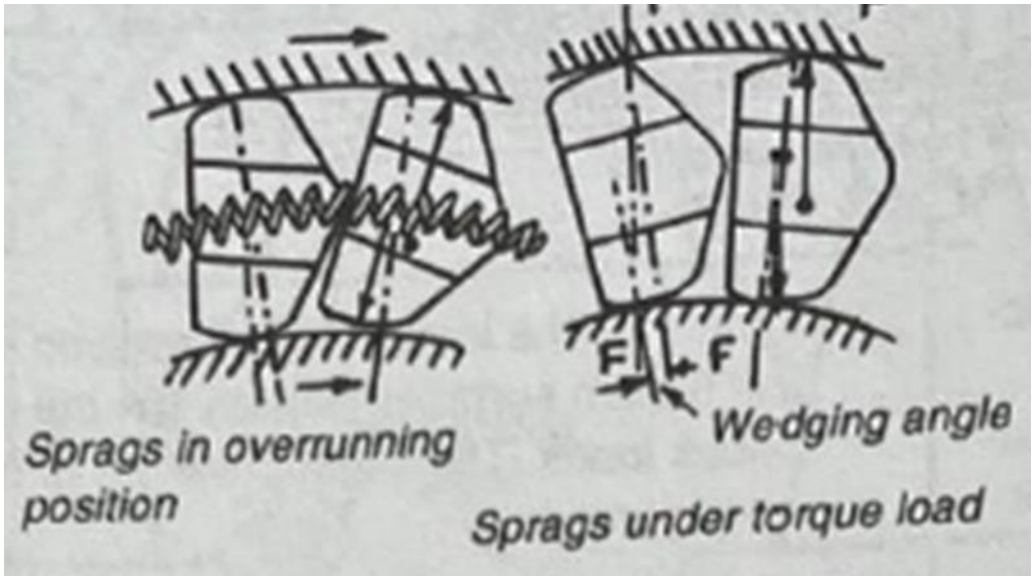
… ***[1.7][b]/[11.7][b]***

Petitioner proposes construing the term "*substantially prevent rotation*" as "prevent any movement after allowing no or minimal movement." Therefore claim limitations [1.7][b]/[11.7][b] should be interpreted as "*wherein the* [one-way bearing assembly having inner and outer rings and sprags] *is structured to* [prevent any movement after allowing no or minimal movement] *rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting*

rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction."

The original claim limitations and the "*safety device*" construction, are taught by the combination of Chickering, Magid, and Sclater for the same reasons provided for claim [7][b] in Ground 2. (*See* Ex.1003, ¶303.)

Regarding the proposed construction for "*substantially prevent rotation*," Sclater discloses, with reference to the below left figure, that when the inner ring rotates in a first direction, the sprags move out of the locked position to overrun. However, as illustrated below right, when the inner ring rotates in the opposite direction, the sprag profile moves the sprags into a locked position. Sclater therefore teaches that a sprag-type one-way bearing allows minimal movement before the sprags rotate into a locked position. (*See* Ex.1003, ¶304.)



Ex.1017 at 318

2. Dependent claims 2-10, 14, and 18

The additional limitations of these claims are not affected by Petitioner's claim construction positions and therefore they are taught by the combination of Chickering, Magid, and Sclater for the same reasons provided in Grounds 1 and 2. (*See* Ex.1003, ¶¶306-307.)

3. Rationale to Combine Chickering, Magid, and Sclater

It would have been obvious to a POSA to combine the manual curved treadmill disclosed in Chickering with the known technique of a one-way clutch to prevent belt motion in a forward direction as disclosed in Magid for at least the same reasons given for Ground 1. (Ex.1003, ¶¶333, 230-243.)

A POSA would have been motivated to substitute Sclater's one-way sprag-type bearing assembly for Magid's ratchet-and-pawl one-way mechanism for the same reasons provided above for Ground 2. (Ex.1003, ¶¶333, 271-278.)

E. Ground 4: Claims 1-5, 10-11, 14, 15, 18, and 25 are Unpatentable as Obvious over Socwell in View of Magid

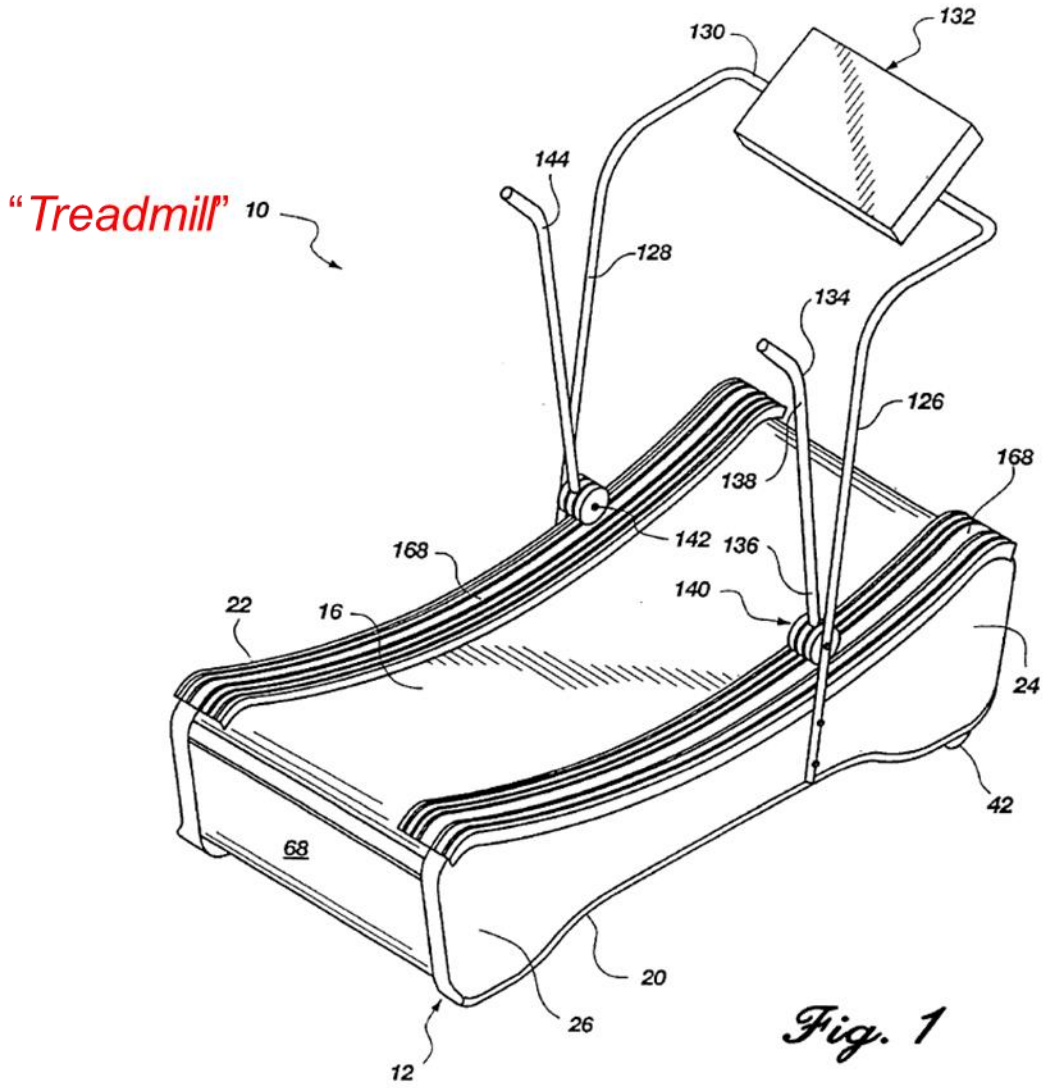
1. Independent Claims 1, 11, and 25

… ***[1.0]/[11.0] A manually powered treadmill comprising:***

… ***[25.0] A method, comprising: providing a manually powered treadmill,***

Socwell discloses a "*manually powered treadmill*": "[T]he curved deck treadmill 10 … may be implemented without a driving means engagably disposed

to a roller in order to facilitate the forced rotation of the belt 16." (Ex.1011, 11:34-38; 11:53-56.) (Ex.1003, ¶¶335-336, 387, 413.)



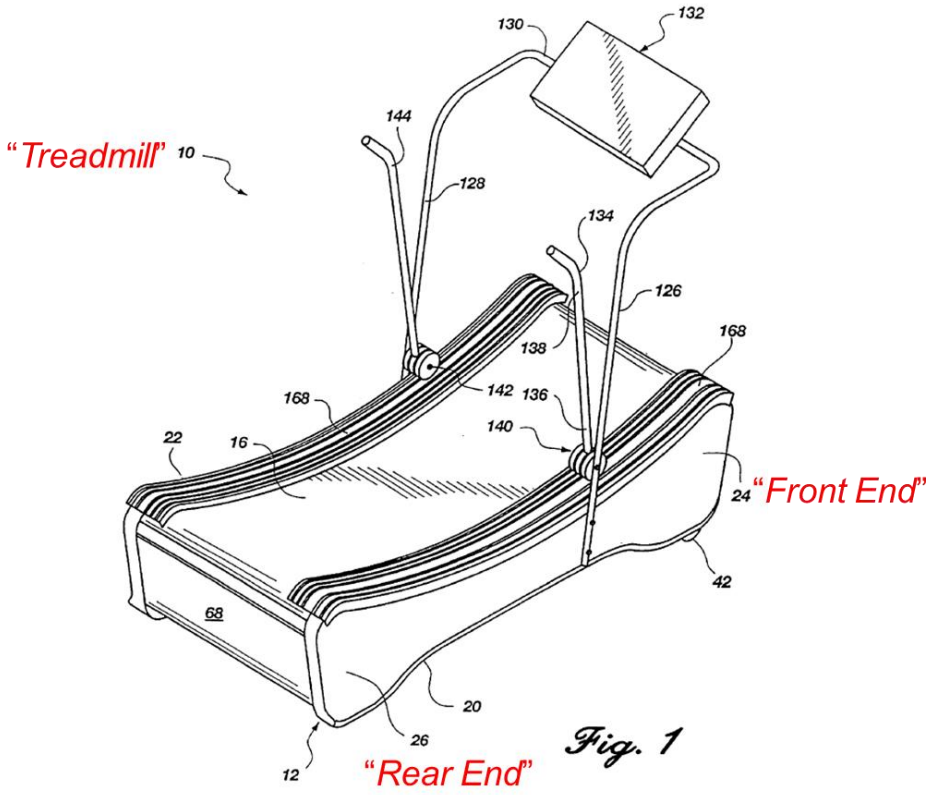
Ex.1011, Fig.1

… ***[1.1]/[11.1] a frame having a front end and a rear end positioned opposite the front end;***

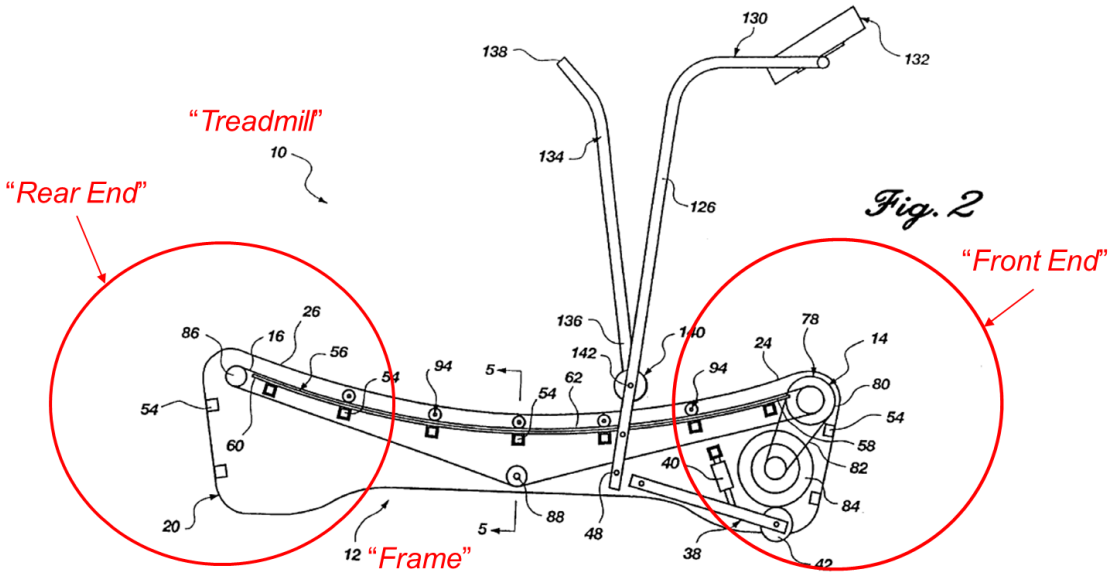
… ***[25.1] the manually powered treadmill having a frame with a***

front end and rear end;

Socwell discloses that "treadmill 10 comprises a support frame 12 having a first side 20 and a second opposing side 22 and having a deck 56 supportably disposed therebetween." (Ex.1011, 5:23-26; Fig.1.) "The first side 20 of the support frame 12 includes a first end 24 and a second opposing end 26." (Ex.1011, 6:22-25; Ex.1003, ¶¶337-339, 338, 413.)



Ex.1011, Fig.1



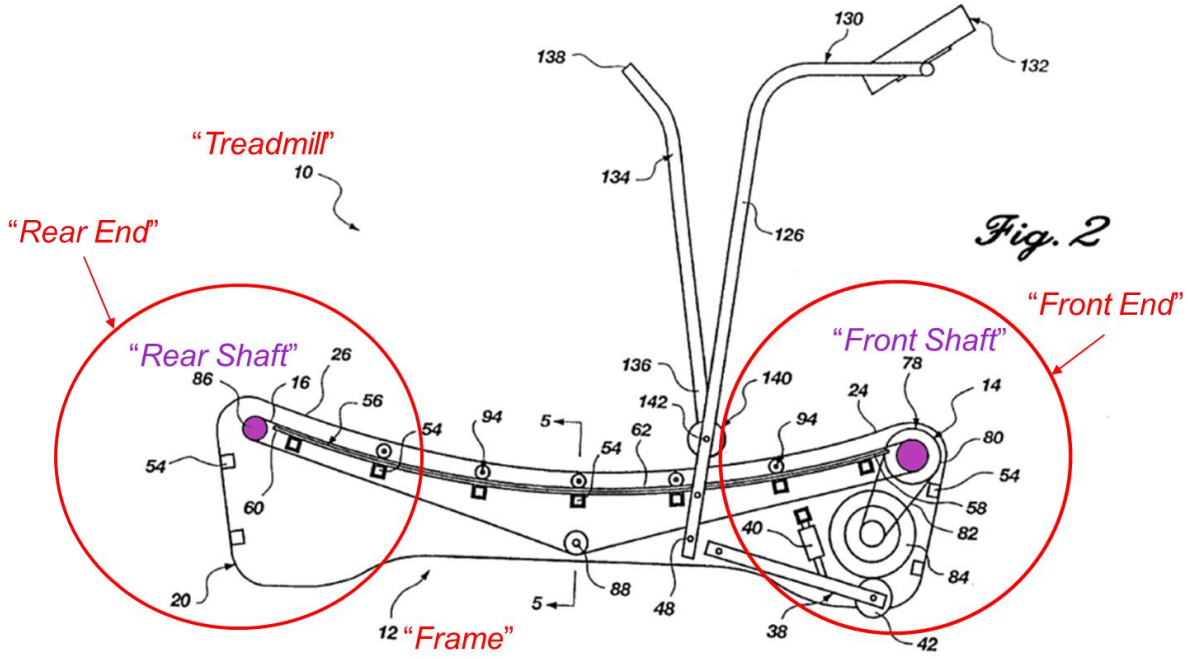
Ex.1011, Fig.2

… ***[1.2]/[11.2] a front shaft rotatably coupled [attached] to the frame at the front end;***

… ***[1.3]/[11.3] a rear shaft rotatably coupled [attached] to the frame at the rear end;***

Socwell discloses a roller assembly 14 supported between the right side frame 20 and left side frame 22 that includes a first roller 78 ("*front shaft*") and a second roller 86 ("*rear shaft*"). (Ex.1003, ¶¶340-343, 389-390.) "The first roller 78 may be rotatably disposed contiguous the first end 58 of the deck 56 between the first side 20 and the second opposing side 22 of the support frame 12." (Ex.1011, 5:35-38.) The "second roller 86 is" "[c]orrespondingly similar in construction and design," and "preferably disposed contiguous the second end 60 of the deck 56 between the first and second sides 20, 22 of the support frame 12." (Ex.1011, 5:38-

41.)



Ex.1011, Fig.2

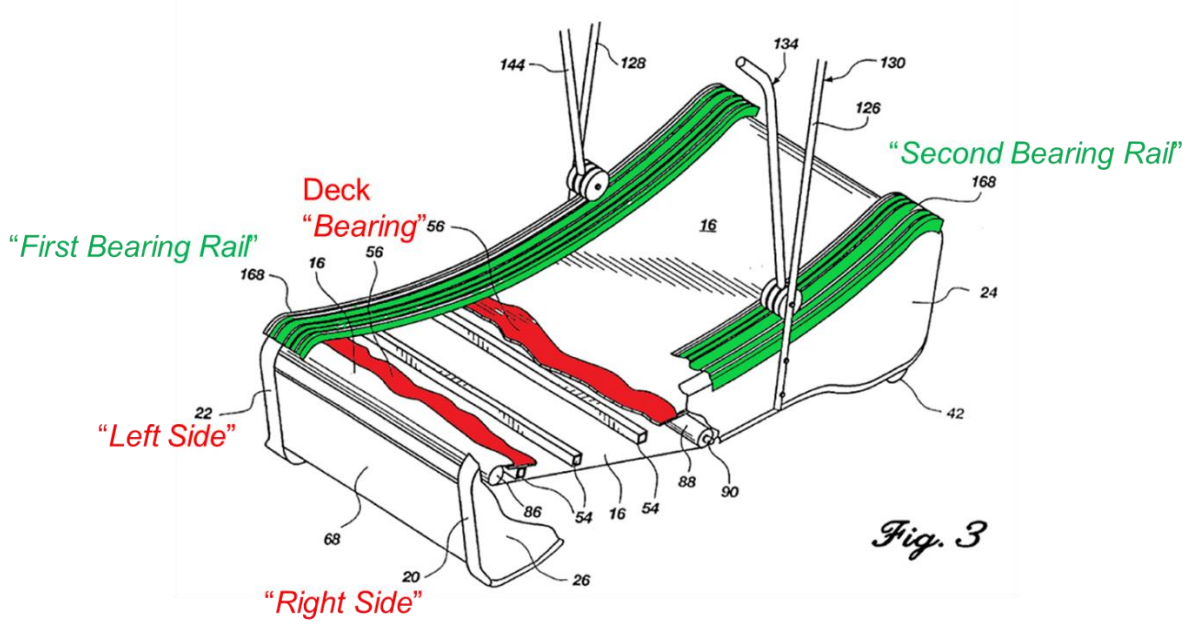
… ***[1.4]/[11.4] a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;***

… ***[1.5]/[11.5] a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;***

… ***[25.2] [a] providing a first bearing rail and a second bearing rail, the first and second bearing rails each comprising a plurality of bearings and [b] extending longitudinally on the frame,***

Socwell discloses a deck 56 ("*bearing*") that extends between a first side 20 ("*right side*") and a second opposing side ("*left side*") of the frame 12: "the curved deck treadmill 10 comprises a support frame 12 having a first side 20 and a second

opposing side 22 and having a deck 56 supportably disposed therebetween." (Ex.1011, 5:22-25.) "[T]he deck 56 is preferably formed consisting of a wood laminate having an upper surface 66 that may be impregnated with a wax material to provide a means for reducing the coefficient of friction acting thereon." (Ex.1011, 8:11-15.) The deck 56 is a bearing surface. (Ex.1003, ¶¶344-345, 391, 392, ¶¶414, 415.)



Ex.1011, Fig.3

Socwell discloses "belt securing assemblies 94 which provide a means for retaining the endless belt 16 in a curvilinear configuration being substantially flush with the upper surface 66 of the deck 56." (Ex.1011, 10:5-12.) Each "belt securing assembly 94 comprises a roller 98 having an axle 100 which rotatably engages a mounting bracket 96 … such that the roller 98 may engage the belt 16, thereby

substantially retaining a side portion of the belt 16 substantially flush with the deck 56." (Ex.1011, 10:17-26; Ex.1003, ¶¶347-348.) The rollers 98 and the deck 56 collectively provide a "*plurality of bearings*." (Ex.1003, ¶349.)

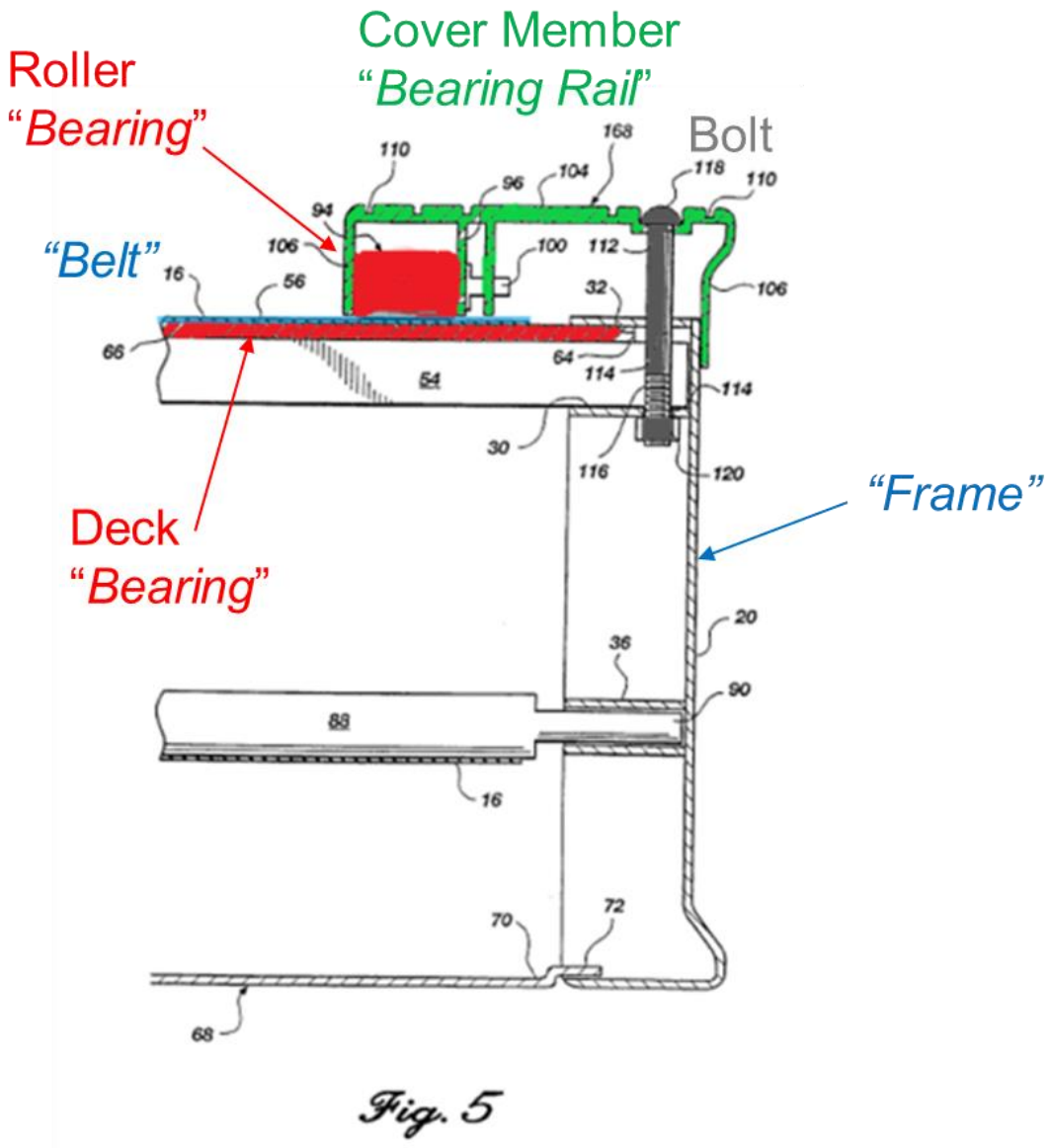


Fig. 5

Ex.1011, Fig.5

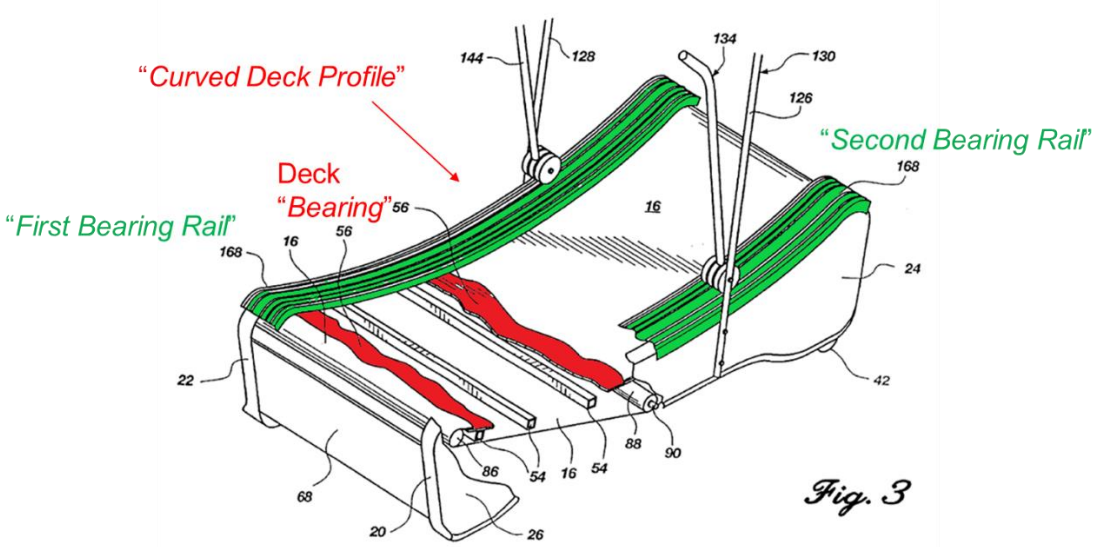
With reference to Figure 5 above, Socwell discloses a cover member 168 ("*bearing rail*") that supports the belt securing assemblies 94, including the rollers

98 (“*bearings*”), and attaches to the frame 12 using bolts 118. (Ex.1011, 11:15-23; Ex.1003, ¶350.) The bolts 118 may also extend through apertures formed through the deck 56 (“*bearing*”) to attach the deck 56 to the frame 12. (Ex.1011, 11:22-29; Ex.1003, ¶351.) The cover members 168 are elongate in shape and extend longitudinally along opposing sides of the frame 12. (Ex.1011, 10:13-17, Fig. 3; Ex.1003, ¶352.)

… ***[25.2][c] wherein the first and second bearing rails define a curved top profile;***

Socwell discloses a belt 16 that is supported by the curved deck 56 and retained by rollers 98 (“*plurality of bearings*”). (Ex.1011, 10:17-26; Fig.5.) The cover members 168 (“*bearing rails*") support the deck 56 and rollers 98 (“*plurality of bearings*”). (Ex.1011, 11:15-23.) This arrangement provides a curved shape for the belt 16 to follow. (Ex.1011, 4:13-19.)

The deck 56 and rollers 98 are supported by the cover members 168 (“*bearing rails*”) to define the curved running surface. Moreover, the cover members 168, as shown below, define a curved top profile. (Ex.1003, ¶¶416-417.)



Ex.1011, Fig.3

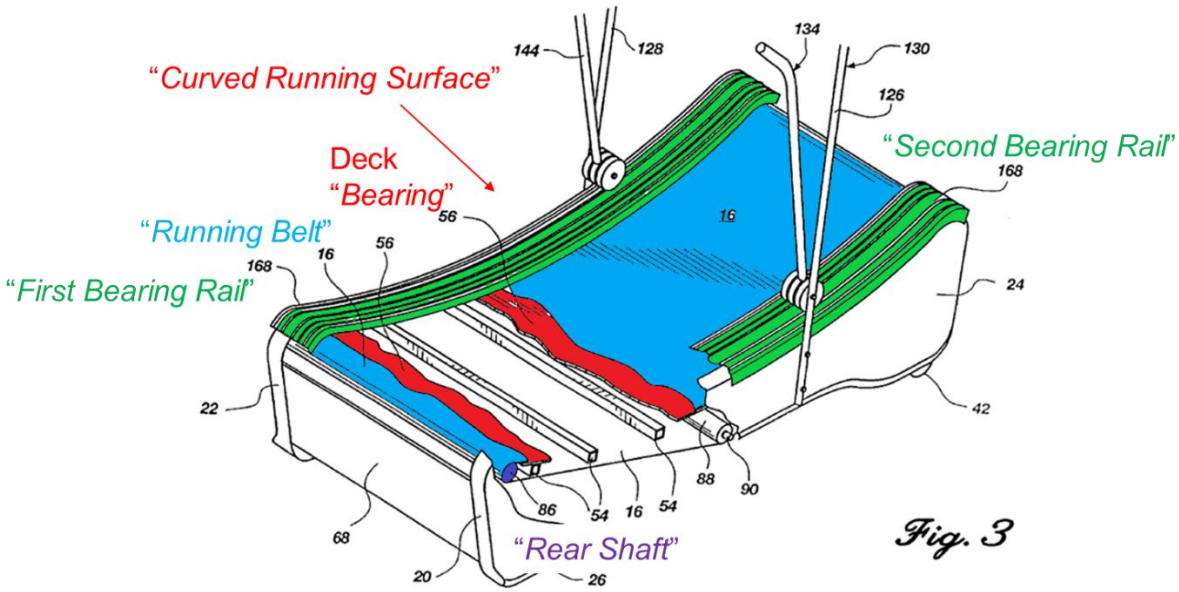
… ***[1.6] a running belt supported by the first bearing rail and the second bearing rail and disposed about the front shaft and the rear shaft, wherein the running belt follows a curved running surface; and***

… ***[11.6] [a] a running belt at least partially disposed about the front shaft and the rear shaft and at least partially supported by the first bearing rail and the second bearing rail,***

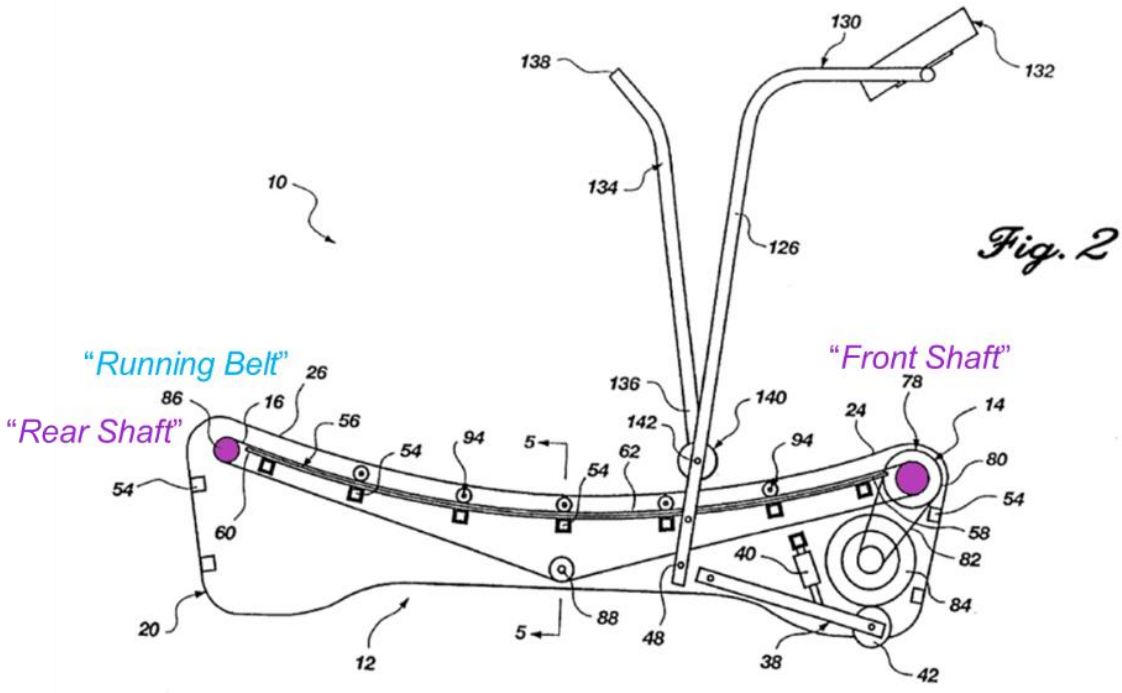
… ***[25.3] disposing a running belt on the plurality of bearings of the first bearing rail and the second bearing rail such that the running belt follows a top curved running surface corresponding to the curved top profile of the first and second bearing rails;***

Socwell discloses a belt 16 ("*running belt*") disposed around the front roller 78 ("*front shaft*") and rear roller 86 ("*rear shaft*"): "the belt 16 operably disposed in relation to the rollers 78, 86, 88 [and] may be formed comprising an endless

construction which preferably consists of a sufficiently sturdy material." (Ex.1011, 7:31-52; Ex.1003, ¶¶357, 393, 421-423.)



Ex.1011, Fig.3



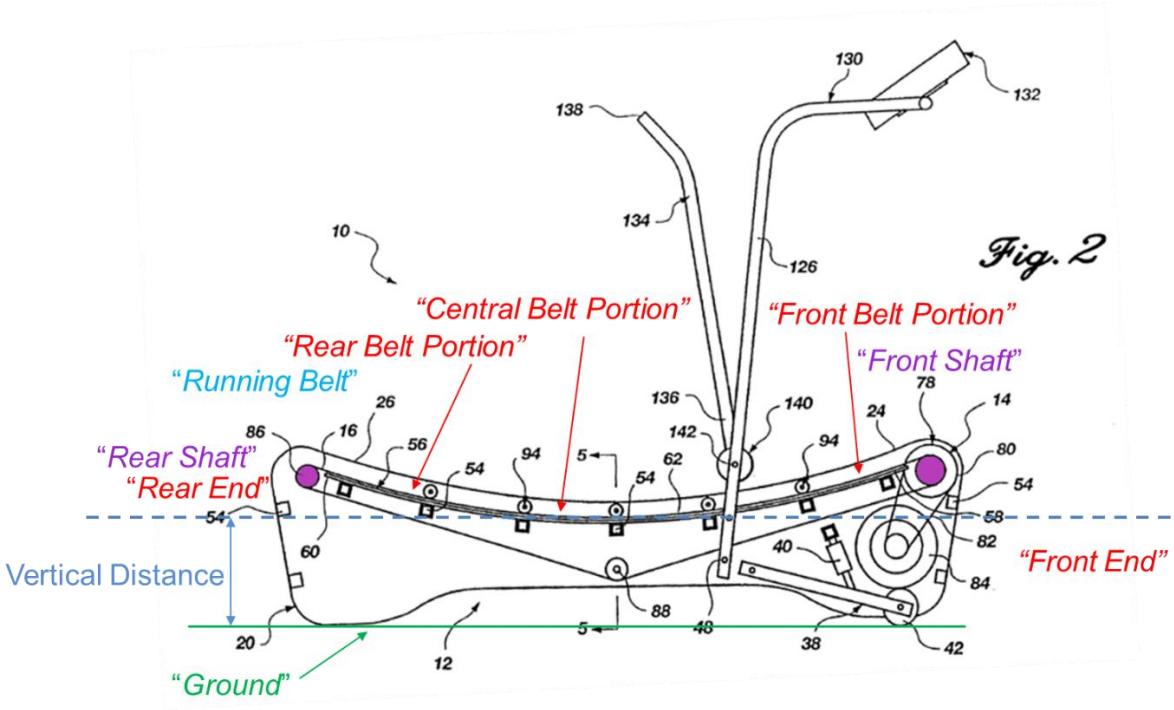
Ex.1011, Fig.2

The belt 16 is supported by the curved deck 56 and retained by rollers 98 ("*plurality of bearings*"). (Ex.1011, 10:17-26; Fig.5.) The "belt may be rotatably mounted in relation to the roller assembly and operatively disposed in relation to the deck, whereby providing a structurally supported arcuate shaped, movable surface on which a user may exercise." (Ex.1011, 4:13-19; Ex.1003, ¶¶355-358.) The cover members 168 ("*bearing rails*") are mounted to the frame and support the deck 56 and rollers 98. (Ex.1003, ¶422.) The cover members 168 ("*bearing rails*"), supporting the deck 56 and rollers 98 ("*plurality of bearings*"), provide a structurally arcuate shape such that the "*running belt follows a curved running surface*." (Ex.1003, ¶423.)

> … ***[11.6][b] wherein the running belt includes a front belt portion proximate the front end, a rear belt portion proximate the rear end, and a central belt portion intermediate the front and rear belt portions, wherein the central belt portion is positioned vertically closer to a ground surface supporting the frame than the front and rear belt portions such that the running belt follows a curved running surface; and***

As illustrated in the image below, Socwell discloses that belt 16 includes a "*front belt portion"* proximate the "*front end*" of the treadmill 10, a "*rear belt portion*" proximate the "*rear end*" of the treadmill 10, and a "*central belt portion*"

between the front and rear ends. The "*central belt portion*" is positioned vertically closer to a ground surface supporting the frame 12 ("*frame*") than the "*front and rear belt portions*," as depicted by the blue vertical distance annotation, such that belt 16 follows a "*curved running surface*." (Ex.1003, ¶¶394-395.)



Ex.1011, Fig.2

… ***[1.7] [a] a safety device coupled to at least one of the front shaft and the rear shaft,***

Magid discloses a walker apparatus with a ("*safety device*") "unidirectional **control means** 6, 6' installed to permit only unidirectional movement of the left and right foot belts 4, 4'." (Ex.1012, 4:46-49; Ex.1003, ¶359.) As illustrated below, control means 6, 6' may be attached to the front rollers 41 (Fig.5) or the rear rollers

(Figs. 2, 9). (Ex.1012, 4:46-59, Ex.1003, ¶¶360-362.)

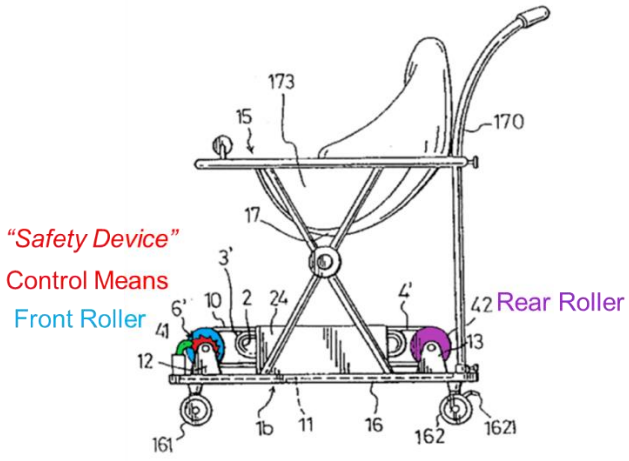


FIG. 5

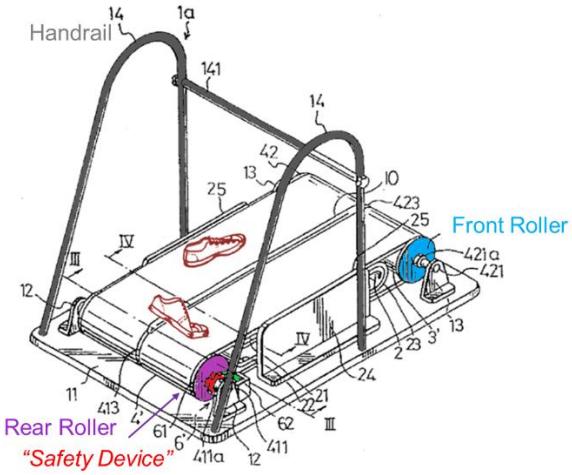


FIG. 2

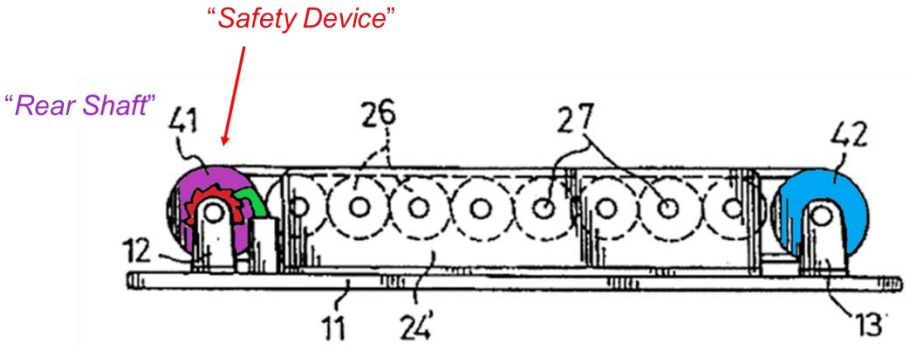


FIG. 9

Ex.1012, Figs.2,5,9

… ***[1.7] [b] wherein the safety device is structured to substantially prevent rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.***

… ***[11.7] a safety device for substantially preventing rotation of at least one of the front shaft and the rear shaft in a first rotational***

direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.

… ***[25.4] permitting movement of the running belt in a first direction; and [25.5] substantially preventing movement of the running belt in a second direction opposite the first direction.***

Magid discloses that "unidirectional control means 6,6' … permit only unidirectional rotation of the front rollers 41, thereby preventing bidirectional movement of the foot belts 4, 4'. (Ex.1012, 4:46-59; Ex.1003, ¶¶365, 396-397, 424.) As shown below, Magid further discloses "the control means 6, 6' includes a pair of ratchet gears 61 attached to outer ends of the front rollers 41 and mounted rotatably on the first shaft 411, and a pair of pawls 62 secured to the base 11 and engaging one of the ratchet gears 61." (Ex.1012, 4:46-59; Ex.1003, ¶¶365-366.)

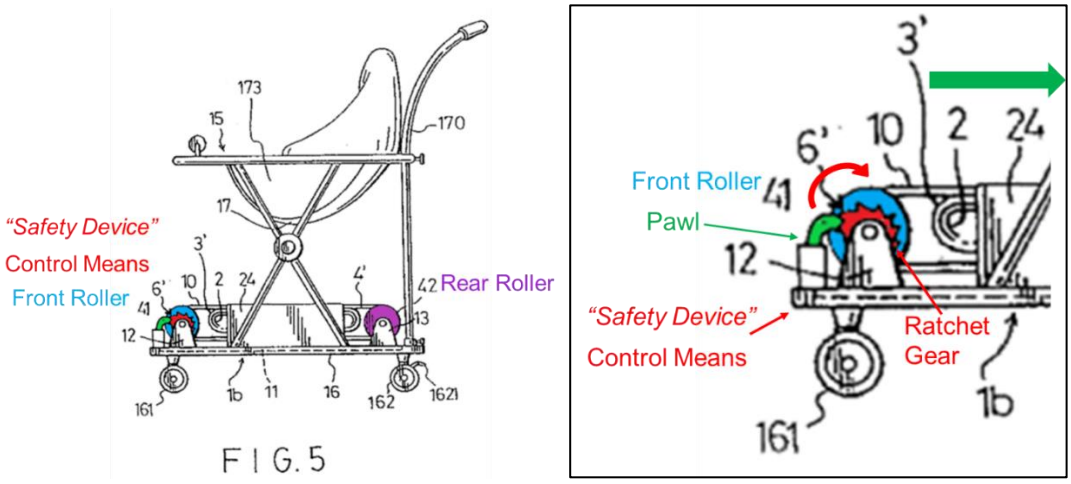


FIG. 5

Ex.1012, Fig.5

Magid also discloses that "ratchet gears may be attached to the rear rollers 42 to achieve the same result." (Ex.1012, 4:58-59.) With reference to Figure 2 below, Magid discloses control means 6, 6' with ratchet gears 61 attached to the outer ends of the rear rollers and a pawl 62 secured to base 11 to engage each ratchet gear 61. (Ex.1012, 4:46-59; Ex.1003, ¶¶367-368.)

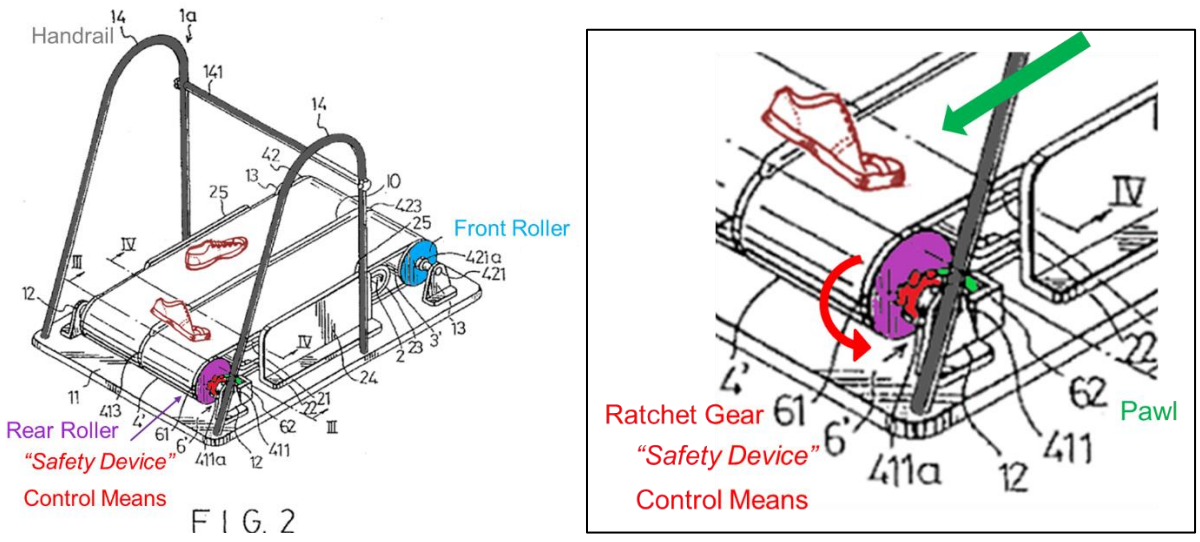


FIG. 2

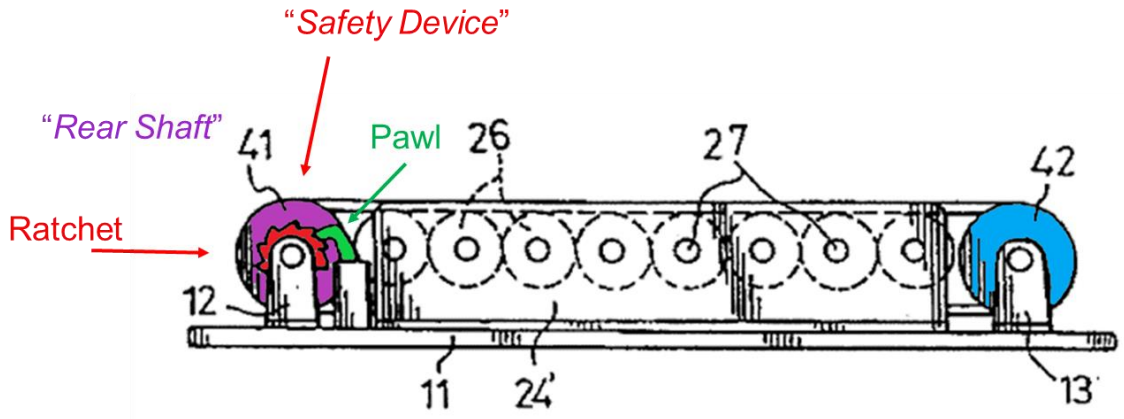


FIG. 9

Ex.1012, Figs.2,9

2. Rationale to Combine Socwell and Magid

It would have been obvious to a POSA to combine Socwell's curved manual treadmill with the known technique of a one-way clutch to prevent treadmill belt forward motion as disclosed in Magid. (Ex.1003, ¶¶425-437.)

Socwell and Magid are from the same field – manual treadmills for exercise use. (Ex.1011, 1:10-12; Ex.1012, 1:53-56; 3:23-27.) Both disclose treadmills with a belt disposed about end rollers. (Ex.1011, 5:32-44; 8:7-27, Fig.3; Ex.1012, 4:64-5:18, Fig.2.) Socwell discloses a curved deck 56 and rollers 98 that cooperate to place the belt 16 in a curved shape. (Ex.1011, 10:5-31, Fig.2; Ex.1003, ¶426.)

It has long been recognized that users may be injured by falling off a treadmill while mounting or dismounting, or using it:

> A person exercising on this type of treadmill is likely to lose his balance because the frictionless surface offers no resistance to the movement of his feet, and he is therefore unable to obtain the leverage necessary for proper balance. Also, the user is likely to run off the lower end of the treadmill because the faster he runs the faster the belt accelerates and moves beneath his feet, carrying him to the rear.

(Chickering, Ex. 1013, 1:30-37.)

> In particular, if the rollers supportably disposed in relation to the endless belt are so easily moveable, the user may potentially lose his equilibrium or balance and fall from the exercise treadmill resulting in possible injuries.

(Socwell, Ex. 1011, 1:32-36.)

> Another meaningful disadvantage of exercise treadmills of the prior art is the inherent danger associated with users tending to fall off the back end of the treadmill and become injured.

(Socwell, Ex. 1011, 2:45-48.)

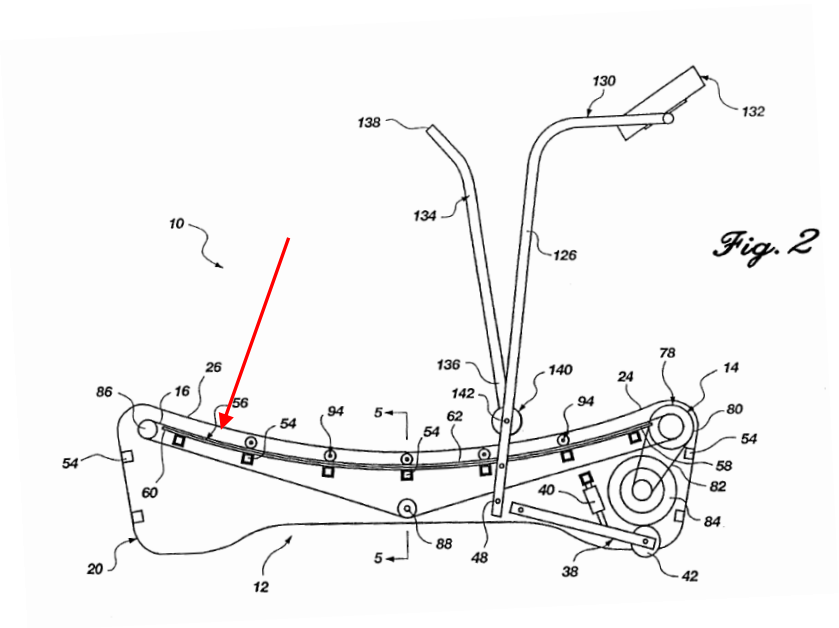
Professional organizations have produced standards to provide guidance regarding exercise equipment safety in general, and specifically for treadmill safety. *See* Ex.1019; Ex.1020; and Ex.1007. (Ex.1003, ¶¶427-428.)

Socwell recognizes it is difficult to stabilize the running belt in manual treadmills. According to Socwell, this is due to the difficulty in balancing the frictional and inertial qualities of belt supporting devices. (Ex.1011, 1:30-56). Socwell describes motorization as the prior-art solution to the problem of balancing these qualities. (Ex.1011, 1:57-67; Ex.1003, ¶429.)

Rather than relying on a motor, Socwell discloses calibrating the rollers and deck to provide optimal frictional resistance of the belt to ensure safety while providing proper resistance for exercising. (Ex.1011, 11:57-60). Socwell also explains the curved running surface prevents a user from falling off the back. (Ex.1011, 3:40-45; Ex.1003, ¶430.)

Accordingly, Socwell does not fully address the safety issue of the belt moving in a forward direction when a user steps onto the treadmill having free-

moving rollers. Such forward motion is especially likely to occur if a user were to step onto the rearward end of the curved running surface (red arrow), causing the foot to unexpectedly move towards the lower portion of the treadmill. This risk is exacerbated when the treadmill is adjusted to the generally horizontal position. (Ex.1003, ¶431.)



Ex.1011, Fig.2

Magid discloses a one-way clutch (control means 6, 6') coupled to a front shaft (Fig.5) or rear shaft (Fig.2) to permit only unidirectional belt movement. (Ex.1012, Fig.5, 4:46-59; Ex.1003, ¶432.)

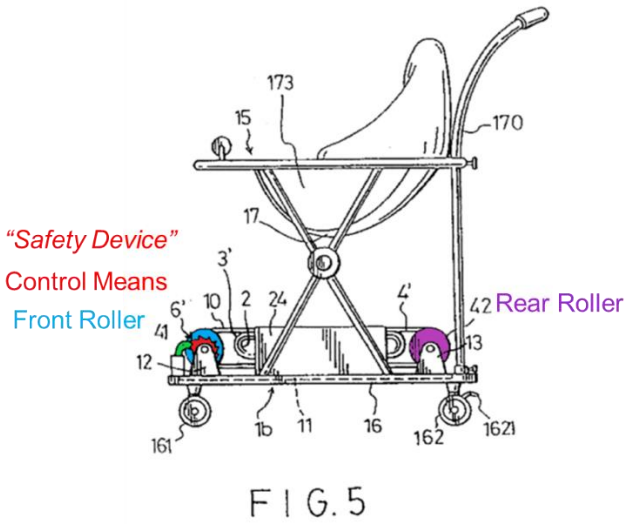


FIG. 5

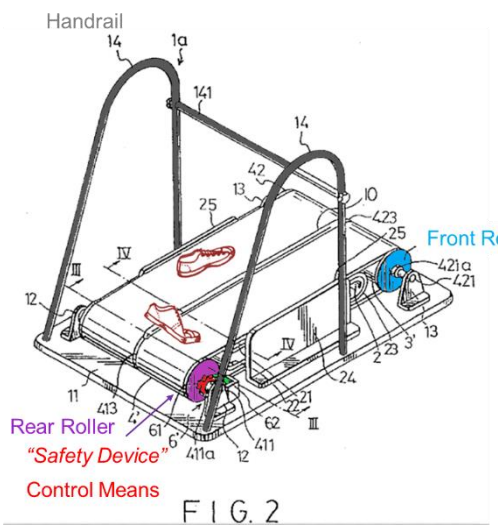
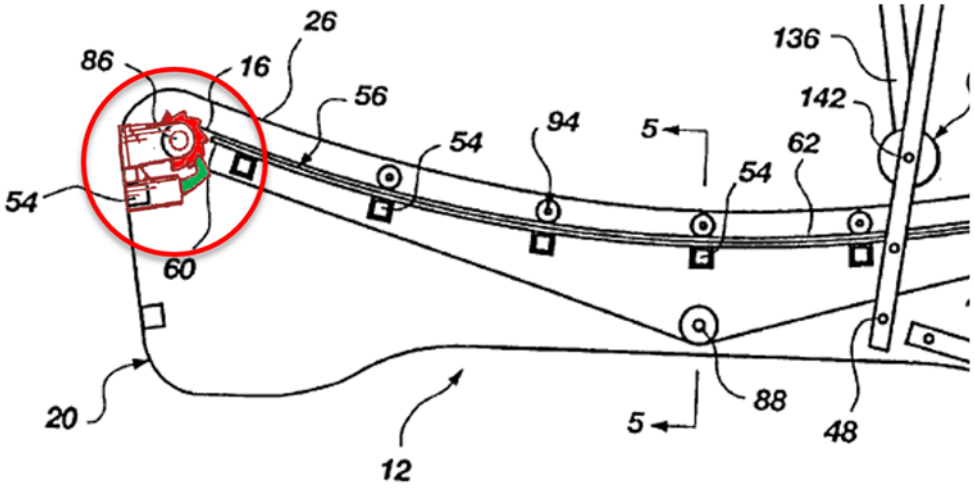


FIG. 2

Ex.1012, Figs.5,2

A POSA would have been motivated to modify Socwell to include Magid's control means mounted to the front or rear roller to prevent the risk of a user stepping onto the belt and losing their balance when the belt unexpectedly moves forward. (Ex.1003, ¶¶433-434.) For example, the below image shows Magid's control means attached to the rear shaft.



Ex.1011, Fig.2

The modification would include mounting one or more one-way ratchet clutches to the front or rear roller. The rachet gear would be mounted coaxially with the roller 86 (or roller 78) and the pawl would be secured to the frame. (Ex.1003, ¶435.)

This modification would have been a simple combination of prior art elements: Socwell's curved manual treadmill and Magid's one-way ratchet clutch. As illustrated above, the pawl would be arranged forward the ratchet gear and biased by a spring to engage the gear teeth. The ratchet gear teeth are swept forward to yield predictable results: allowing the ratchet gear to overrun counterclockwise with rearward belt motion and prevent forward motion of the belt. (Ex.1003, ¶436.)

The one-way clutch of Magid would function the same when added to

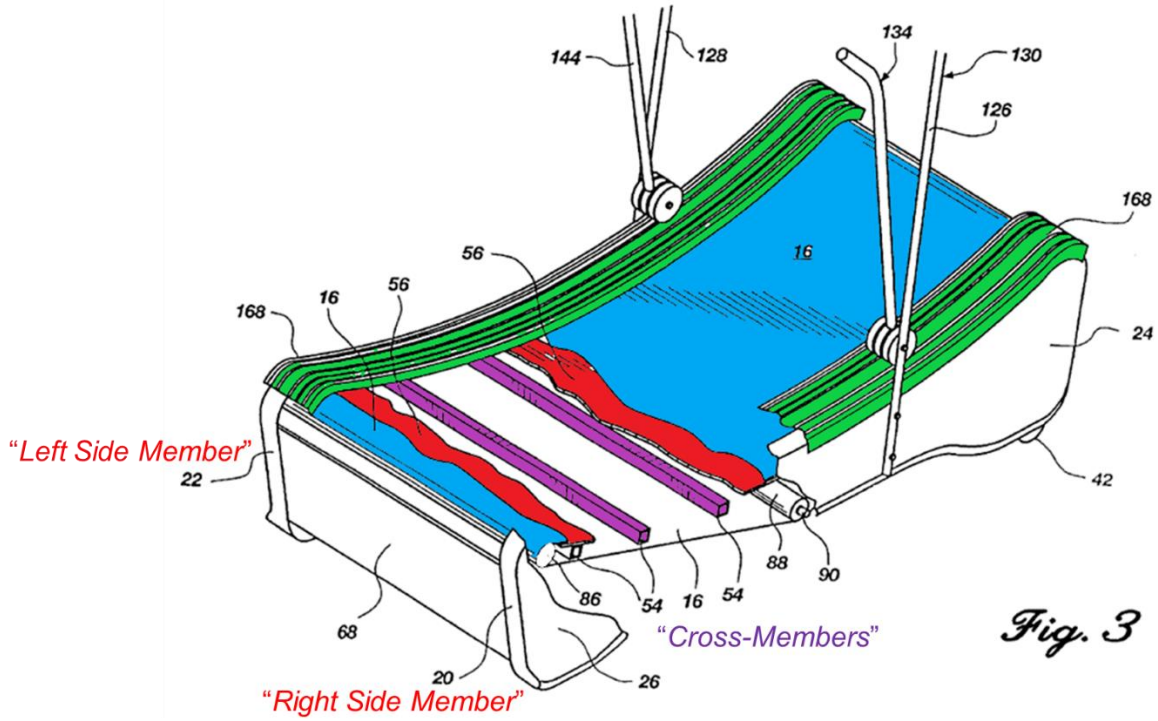
Socwell and provide the predictable result in Socwell's running belt of only rotating in the exercise direction thus providing the same benefit described in Magid. (Ex.1003, ¶¶437.)

The modification would also be the use of known technique—using a one-way clutch in a backstopping mode of operation—to improve similar devices, *i.e.*, treadmills, in the same way, *i.e.*, to provide unidirectional belt motion. (Ex.1012, 4:48-54; Ex. 1018, 8-9, 52-53; Ex.1003, ¶437.)

3. Dependent Claims 2-5, 10, 14, 15, and 18

… ***[2.] The manually powered treadmill of claim 1, wherein the frame includes at least one cross-member, a left side member, and a right side member; and wherein the at least one cross-member extends between the left side member and the right side member.***

Socwell discloses supports ribs 54 (*i.e.*, "*cross members"*) that "extend substantially transverse dimensionally between first and second sides 20, 22 of the support frame … [to] provide a means for structurally supporting the deck 56." (Ex.1011, 8:27-36; Ex.1003, ¶¶372-373.)



Ex.1011, Fig.3

… ***[3] The manually powered treadmill of claim 2, wherein each one of the first and second bearing rails are coupled to at least one of the at least one cross-member.***

Socwell discloses coupling the cover members 168 ("*bearing rails*") to each support rib 54 ("*cross-member*") with a bolt 118:

> Alternatively, the bolt 118 may be disposed through an aperture 116 formed in a support rib 54 which may further serve to secure the support rib 54 to the support frame 12.

(Ex.1011, 11:22-25; Ex.1003, ¶¶374-375.)

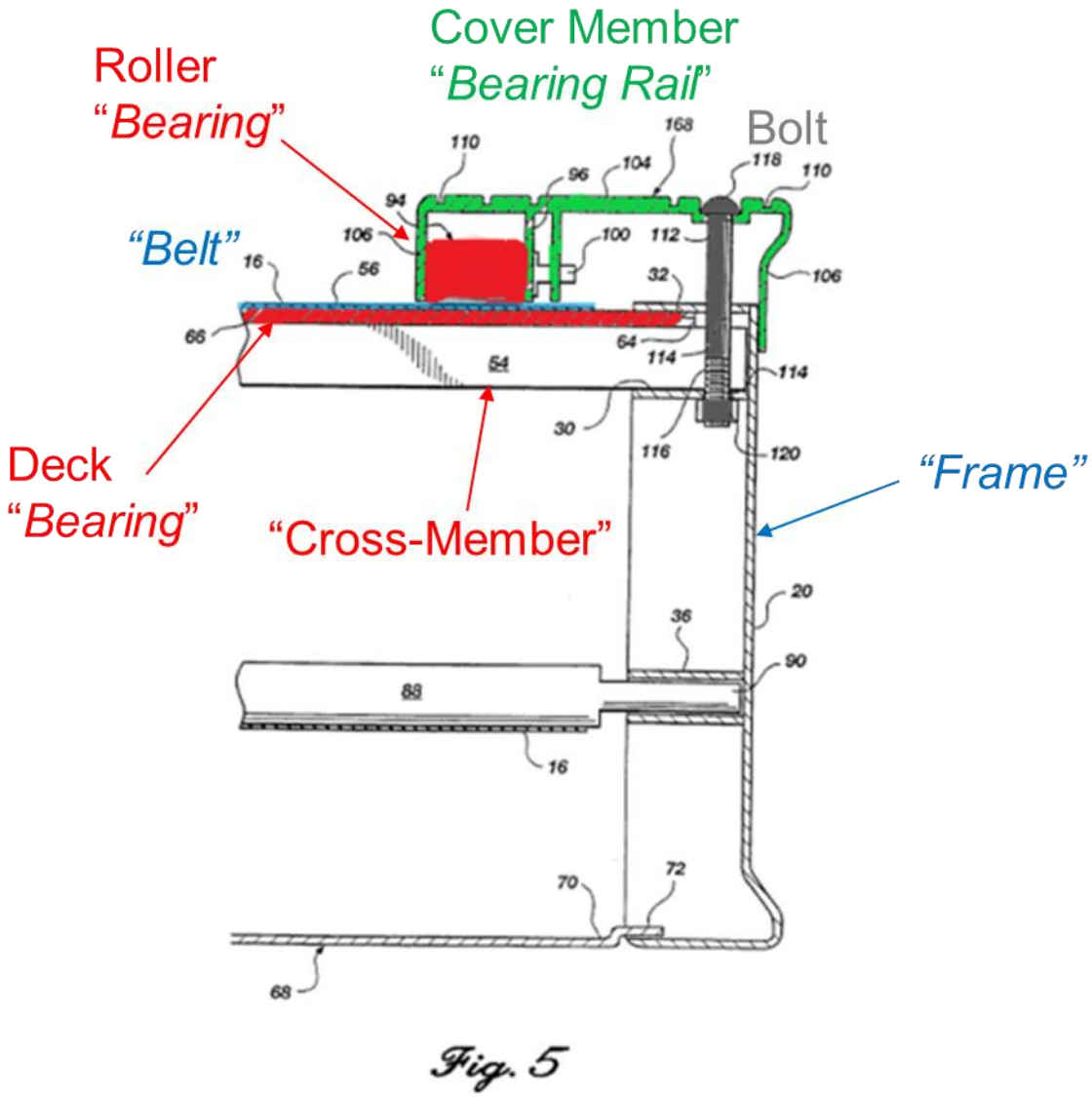


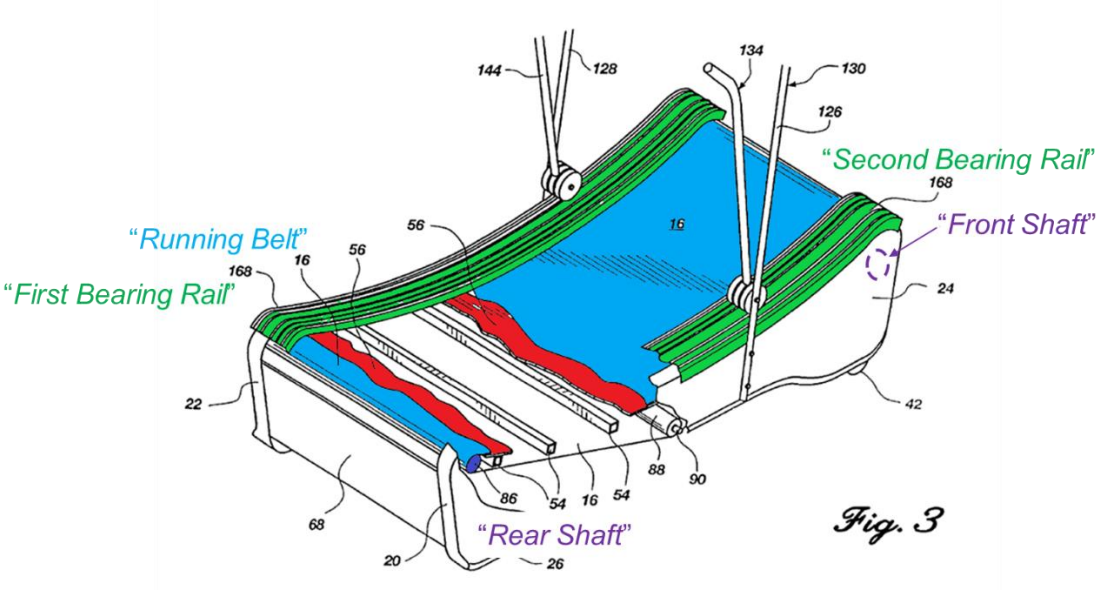
Fig. 5

Ex.1011, Fig.5

… ***[4.]/[18.] The manually powered treadmill of claim 1 [claim 11], wherein each [one] of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.***

Socwell discloses that the cover members 168 (the "*first bearing rail*" and the "*second bearing rail*") are attached to the frame 12 by bolts 118. (Ex.1011,

11:15-23, Fig.5; Ex.1003, ¶¶376-378, 409.) The cover members 168 extend longitudinally along a length of the frame 12:



Ex.1011, Fig.3

… ***[5.] The manually powered treadmill of claim 1, wherein each one of the first bearing rail and the second bearing rail define in part a top profile corresponding to the curved running surface.***

Socwell discloses a belt 16 that is supported by the curved deck 56 and retained by the rollers 98 ("*plurality of bearings*"). (Ex.1011, 10:17-26; Fig.5, Ex.1003, ¶379.) This arrangement provides a curved shape for the belt 16 to follow. (Ex.1011, 4:13-19.) The cover members 168 ("*bearing rails*") support the deck 56 and rollers 98 ("*plurality of bearings*"). (Ex.1011, 11:15-23, Ex.1003, ¶380.)

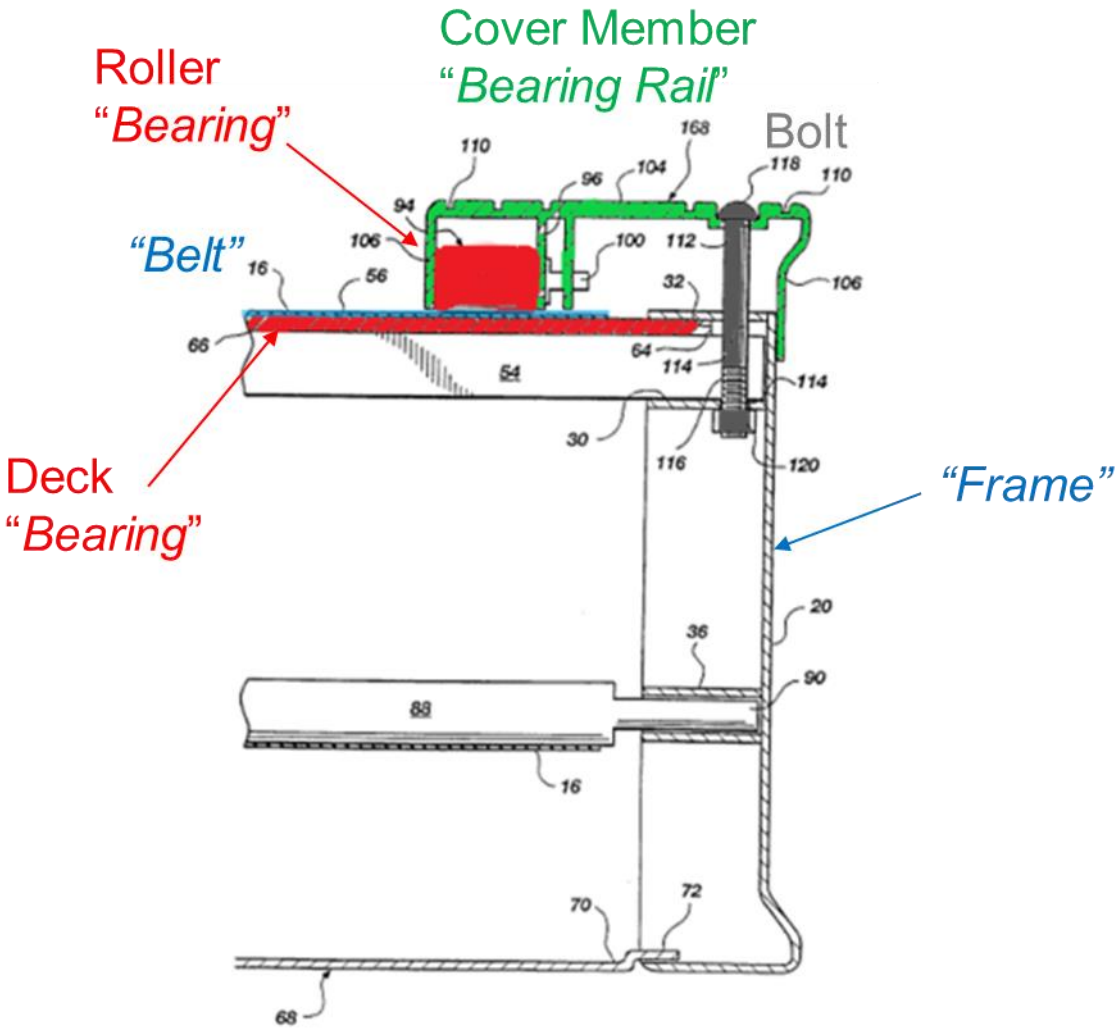
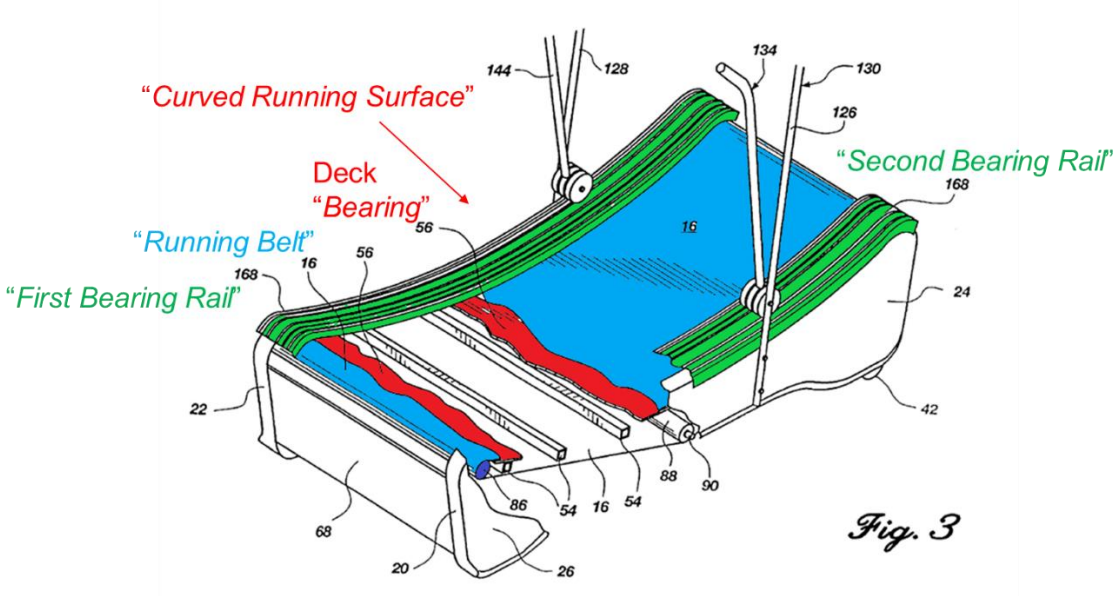


Fig. 5

Ex.1011, Fig.5

The deck 56 and rollers 98, supported by the cover members 168 ("*bearing rails*"), define the curved running surface. (Ex.1003, ¶381.)



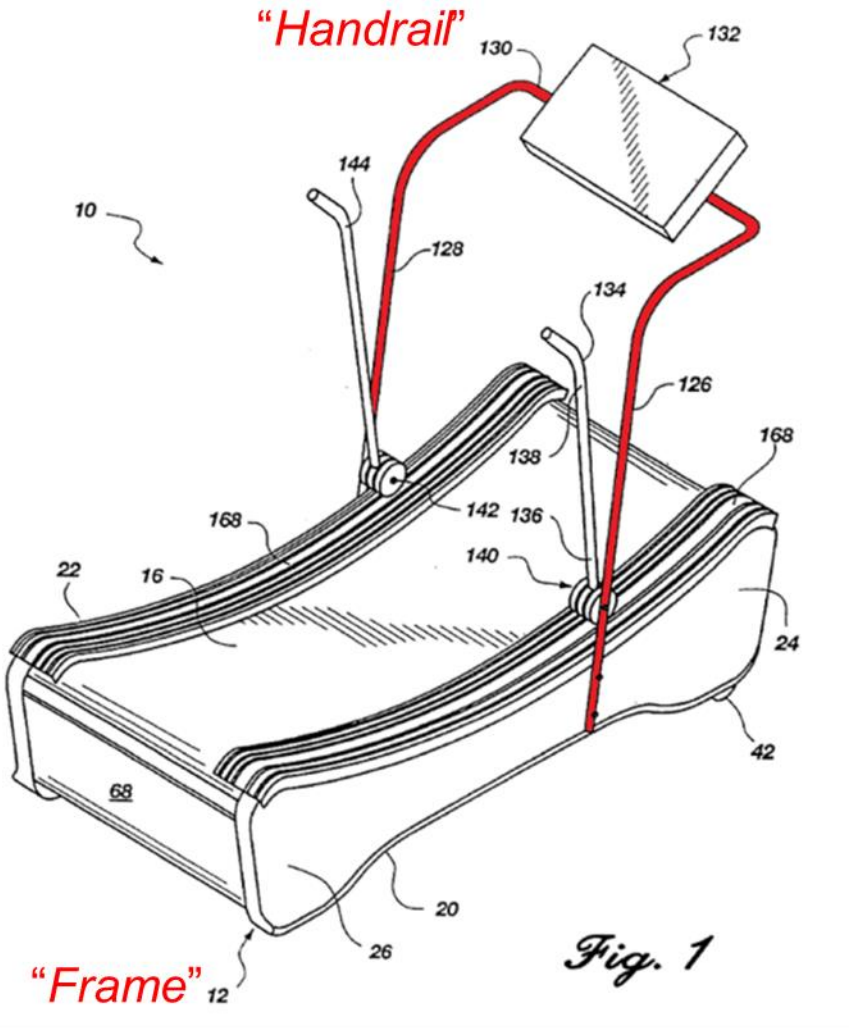
Ex.1011, Fig.3

… ***[10.] The manually powered treadmill of claim 1, further comprising a handrail attached to the frame and structured to provide a support structure for the user of the manually powered treadmill.***

Socwell discloses a crossbar 130 ("*handrail"*) attached to the frame 12. (Ex.1003, ¶383.)

> As further illustrated in FIGS. 1 and 2, at least one crossbar 130 may be structurally supported in relation to the support frame 12.

(Ex.1011, 5:46-56; *see also* 11:62-13.)

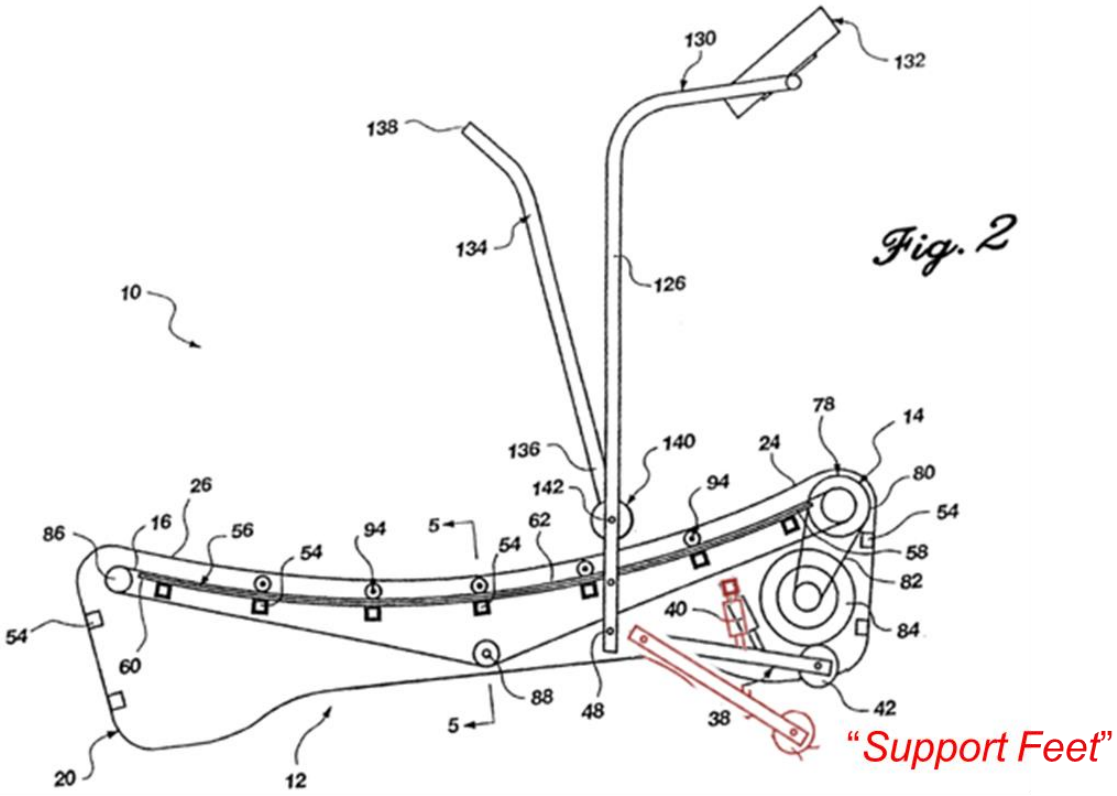


Ex.1011, Fig.1

… ***[14] The manually powered treadmill of claim 11, further comprising support feet coupled to the frame, wherein the support feet are vertically adjustable to adjust an incline of the manually powered treadmill relative to the ground surface.***

Socwell discloses adjustable wheels 42 ("*support feet*"). A "foot roller assembly 38 preferably includes one or more wheels 42 rotatably connected thereto in such a manner so as to provide a means for readily moving the curved deck

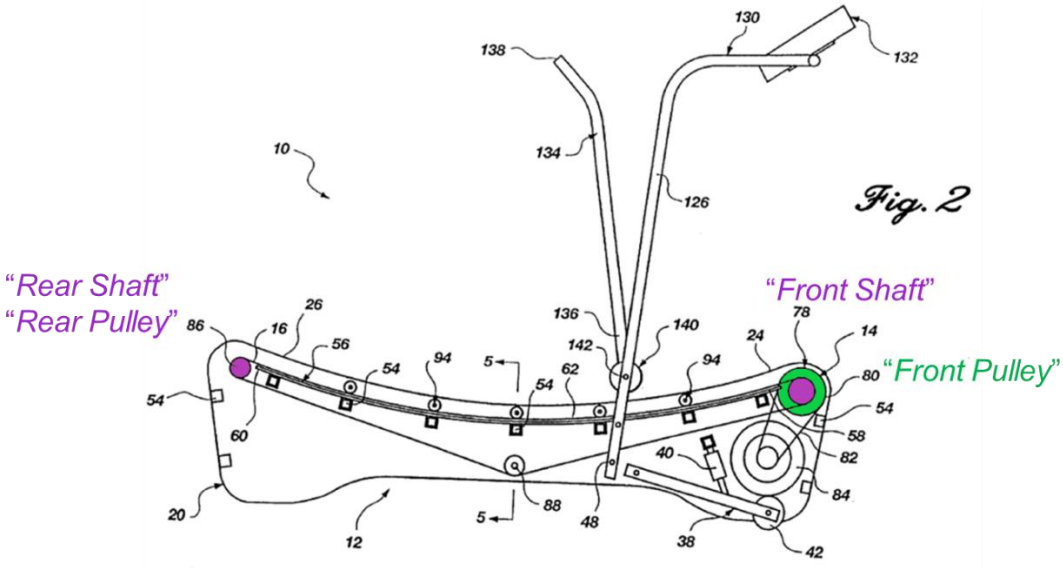
treadmill 10." (Ex.1011, 9:34-36.) "The foot roller assembly 38 may further comprise a force absorbing member 40 … [that includes] "means for stabilizing the curved deck treadmill 10 at an elevated position so as to provide a means for inclining the front end 24 of the support frame 12 for increasing user workout." (Ex.1011, 9:36-47.) (Ex.1003, ¶¶400-404.)



Ex.1011, Fig.2

… ***[15.] The manually powered treadmill of claim 11, further comprising at least one front pulley coupled to the front shaft and at least one rear pulley coupled to the rear shaft, wherein a radius of the at least one front pulley is greater than a radius of the at least one rear pulley.***

Socwell discloses a roller assembly 14 supported between the right side frame 20 and left side frame 22 that includes a first roller 78 ("*front shaft*") and a second roller 86 ("*rear shaft*," "*rear pulley*"). (Ex.1011, 5:35-41; Ex.1003, ¶405.) Socwell also discloses a pulley 80 ("*front pulley*") "disposably mounted to the first roller 78 at the first end 24 of the support frame 12." (Ex.1011, 11:38-41; Ex.1003, ¶406.) As illustrated below, the radius of the pulley 80 ("*front pulley*") is greater than a radius of the second roller 86 ("*rear pulley*"). (Ex. 1003, ¶407.)



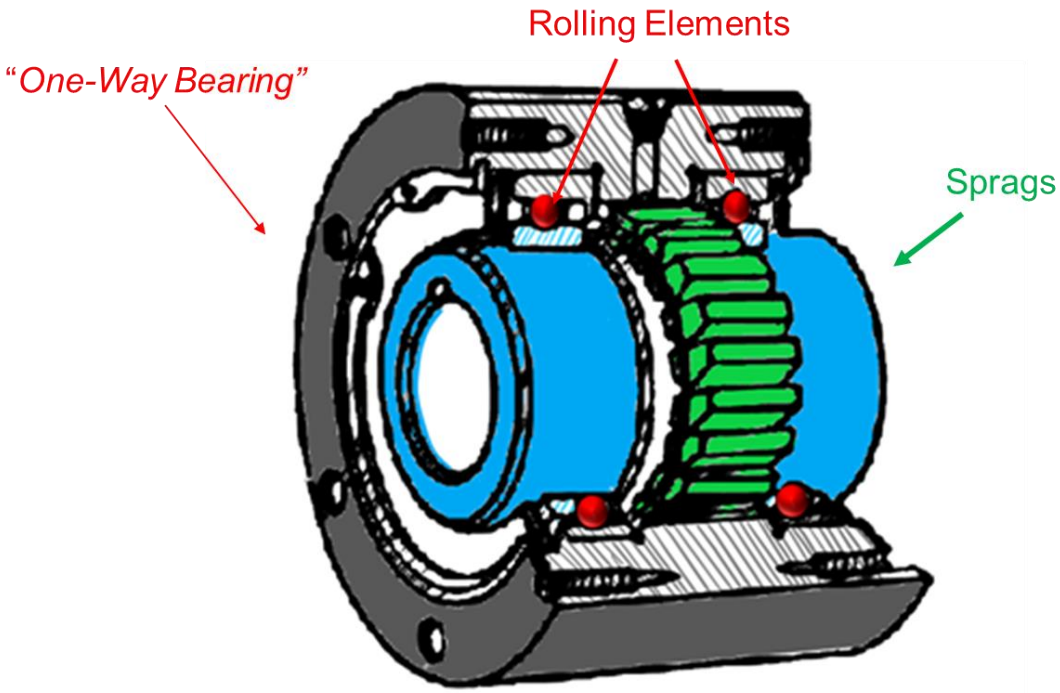
Ex.1011, Fig.2

F. Ground 5: Claims 6-9, and 12 are Obvious over Socwell and Magid in View of Sclater

… ***[6]/[12] The manually powered treadmill of claim 1, wherein the safety device includes a one-way bearing.***

Sclater discloses a one-way bearing assembly that includes sprags. (Ex.1017, 312.) Sclater discloses this assembly functions as a one-way bearing by providing

"one-direction only torque transmission in an overrunning clutch." (*Id*; Ex.1003, ¶442).



Ex.1017 at 318

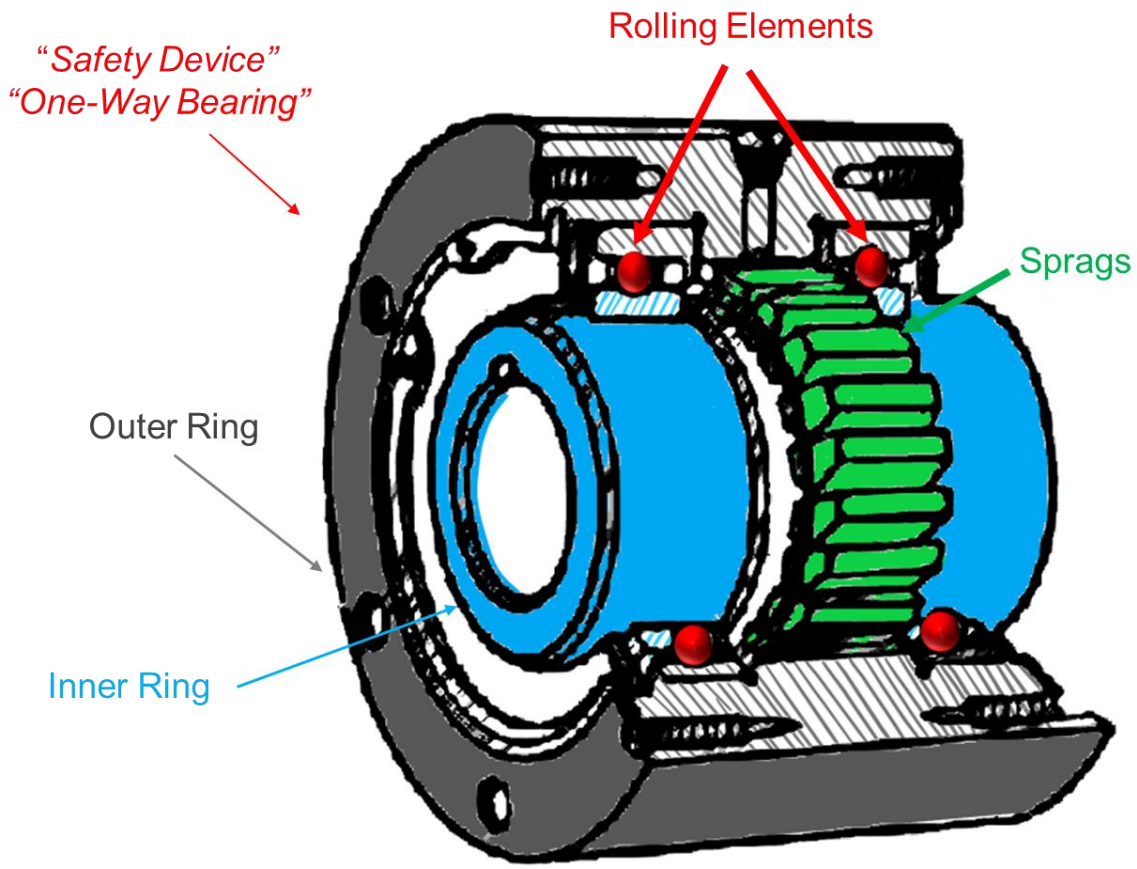
Sclater further discloses:

> Precision sprags act as wedges…. In the formsprag clutch, torque is transmitted from one race to another by the wedging action of sprags between the races in one direction; in the other direction the clutch freewheels.

(Ex.1017 at 318.)

… ***[7][a] The manually powered treadmill of claim 6, wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring,***

Sclater discloses that sprag-type one-way bearing assemblies include sprags disposed between inner and outer rings. (Ex.1003, ¶¶445-446.)

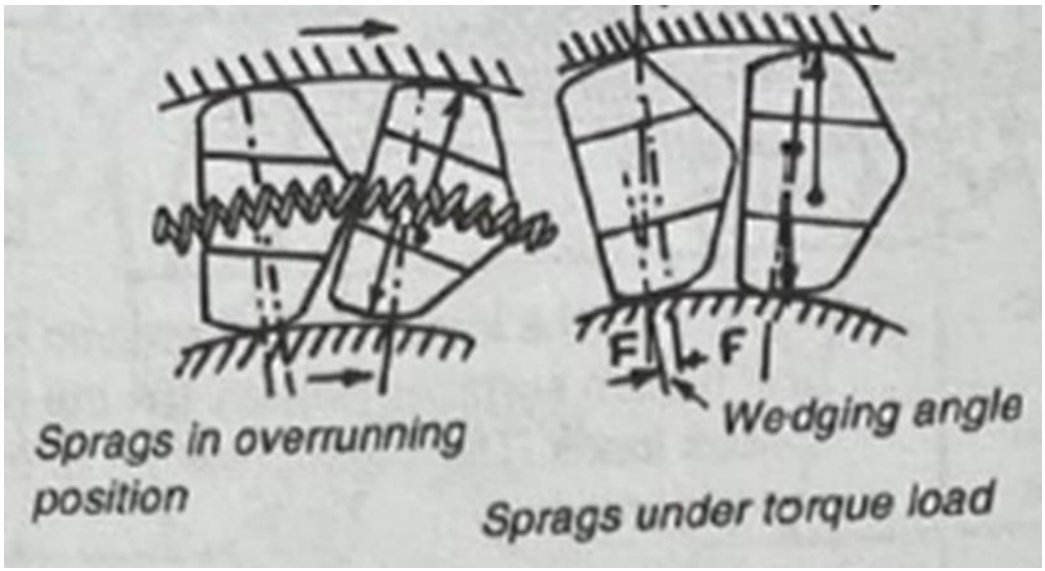


Ex.1017 at 318

… ***[7][b] wherein the plurality of sprags are asymmetric shaped to substantially prevent rotation of the inner ring in the first rotational direction while permitting rotation of the inner ring in the second rotational direction.***

Sclater discloses that the sprags have a "sprag profile, which is composed of two nonconcentric curves of different radius." ("*asymmetric shaped*" "*sprags*") and that a "a locking ramp is provided by the sprag profile." As illustrated in the

figure below on the left, Sclater discloses that when the inner ring rotates in a first direction relative to the outer ring, the sprags move out of the locked position such that an overrun condition occurs. However, as illustrated below right, when the inner ring rotates in the opposite direction relative to the outer ring, the sprag profile causes the sprags to wedge into a locked position preventing relative rotation between the inner and outer rings. (Ex.1017, 312.) (Ex.1003, ¶¶447-449.)



Ex.1017 at 318

… ***[8] The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the rear shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the rear shaft in the first rotational direction while permitting rotation of the rear shaft in the second rotational direction.***

… ***[9] The manually powered treadmill of claim 7, further***

comprising a key that is fixed relative to the inner ring and a keyway formed in the front shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the front shaft in the first rotational direction while permitting rotation of the front shaft in the second rotational direction.

Magid discloses that the control means 6, 6' are attached to the rear roller ("*rear shaft*") or the front roller ("*front shaft*"). (Ex.1012, 4:46-59.) (Ex.1003, ¶¶450, 456.)

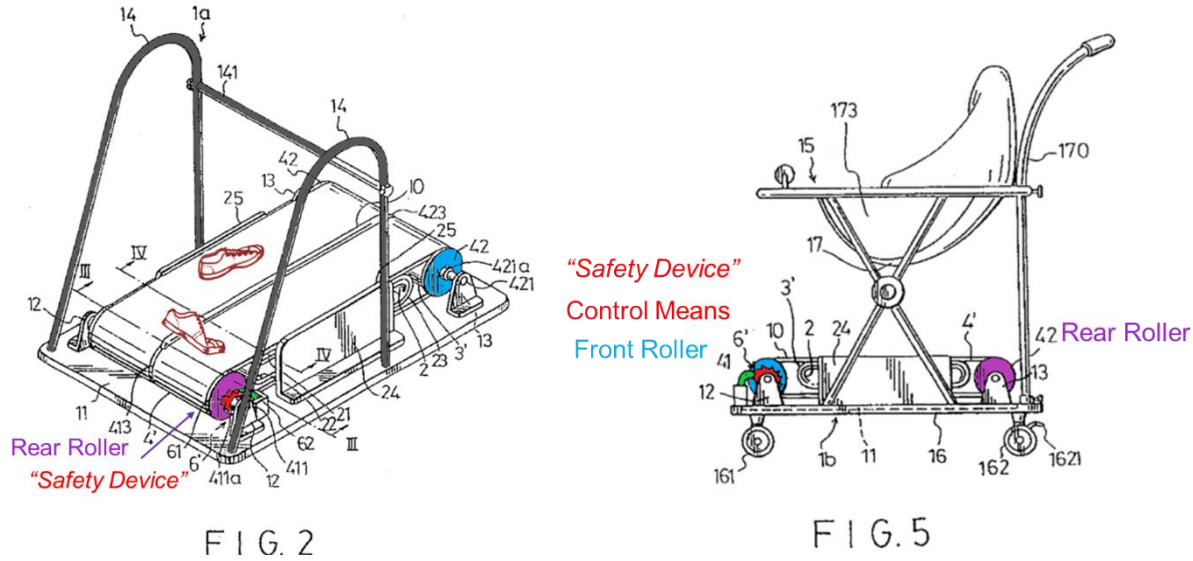
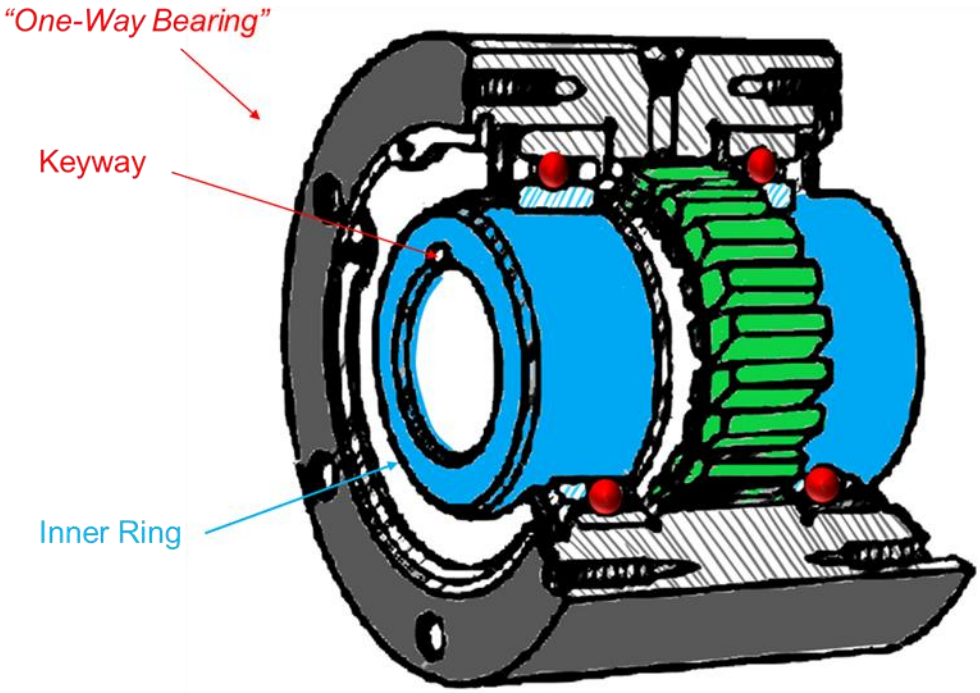


FIG. 2 FIG. 5

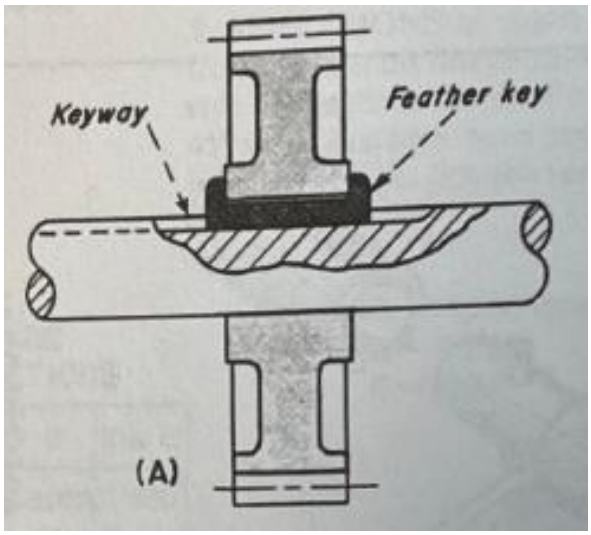
Ex.1012, Figs.2,5

Sclater discloses a keyway formed into the inner ring of the one-way bearing. (Ex.1003, ¶¶452, 457.)



Ex.1017 at 318

Sclater further discloses a key that is fixed to an inner diameter of a gear to engage a keyway that is formed in the corresponding shaft. (Ex.1017 at 420-421; Ex.1003, ¶¶453-454, 458-459.)



Ex.1017 at 420

1. Rationale to Combine Socwell, Magid, and Sclater

A POSA would have been motivated to substitute Sclater's one-way sprag-type bearing assembly for Magid's ratchet-and-pawl one-way mechanism for the same reasons provided above for Ground 2. (Ex.1003, ¶¶465-472.)

G. Ground 6: Claims 1-12, 14, and 18 are Unpatentable as Obvious over Socwell in View of Magid and Sclater

1. Independent Claims 1 and 11

For Ground 6, Petitioner proposes claim constructions for the terms: a) "*shaft*", b) "*safety device*" and c) "*substantially prevent*" which affects claims limitations: a) [1.2]/[11.2] and [1.3]/[11.3], b) [1.7][a]/[11.7][a], and c) [1.7][b]/[11.7][b]. The remaining limitations are taught by the combination of Socwell, Magid, and Sclater for the same reasons provided in Grounds 4 and 5.

… ***[1.2]/[11.2] and [1.3]/[11.3]***

Petitioner proposes construing the term "*shaft*" as "a rotating element used to transmit power from one part to another." The original limitations are taught by the combination of Socwell and Magid for the same reasons provided in Ground 1. (*See* Ex.1003, ¶¶476-478, 515, ¶¶481-482, 516.) Regarding the proposed claim construction, Socwell's first roller 78 ("*front shaft*") and second roller 86 ("*rear shaft*") are coupled to each other through the belt 16. Each roller 78, 86 receives power from the user through the belt, and transfers the power to the other roller

78,86 through the belt. (*See* Ex.1003, ¶¶479-480, 484.)

… ***[1.7][a]/[11.7][a]***

Petitioner proposes construing "*safety device*" as a means-plus- function term requiring the structure disclosed in the '580 Patent for fulfilling this function. (*See* Ex.1001, 27:16-29; 29:23-28; Figs.2, 36.)

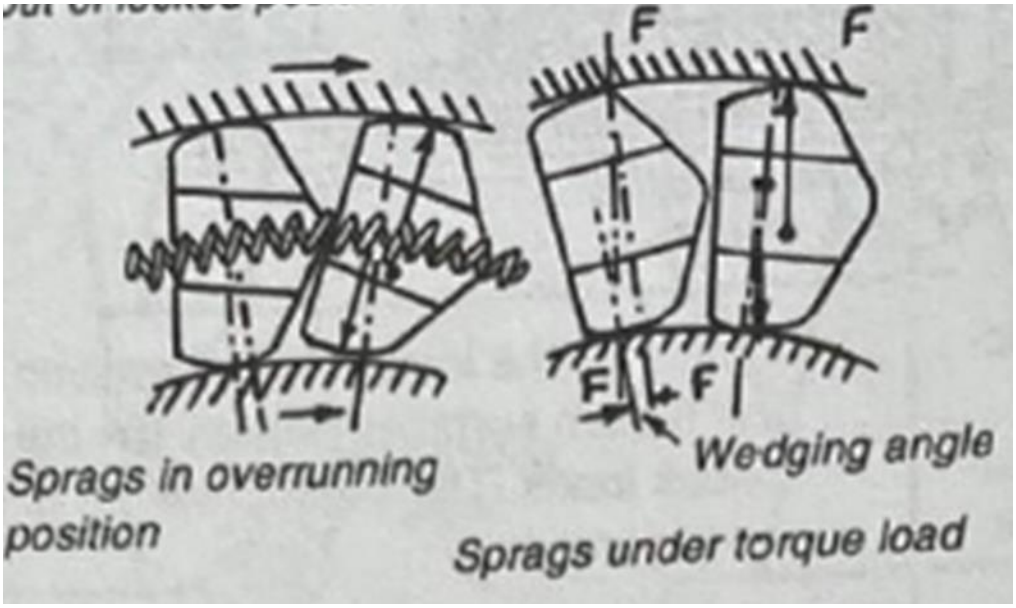
The proposed construction of the "*safety device*" in Claims [1.7][a]/[11.7][a] as a "one-way bearing assembly having inner and outer rings and sprags" is similar to the limitations of claim [7.][a], *i.e.*, "*wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring*," that are addressed in Ground 5. Therefore claims [1.7][a]/[11.7][a] are taught by the combination of Socwell, Magid, and Sclater for the same reasons provided for claim [7][a] in Ground 5. (*See* Ex.1003, ¶¶488-494, 519.)

… ***[1.7][b]/[11.7][b]***

Petitioner proposes construing the term "*substantially prevent rotation*" as "prevent any movement after allowing no or minimal movement." The original claim limitations and the "*safety device*" construction, are taught by the combination of Socwell, Magid, and Sclater for the same reasons provided for claim [7][b] in Ground 5. (*See* Ex.1003, ¶¶495-497.)

Regarding the proposed construction for "*substantially prevent rotation*," As illustrated in the figure below on the left, Sclater discloses that when the inner ring

rotates in a first direction relative to the outer ring, the sprags move out of the locked position such that an overrun condition occurs. However, as illustrated below right, when the inner ring rotates in the opposite direction, the sprag profile wedges the sprags into a locked position preventing relative motion between the inner and outer rings. (*See* Ex.1003, ¶¶498-499.)



Ex.1017 at 318

2. Dependent claims 2-10, 14, and 18

The additional limitations of these claims are not affected by Petitioner's claim construction positions and therefore they are taught by the combination of Chickering, Magid, and Sclater for the same reasons provided in Grounds 1 and 2. (*See* Ex.1003, ¶¶500-501.)

3. Rationale to Combine Socwell, Magid, and Sclater

It would have been obvious to a POSA to combine the manual curved

treadmill disclosed in Socwell with the known technique of a one-way clutch to prevent belt motion in a forward direction as disclosed in Magid for at least the same reasons given for Ground 4. (Ex.1003, ¶¶528.)

A POSA would have been motivated to substitute Sclater's one-way sprag-type bearing assembly for Magid's ratchet-and-pawl one-way mechanism for the same reasons provided above for Ground 5. (Ex.1003, ¶¶528, 425-437, 465-472.)

VIII. Objective Indicia of Nonobviousness

Petitioner is not aware of any evidence of alleged secondary considerations of non-obviousness having nexus to the challenged claims. (Ex.1003, ¶529.)

IX. Discretionary Considerations Favor Institution

A. The *Fintiv* Factors Strongly Favor Institution

The Fintiv factors strongly favor institution. *Apple Inc. v. Fintiv, Inc*., IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential); *see* June 21, 2022 Memorandum: Interim Procedure for Discretionary Denials in AIA Post Grant Proceedings with Parallel District Court Litigation ("June 2022 Memo").

Factor 1 is neutral or favors institution. No motion for stay has been filed and the court has not indicated whether it would grant any such motion. Because the Board typically "will not attempt to predict how the district court in the related district court litigation will proceed," *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (P.T.A.B. June

16, 2020) (informative), factor 1 carries little weight here.

Factor 2 strongly favors institution. The co-pending litigation in S.D. California is in its early stages, no trial date has been set, and the median time to trial for civil actions in S.D. California is 45.4 months. (Ex.1023, District Court Statistics at 69; June 2022 Memo at 3.) Thus, trial would likely occur (if at all) in early 2026—over a year after the projected final decision here. *See Mylan Pharms. Inc. v. Bayer Pharma Aktiengesellschaft*, IPR2022-00517, Paper 15 at 8-9 (P.T.A.B. Aug. 9, 2022) (evaluating median time to trial for factor 2).

Factor 3 strongly favors institution. By institution, neither the parties nor the S.D. California court will have invested significant resources in the litigation. The court has not issued a scheduling order beyond the Markman Hearing, or any substantive rulings (e.g., claim construction, dispositive motion).

Factors 4 and 5 strongly favor institution. Petitioner stipulates that, if the Board institutes this Petition, Petitioner will not raise at trial in parallel litigation any Ground raised here. Petitioner's stipulation mitigates concerns for duplicating efforts and inconsistent conclusions.

Factor 6 strongly favors institution. The Petition's merits are strong. (June 2022 Memo at 3-5.) Additionally, under factor 6: (1) the Board is best suited to address the technical issues raised here; (2) a decision on the merits at institution may aid the parties in resolving their dispute; and (3) determining patentability will

benefit the public, providing a complete record and rationale absent from a jury verdict form.

Holistically, the *Fintiv* factors strongly favor institution.

B. The *Advanced Bionics* Factors Favor Institution

Denial under §325(d) is not warranted. Sclater was not before the Examiner during prosecution. Chickering, Socwell, Cutter, and Schonenberg are cited on the '580 Patent's face, but were not applied to the Challenged Claims during prosecution or otherwise analyzed. The Examiner did not issue any rejections during prosecution, but did reference Magid, which is cited, without explanation, in an interview summary. Section IV. C.1.

The Office erred by its inconsistent examination of the "*bearing rails*" limitation of the '580 Patent as compared to the examination of the '169 Patent. The '169 Patent as filed claimed bearing rails in dependent claim 16. The Examiner rejected the claim over a combination of Schmidt and Magid, relying on Schmidt's disclosure with reference to Figure 6 for satisfying the "*bearing rails*" limitation. Patent Owner amended the claim to require bearings that were "*rotatably coupled*" to the bearing rails to distinguish Schmidt. The Examiner then indicated the claim was allowable. Patent Owner subsequently amended independent claim 14 to include this limitation.

In the '580 Patent, the Examiner issued a Notice Of Allowance with an

Examiner's amendment adding bearing rail limitations to all independent claims that did *not* require the bearings be "rotatably coupled" to the bearing rails. It is unclear why the Examiner now found these limitations to be patentable over Schmidt's rails in contrast to his prior rejection. (Compare Ex.1002, 188-189 to Ex.1021, 132, 154.)

The Office also erred by failing to appreciate the many prior art references, that disclose manual treadmills with "*bearing rails having a plurality of bearings*." (*See e.g.*, Ex.1013, Fig.1; Ex.1011, Fig.2; Ex.1010, Fig.10.)

The Office has consistently and correctly determined that Magid discloses the "*safety device*" limitations. (Ex.1021 at 202-203.) The Office has also consistently and correctly determined that it would have been obvious to combine Magid's one-way clutch with a manual curved deck treadmill. (Ex. 1021 at 202-203.)

X. Conclusion

There is a reasonable likelihood that Petitioner will prevail on the claims 1-12, 14, 15, 18, and 25 of the ‘580 Patent. *Inter partes* review should be instituted for each of these identified claims.

Respectfully submitted,

Dated: April 11, 2023

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Certificate of Service

The undersigned hereby certifies that the foregoing **PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. § 311 *ET SEQ*. AND 37 C.F.R. § 42.100 *ET SEQ*. (U.S. PATENT NO. 9,039,580)**, including all exhibits and supporting evidence, was served by overnight courier in its entirety on **April 11, 2023**, upon the following correspondence address as shown for the '580 Patent:

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Certificate of Compliance Pursuant to 37 C.F.R. § 42.24

This paper complies with the type-volume limitation of 37 C.F.R. § 42.24. The paper contains 13,645 words, excluding the parts of the paper exempted by §42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii)&(iv).

Respectfully submitted,

Dated: April 11, 2023

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Appendix A

A. Listing of All Challenged Claims

[1.0]	1. A manually powered treadmill comprising:
[1.1]	a frame having a front end and a rear end positioned opposite the front end;
[1.2]	a front shaft rotatably coupled to the frame at the front end;
[1.3]	a rear shaft rotatably coupled to the frame at the rear end;
[1.4]	a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;
[1.5]	a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;
[1.6]	a running belt supported by the first bearing rail and the second bearing rail and disposed about the front shaft and the rear shaft, wherein the running belt follows a curved running surface; and
[1.7]	[a] a safety device coupled to at least one of the front shaft and the rear shaft, [b] wherein the safety device is structured to substantially prevent rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.
[2]	2. The manually powered treadmill of claim 1, wherein the frame includes at least one cross-member, a left side member, and a right side member; and wherein the at least one cross-member extends between the left side member and the right side member.

[3]	3. The manually powered treadmill of claim 2, wherein each one of the first and second bearing rails are coupled to at least one of the at least one cross-member.
[4]	4. The manually powered treadmill of claim 1, wherein each one of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.
[5]	5. The manually powered treadmill of claim 1, wherein each one of the first bearing rail and the second bearing rail define in part a top profile corresponding to the curved running surface.
[6]	6. The manually powered treadmill of claim 1, wherein the safety device includes a one-way bearing.
[7]	7. The manually powered treadmill of claim 6, wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring, wherein the plurality of sprags are asymmetric shaped to substantially prevent rotation of the inner ring in the first rotational direction while permitting rotation of the inner ring in the second rotational direction.
[8]	8. The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the rear shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the rear shaft in the first rotational direction while permitting rotation of the rear shaft in the second rotational direction.

[9]	9. The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the front shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the front shaft in the first rotational direction while permitting rotation of the front shaft in the second rotational direction.
[10]	10. The manually powered treadmill of claim 1, further comprising a handrail attached to the frame and structured to provide a support structure for the user of the manually powered treadmill.
[11.0]	11. A manually powered treadmill, comprising:
[11.1]	a frame having a front end and a rear end positioned opposite the front end;
[11.2]	a front shaft attached to the frame adjacent the front end;
[11.3]	a rear shaft attached to the frame adjacent the rear end;
[11.4]	a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;
[11.5]	a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;
[11.6]	[a] a running belt at least partially disposed about the front shaft and the rear shaft and at least partially supported by the first bearing rail and the second bearing rail, [b] wherein the running belt includes a front belt portion proximate the front end, a rear belt portion proximate the rear end, and a central belt portion intermediate the front and rear belt portions, wherein the central belt portion is positioned vertically closer to a ground surface supporting the frame than the front and rear belt portions such that the running belt follows a curved running surface; and

[11.7]	a safety device for substantially preventing rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.
[12]	12. The manually powered treadmill of claim 11, wherein the safety device includes a one-way bearing.
[14]	14. The manually powered treadmill of claim 11, further comprising support feet coupled to the frame, wherein the support feet are vertically adjustable to adjust an incline of the manually powered treadmill relative to the ground surface.
[15]	15. The manually powered treadmill of claim 11, further comprising at least one front pulley coupled to the front shaft and at least one rear pulley coupled to the rear shaft, wherein a radius of the at least one front pulley is greater than a radius of the at least one rear pulley.
[18]	18. The manually powered treadmill of claim 11, wherein each of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.
[25.0]	25. A method, comprising:
[25.1]	providing a manually powered treadmill, the manually powered treadmill having a frame with a front end and rear end;
[25.2]	[a] providing a first bearing rail and a second bearing rail, the first and second bearing rails each comprising a plurality of bearings and [b] extending longitudinally on the frame, [c] wherein the first and second bearing rails define a curved top profile;

[25.3]	disposing a running belt on the plurality of bearings of the first bearing rail and the second bearing rail such that the running belt follows a top curved running surface corresponding to the curved top profile of the first and second bearing rails;
[25.4]	permitting movement of the running belt in a first direction; and
[25.5]	substantially preventing movement of the running belt in a second direction opposite the first direction.

Appendix B

B. Comparison of Independent Claims

[1.0] A manually powered treadmill comprising:	[11.0] A manually powered treadmill, comprising:	[25.0] A method, comprising: providing a manually powered treadmill,
[1.1] a frame having a front end and a rear end positioned opposite the front end;	[11.1] a frame having a front end and a rear end positioned opposite the front end;	[25.1] the manually powered treadmill having a frame with a front end and rear end;
[1.2] a front shaft rotatably coupled to the frame at the front end;	[11.2] a front shaft attached to the frame adjacent the front end;	
[1.3] a rear shaft rotatably coupled to the frame at the rear end;	[11.3] a rear shaft attached to the frame adjacent the rear end;	
[1.4] a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;	[11.4] a first bearing rail having a plurality of bearings, the first bearing rail attached to a left side of the frame;	[25.2] [a] providing a first bearing rail and a second bearing rail, the first and second bearing rails each comprising a plurality of bearings and [b] extending longitudinally on the frame, [c] wherein the first and second bearing rails define a curved top profile;
[1.5] a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;	[11.5] a second bearing rail having a plurality of bearings, the second bearing rail attached to a right side of the frame;	
[1.6] a running belt supported by the first bearing rail and the second bearing rail and disposed about the front shaft and the rear shaft, wherein the running belt	[11.6] [a] a running belt at least partially disposed about the front shaft and the rear shaft and at least partially supported by the first bearing rail and the second bearing rail, [b]	[25.3] disposing a running belt on the plurality of bearings of the first bearing rail and the second bearing rail such that the running belt follows a top curved running surface

follows a curved running surface; and	wherein the running belt includes a front belt portion proximate the front end, a rear belt portion proximate the rear end, and a central belt portion intermediate the front and rear belt portions, wherein the central belt portion is positioned vertically closer to a ground surface supporting the frame than the front and rear belt portions such that the running belt follows a curved running surface; and	corresponding to the curved top profile of the first and second bearing rails;
[1.7] [a] a safety device coupled to at least one of the front shaft and the rear shaft, [b] wherein the safety device is structured to substantially prevent rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.	[11.7] a safety device for substantially preventing rotation of at least one of the front shaft and the rear shaft in a first rotational direction while permitting rotation of the at least one of the front shaft and the rear shaft in a second rotational direction opposite the first rotational direction.	[25.4] permitting movement of the running belt in a first direction; and [25.5] substantially preventing movement of the running belt in a second direction opposite the first direction.

C. Comparison of Dependent Claims

[2.] The manually powered treadmill of claim 1, wherein the frame includes at least one cross-member, a left side member, and a right side member; and wherein the at least one cross-member extends between the left side member and the right side member.	
[3.] The manually powered treadmill of claim 2, wherein each one of the first and second bearing rails are coupled to at least one of the at least one cross-member.	
[4.] The manually powered treadmill of claim 1, wherein each one of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.	[18.] The manually powered treadmill of claim 11, wherein each of the first and second bearing rails are attached longitudinally to the frame between the front shaft and the rear shaft.
[5.] The manually powered treadmill of claim 1, wherein each one of the first bearing rail and the second bearing rail define in part a top profile corresponding to the curved running surface.	
[6.] The manually powered treadmill of claim 1, wherein the safety device includes a one-way bearing.	[12.] The manually powered treadmill of claim 11, wherein the safety device includes a one-way bearing.
[7.] The manually powered treadmill of claim 6, wherein the one-way bearing includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and outer ring, wherein the plurality of sprags are	

asymmetric shaped to substantially prevent rotation of the inner ring in the first rotational direction while permitting rotation of the inner ring in the second rotational direction.	
[8.] The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the rear shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the rear shaft in the first rotational direction while permitting rotation of the rear shaft in the second rotational direction.	
[9.] The manually powered treadmill of claim 7, further comprising a key that is fixed relative to the inner ring and a keyway formed in the front shaft, wherein the key is configured to cooperate with the keyway to prevent rotation of the front shaft in the first rotational direction while permitting rotation of the front shaft in the second rotational direction.	
[10.] The manually powered treadmill of claim 1, further comprising a handrail attached to the frame and structured to provide a support structure for the user of the manually powered treadmill.	
	[14.] The manually powered treadmill of claim 11, further comprising support feet coupled to the frame, wherein the support feet are vertically adjustable to adjust an incline of the manually powered treadmill

	relative to the ground surface.
	[15.] The manually powered treadmill of claim 11, further comprising at least one front pulley coupled to the front shaft and at least one rear pulley coupled to the rear shaft, wherein a radius of the at least one front pulley is greater than a radius of the at least one rear pulley.