

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

WOODWAY USA, INC.  
Patent Owner.

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U.S. Patent No. 10,561,884 to Bayerlein et al.

Case No.: IPR2023-00843

**DECLARATION OF ROBERT GIACHETTI, Ph.D.**

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**List of Exhibits**

| <b>Exhibit #</b> | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001             | U.S. Patent No. 10,561,884 (“the ‘884 Patent”)                                                                                                                                                                                                                                                                                                                                               |
| 1002             | U.S. Patent No. 10,561,884 File History (“the ‘884 Patent 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, <i>Woodway USA, Inc., v. LifeCORE Fitness, Inc. d/b/a Assault Fitness</i> , Case No. 3:22-cv-00492-JO-BLM, Southern District of California, Filed April 11, 2022 (“Complaint”) (Ex. 1005 at 1-8)<br><br>Waiver of Service (April 13, 2022) (Ex. 1005 at 9-10)                                                                                                                     |
| 1006             | Amended Complaint, <i>Woodway USA, Inc., v. LifeCOREFitness, Inc. d/b/a Assault Fitness</i> , 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 (“Schenkenberger”)                                                                                                                                                                                                                                                                                                                                |
| 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”) (available at <a href="https://cod.on.worldcat.org/oclc/49571648">https://cod.on.worldcat.org/oclc/49571648</a> )                                                                                                                                                                            |
| 1017             | Neil Sclater and Nicholas P. Chironis, <i>Mechanisms &amp; Mechanical Devices Sourcebook</i> , Third Ed., (McGraw-Hill 2001) (“Sclater”) (available at <a href="https://catalog.loc.gov/vwebv/holdingsInfo?searchId=26&amp;recCount=25&amp;recPointer=0&amp;bibId=12308523">https://catalog.loc.gov/vwebv/holdingsInfo?searchId=26&amp;recCount=25&amp;recPointer=0&amp;bibId=12308523</a> ) |
| 1018             | Mechanical Clutches and Torque Overload Devices, (Emerson Industrial Automation, 2001) (“Emerson”)                                                                                                                                                                                                                                                                                           |

| <b>Exhibit #</b> | <b>Description</b>                                                                                                                                                                                       |
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| 1019             | Standard Specification for Motorized Treadmills, (ASTM, 2005) (“ASTM Standard”)                                                                                                                          |
| 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 Patent File History”)                                                                                                                                  |
| 1022             | Responsive Claim Constructions, <i>Woodway USA, Inc., v. LifeCOREFitness, Inc. d/b/a Assault Fitness</i> , 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 <a href="https://inhabitat.com/human-powered-gyms-in-hong-kong/">https://inhabitat.com/human-powered-gyms-in-hong-kong/</a> ) |
| 1025             | Minute Order, <i>Woodway USA, Inc., v. LifeCOREFitness, Inc. d/b/a Assault Fitness</i> , Case No. 3:22-cv-00492-JO-BLM, Southern District of California, March 30, 2023.                                 |
| 1026             | <i>Intentionally blank</i>                                                                                                                                                                               |
| 1027             | Claim Construction Brief, <i>Woodway USA, Inc., v. LifeCOREFitness, Inc. d/b/a Assault Fitness</i> , Case No. 3:22-cv-00492-JO-BLM, Southern District of California, March 1, 2023                       |
| 1028             | Responsive Claim Construction Brief, <i>Woodway USA, Inc., v. LifeCOREFitness, Inc. d/b/a Assault Fitness</i> , 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”)                                                                                                                                                             |
| 1030             | U.S. Patent No. 6,923,746 to Skowronski (“Skowronski”)                                                                                                                                                   |

I, Robert Giachetti, Ph.D., P.E., hereby declare as follows:

1. I am making this declaration at the request of LifeCORE Fitness, Inc. (“LifeCORE”) in the matter of *Inter Partes* Review of U.S. Patent No. 10,561,884 (“the ‘884 Patent”) to Bayerlein et al.

2. In preparation of this declaration, I have studied the exhibits as listed in the Exhibit List shown above in my report.

3. In forming the opinions expressed below, I have considered:

- a. The documents listed above as well as additional patents and documents referenced herein;
- b. The relevant legal standards, including the standard for obviousness provided in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), and any additional documents cited in the body of this declaration; and
- c. My knowledge and experience based upon my work and study in this area as described below.

**I. Qualifications and Professional Experience**

4. I am a Licensed Professional Engineer in Illinois and Oklahoma, with over 20 years of experience in Mechanical Engineering. My experience in machinery and mechanisms spans numerous industries; I have worked directly designing mechanical systems and machinery, and I have consulted on the operation of

machinery in various fields including consumer products, rail, linear motion systems, conveyor systems, gear systems, wire rope, and exercise equipment.

5. I am employed by Fusion Engineering, LLC, where I have worked since November of 2020. Fusion is an engineering firm that provides multidisciplinary engineering consulting services.

6. I am currently the Director of Mechanical Engineering at Fusion and I am a Licensed Professional Engineer in Illinois and Oklahoma. In this role, I am responsible for providing engineering consulting services in Mechanical and Biomechanical engineering, coordinating client outreach, coordinating marketing materials, and recruiting.

7. Prior to joining Fusion as the Director of Mechanical Engineering I was a Senior Managing Engineer at Exponent, Inc., where I had been employed since 2008. In my positions there I worked on Biomechanical and Mechanical Engineering projects that frequently related to consumer product design, machinery design, product and machinery performance, and human interaction with consumer products or industrial equipment. In these roles I performed experimental studies where I built custom test fixtures that were comprised of typical mechanical power transmission components (e.g., linear actuators, belts, gears, conveyors, springs, bearings, etc.), measured forces and movements generated by humans, and I was involved in several consulting matters that specifically involved exercise equipment.

8. I am currently a Member of ASTM and ASME where I sit on a number of committees, including ASTM's F15 Consumer Product Committee and ASTM's F08 Sports Equipment, Playing Surfaces, and Facilities Committee, that oversees treadmills. I have been an active participant in both of these committees.

9. I hold a Bachelor's, Master's and Ph.D. degree in Mechanical engineering. I have Minors in Physics as an undergraduate and Mechanics and Aeronautics as a graduate student. I have taught courses in Physics, Mechanical Engineering, and Biomechanics across three universities. My research in graduate school focused on two areas: 1) forces within the knee joint during daily activities, and 2) human balance and the coordination of limb musculature during walking, standing, running, etc.

10. As part of my work in human balance I was employed in the University of Wisconsin-Madison's Biomechanics laboratory in the Department of Kinesiology where I was also a teaching assistant in Biomechanics. While there, my research responsibilities included designing, developing and constructing equipment used to harness participants in efforts to analyze and characterize their lower limb force capabilities during every-day balancing and locomotive tasks. These research responsibilities also involved the use and disassembly of treadmills to characterize force and balance capabilities of participants. As part of these research responsibilities, I reviewed studies focused on using treadmills and similar devices

as rehabilitation devices (e.g. the “Locomat”). During this time, I also assisted in the preliminary development of a force measuring treadmill intended to dissociate the foot forces used in walking from the requirements imposed by upright posture.

11. Prior to attending graduate school, I worked as a project engineer, designing industrial machinery at Braner USA. In this position, I selected mechanical power transmission components, such as bearings and bearing plates in the design of machinery that uncoils sheet metal, conveys it, tensions it, processes it, recoils it and then deposits the coil into a coil car which transports the processed coil away. Prior to Braner USA I worked as an estimator and designer at Alloy Sling Chain, IND. LTD where I designed non-standard items as well as quoted new orders and repairs for lifting equipment.

12. I have been recognized as an expert in mechanical power transmission equipment and serve on the American Society of Mechanical Engineers (ASME) Power Transmission and Gearing Committee. I have also participated, by invitation, in the National Council of Examiners for Engineering and Surveying (NCEES) Mechanical Professional Activities and Knowledge Studies (PAKS) committee. This committee reviews and evaluates the problems and problem types that appear on the Mechanical Engineering Professional Engineering exam for licensure as a Professional Engineer.

13. For nearly 25 years, I have been involved in the area of machine design

and applications of machine design. These machines and products have ranged from children's mattresses to garden hoses, to pressure cookers, electronic tire/raft inflators, and industrial equipment including conveyors.

14. As briefly mentioned above, I have had experience using treadmills in a research environment while studying human balance and gait, and I have assisted with the preliminary design of a unique treadmill. In using treadmills for research purposes, I have disassembled them and am familiar with the common, well known and understood, mechanical power transmission components inside them.

15. In a consulting capacity I have also reviewed exercise equipment in pre-market analysis revolving around mechanical performance. These investigations included exercise equipment such as exercise bikes. In post-accident investigations, I have also reviewed exercise equipment in general on several occasions and these investigations involved many different types of exercise equipment. As part of my work in ASTM's F08 committee I also participate in the development of ASTM's standard both regarding exercise equipment in general, and in treadmills specifically.

16. I have provided my full background in the curriculum vitae that is attached as Exhibit 1004.

## **II. Compensation and Prior Testimony**

17. Fusion engineering is being compensated for my work in this matter at a rate of \$390/hour for my time. I am a salaried employee of Fusion and my

compensation in no way depends on my participation in this proceeding or the outcome of this proceeding.

18. I have previously provided expert testimony in at least three intellectual property related matters. My Curriculum Vitae identifies some of the areas in which I have previously provided expert testimony. (Giachetti CV, Ex. 1004.)

### **III. Materials and Information Considered**

19. My findings, as explained below, are based on my years of education, research, experience, and background in the fields discussed above, as well as my investigation and study of relevant materials. In forming my opinions, I have studied and considered the materials identified in the Exhibit List shown at the beginning of my report. Each of the exhibits listed are true and accurate copies. The Exhibit List includes citations for each exhibit I have reviewed including a weblink where appropriate or applicable.

20. Additionally, I am aware of information generally available to, and relied upon by, persons of ordinary skill in the art at the relevant times, including technical dictionaries and technical reference materials (including textbooks, manuals, technical papers and articles); some of my statements below are expressly based on such awareness.

21. Due to procedural limitations for *inter partes* reviews, the grounds of unpatentability discussed herein are based solely on prior patents and other printed

publications. I understand that Petitioner reserves all rights to assert other grounds for unpatentability or invalidity, not addressed herein, at a later time. Thus, the absence of discussion of such matters here should not be taken as indicating that there are no such additional grounds for unpatentability and invalidity of the '884 Patent.

#### **IV. Relevant Legal Standards**

##### **A. General**

22. I have been asked to provide opinions on the claims of the '884 Patent in light of the prior art.

23. It is my understanding that a claimed invention is unpatentable under 35 USC § 102 if a prior art reference teaches every element of the claim. Further, it is my understanding that a claimed invention is unpatentable under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the alleged invention was made to a person having ordinary skill in the art to which the subject matter pertains. I also understand that an obviousness analysis takes into factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

24. It is my understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness

of the claimed subject matter. Some of these rationales include the following: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

**B. Priority Dates for Claimed Subject Matter**

25. I understand that in order to be considered “prior art,” patents or printed publications must predate the pertinent priority dates for the subject matter claimed in the ’884 Patent.

26. I have been informed that a patent is only entitled to a priority date based on an earlier filed application if the earlier filed application meets the requirements of 35 U.S.C. §112. Specifically, I have been informed that 35 U.S.C. § 112, ¶1 requires that the specification of a patent or patent application must “contain a written description of the invention, and the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly

connected, to make and use the [invention] . . . .” I understand that the requirements of this provision are commonly called the written description requirement and the enablement requirement.

27. I have been informed that compliance with both the written description requirement and enablement requirement must be determined as of the effective filing date of the application for which priority is sought.

28. I have been informed that to satisfy the written description requirement a patent’s specification should reasonably convey to a person of skill in the art that the inventor had possession of the claimed invention as of the effective filing date of the application.

**C. Claim Construction Standard**

29. In order to properly evaluate these claims, I understand that the terms of the claims must first be construed.

30. I understand that in this proceeding, the claims are construed consistent with the specification and using the same construction as that used in litigation. I have been informed that the claims, after being construed in this manner, are then to be compared to the information in the prior art, which for this proceeding is limited to patents and printed publications. I also understand that, at the same time, absent some reason to the contrary, claim terms are typically given their ordinary and accustomed meaning as would be understood by one of ordinary skill in the art.

31. I understand that a claim that includes functional language without sufficient structural limitations may be construed as a “means for” or “means plus” claim. Such a claim may be interpreted as requiring structural limitations disclosed in the specification.

32. I also understand that a means for / means plus claim may or may not include the term “means.”

**D. Anticipation**

33. I understand that the following standards govern the determination of whether a patent claim is “anticipated” by the prior art.

34. I understand that, for a patent to be “anticipated” by the prior art, each and every limitation of the claim must be found, expressly, implicitly or inherently, in a single prior art reference. I further understand that the requirement of strict identity between the claim and the reference is not met if a single element or limitation required by the claim is missing from the applied reference.

35. I understand that claim limitations that are not expressly described in a prior art reference may still be there if they are implicit or inherent to the thing or process being described in the prior art. I have been informed that to establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. I have been informed that

inherency cannot be established just because a certain thing may result from a given set of circumstances.

36. I understand that it is acceptable to consider evidence other than the information in a particular prior art document to determine if a feature is necessarily present in or inherently described by that reference.

**E. Obviousness**

37. I understand that for a single reference or a combination of references to render obvious a claimed invention, a POSA must have been able to arrive at the claimed invention by altering or combining the applied references.

38. I have been informed that a patent claim can be found unpatentable as obvious where the differences between the subject matter taught to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the relevant field. Specifically, I understand that the obviousness question involves a consideration of:

- a) the scope and content of the prior art;
- b) the differences between the prior art and the claims at issue;
- c) the knowledge of a person of ordinary skill in the pertinent art; and
- d) whatever objective factors indicating obviousness or non-obviousness may be present in any particular case – referred to as “secondary considerations.”

39. I have been informed that such secondary considerations include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unmet need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) the taking of licenses under the patent by others and (h) the patentee proceeded contrary to the accepted wisdom of the prior art. I understand that secondary considerations are relevant where there is a connection, or nexus, between the evidence and the claimed invention.

40. In addition, I understand that the obviousness inquiry should not be done in hindsight, but must be done using the perspective of a person of ordinary skill in the relevant art as of the effective filing date of the patent claim.

41. I understand that in order for a claimed invention to be considered obvious, there must be some rationale for combining cited references as proposed.

42. I understand that obviousness may also be shown by demonstrating that it would have been obvious to modify what is taught in a single piece of prior art to create the patented invention. I understand that obviousness may be shown by establishing that it would have been obvious to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of one

of ordinary skill in the art, I have been informed the following are examples of approaches and rationales that may be considered:

- a) Combining prior art elements according to known methods to yield predictable results;
- b) Simple substitution of one known element for another to obtain predictable results;
- c) Use of a known technique to improve similar devices (methods, or products) in the same way;
- d) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- e) Applying a technique or approach that would have been “obvious to try” (i.e., choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; or
- g) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed

invention. I also understand that this suggestion or motivation may come from such sources as explicit statements in the prior art, or from the knowledge or common sense of one of ordinary skill in the art.

43. I understand that an invention that might be considered an obvious variation or modification of the prior art may be considered non-obvious if one or more prior art references discourages or lead away from the line of inquiry disclosed in the reference(s). I understand a reference does not “teach away” from an invention simply because the reference suggests that another embodiment of the invention is better or preferred. My understanding of the doctrine of teaching away requires a clear indication that the combination should not be attempted (e.g., because it would not work or explicit statement saying the combination should not be made).

#### **V. Qualifications of one of ordinary skill in the art**

44. Based on my review of these materials, I believe that the relevant field for purposes of the '884 Patent includes exercise apparatuses and methods for developing or strengthening the muscles or joints of the body by working against gravity, a counterforce or countermovement, such as the field of treadmills, including manual treadmills. (See Ex. 1001, 1:21-23.)

45. As described in Section I above, I have extensive experience in the relevant field, including experience relating to treadmill design. Based on my

experience, I have an established understanding of the relevant field.

46. I understand that a “person of ordinary skill in the art” (POSA) or a “skilled artisan” is one who is presumed to be aware of all pertinent art as of the relevant timeframe, thinks along conventional wisdom in the art, and is a person of ordinary creativity. I understand that the level of skill in the art is evidenced by the prior art references. It is my understanding that the ’884 Patent is to be interpreted based on how it would be read by a POSA. It is my understanding that factors such as the education level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made may help establish the level of skill in the art. I understand that a POSA is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above.

47. I understand the relevant timeframe for evaluating a claim is at the time of the invention, which is based on the effective filing date of each claim, or the date at which the subject matter of the claim was first disclosed in an application in such full, clear, concise, and exact terms as to enable the person skilled in the art to make and use the claimed invention. For reasons not addressed in this Declaration or the Petition it accompanies, the effective filing date of certain claims of the ’884 Patent is March 16, 2010. However, I have assumed a March 17, 2009 priority date for purposes of my analysis below, as the priority date is not relevant to the specific

grounds of unpatentability forming the basis of this challenge.

48. In my opinion, given the relevant field and relevant timeframe of the '884 Patent, a POSA would have 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).

49. Based on my experience, I have an understanding of the capabilities of a person of ordinary skill in the relevant field as of March 2009.

## **VI. State of the art**

50. A treadmill is “an exercise device that consists of an endless conveyor belt that is rotated either manually or by a motor and on which a person can walk or jog in one place.” (“Treadmills: Supplier Guide” Ex. 1007 at 2.) The user moves their foot against a running surface that would propel them forward, however, in most treadmills, the running surface moves rearward at the same speed such that the user walks or runs in place. Treadmills, when viewed through the lens of a POSA, fall under two categories of broad technical skills: machine design and biomechanics. The biomechanical portion covers the anthropometry of humans, such as their size and shape, *i.e.* anthropometry. The aspect of machine design includes the knowledge of elementary machine components and how they are assembled to accomplish intended tasks, *i.e.*, power transmission.

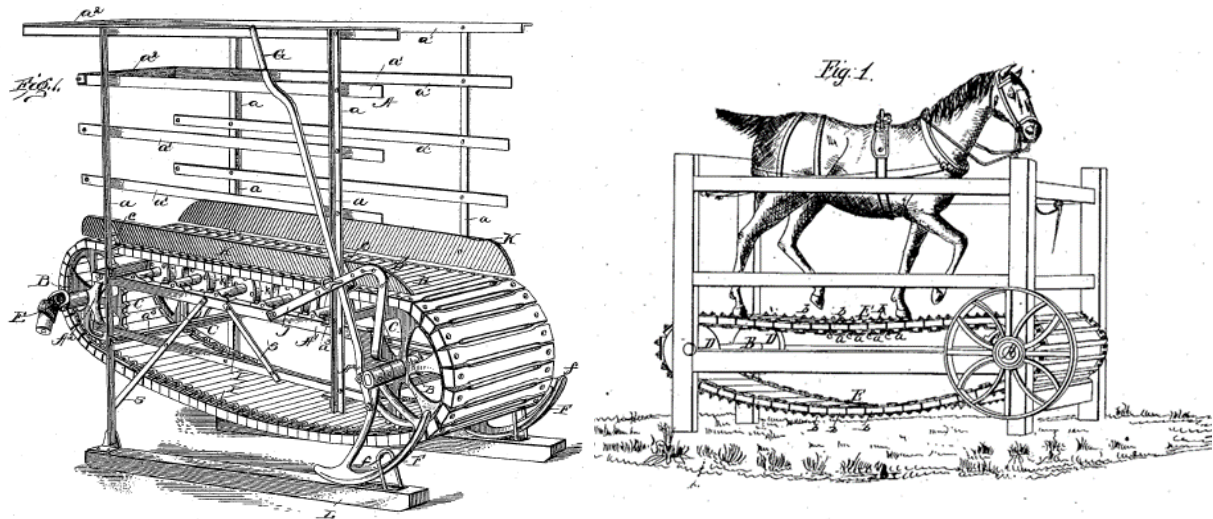
51. A manual treadmill is generally regarded as a treadmill in which the user provides the power that moves the running surface, whereas a motorized treadmill includes a motor that propels the running surface. A treadmill may include a flat running surface or a curved running surface, which is the two-dimensional shape of the running surface when viewed from the side, irrespective of the orientation relative to level ground. Treadmills typically include one or more bearings to support the running surface. Treadmills have a number of safety concerns that are addressed by several standards bodies including The Australian Competition and Consumer Commission, ASTM International (*e.g.*, ASTM F2115), and International Organization for Standardization (*e.g.*, ISO 20957).

**A. Manual vs Motorized Treadmills**

52. Manual treadmills have been used for harnessing human or animal power for hundreds of years using hamster-style wheels. Treadmills resembling modern treadmills began to appear in the mid-1800s and early 1900s. For example, U.S. Patent No. 641,424 to Ziebell (Ex. 1008) issued in 1900, and US Patent 8308X to Briggs<sup>1</sup> issued in 1834; both patents describe treadmills for harnessing animal power.

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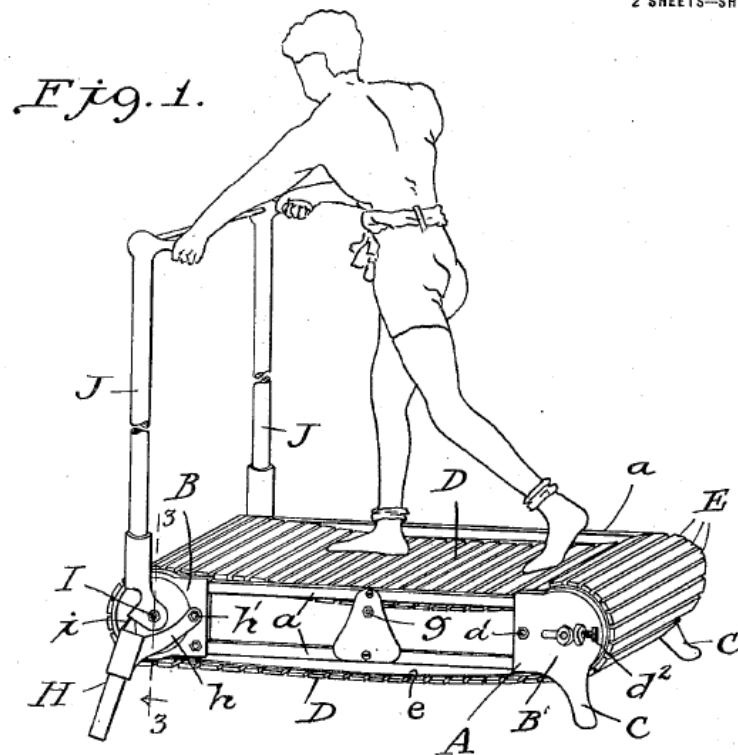
<sup>1</sup> Available at <https://catalog.archives.gov/id/178329130>.



**Ziebell, Ex. 1008, Fig. 1 (Left); Briggs, Fig. 1 (Right)**

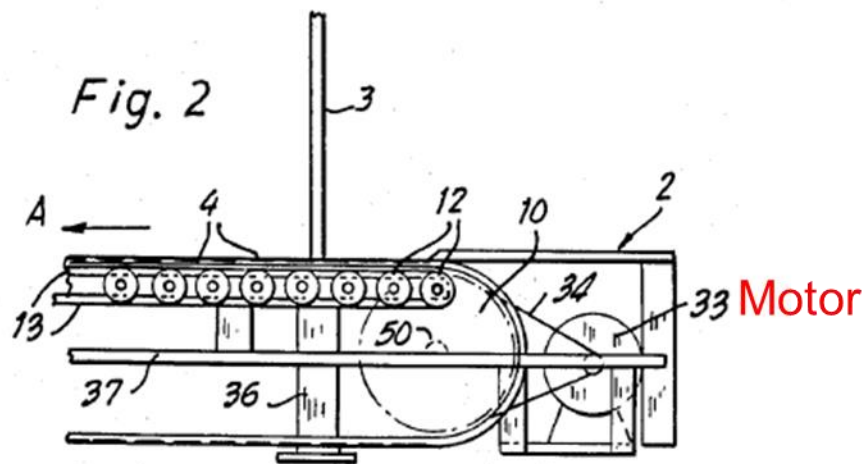
53. Manual treadmills for exercise purposes emerged in the early 1900's, before electrical power and electrical motors were widely available to consumers. For example, U.S. Patent No. 1,211,765 to A.P. Schmidt issued January 9, 1917, and describes a "Health Exerciser." (Ex. 1009.)

2 SHEETS—SHEET



Schmidt, Ex. 1009, Fig. 1

54. By the late 1900's inexpensive and lightweight polymeric belts were widely available, electricity and electric motors were also widely available, and accordingly, treadmills began to be offered with motors to propel the running surface. For example, U.S. Patent No. 4,614,337 to Schonenberger (Ex. 1010) issued on September 30, 1986 and describes a motorized treadmill:



**Schonenberger, Ex. 1010, Fig. 2 (Annotated)**

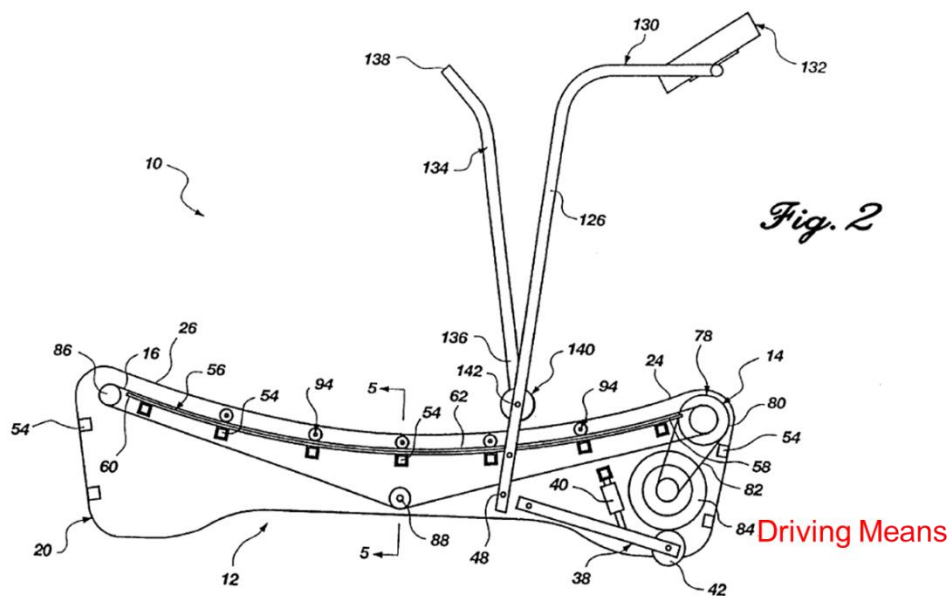
The physical exercise apparatus illustrated in FIG. 1 is driven by a motor 33 (FIGS. 2, 3) which drives the movable surface 1. A person standing on the surface, when driven, in order to remain thereon, must walk, jog, or run. The apparatus is enclosed in a housing 2 to which also support bars 3 are secured.

(Schonenberger, Ex. 1010, 4:1-6.)

55. Similarly, U.S. Patent No. 5,897,461 to Socwell (Ex. 1011) issued on April 27, 1999 and describes an Exercise Treadmill with driving means 84, such as a conventional electric motor, for rotating the running surface:

In one presently preferred embodiment of the present invention, a driving means 84 is operably connected to at least one roller to enable the rotation of the belt 16. The driving means 84 preferably comprises a conventional electric motor for rotating the belt 16.

(Socwell, Ex. 1011, 11:34-36; Fig. 2.)



**Socwell, Ex. 1011, Fig. 2 (Annotated)**

56. Motorized treadmills add cost and complexity:

A meaningful disadvantage of prior art motorized exercise treadmills includes the general disposition or placement of the motor in relation to the roller assembly and belt. Accordingly, the motor may be generally disposed either in front of, behind, or at one side of the endless belt. The usual placement or disposition of the motor in relation to prior art exercise treadmills, however, typically minimizes valuable space which could be alternatively allocated to the disposition of other internally working components of the treadmill or for the purpose of increasing the walking surface provided by the dimensional size of the belt.

(Socwell, Ex. 1011, 2:1-11.)

57. Manual treadmills do not require electricity to drive the belt, which is an attractive option for a climate conscious runner. Accordingly, to reduce cost,

complexity, and electrical energy consumption, both Schonenberger and Socwell also describe offering their treadmills without motors for use as manual treadmills:

This invention allows a runner to use the apparatus in a 5% elevation position without any external motor power.

(Schenkenberger, Ex. 1010, 6:16-18<sup>2</sup>.)

One of the drums 10 is driven by motor 33, or by gravity of earth or by any other suitable motive drive apparatus by means of a drive belt 34 (FIGS. 2, 3), preferably with interposition of a step-down gearing.

(Schenkenberger, Ex. 1010, 4:34-37.)

In an alternate embodiment, the curved deck treadmill 10 or the present invention may be implemented without a driving means engagably disposed to a roller in order to facilitate the forced rotation of the belt 16. If so implemented, the rollers 78, 86 and 88 and the deck 56 should be generally calibrated in relation to the belt 16 to provide an optimal frictional resistance to enable a user to safely walk, jog, and/or run thereon, while still providing sufficient resistance to enable a user to exercise.

(Socwell, Ex. 1011, 11:53-61.)

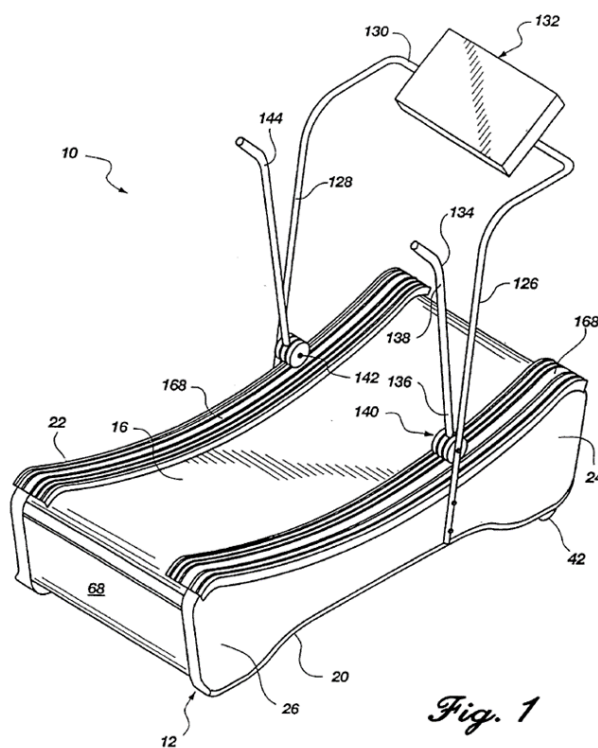
## **B. Running Surface**

58. The running surface is the portion of the treadmill where the user is expected to place their feet while exercising. Treadmills typically include one of

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<sup>2</sup> All emphasis added unless otherwise noted.

two different types of running surfaces: a belt style, or a track style. A belt style running surface is a flexible unitary endless belt that is usually formed from a thin sheet of a polymer material, although a number of other materials and methods of construction also are known, such as using a woven fabric or metal. This type of belt as shown in Figure 1 of Socwell below:



**Socwell, Ex. 1011, Fig. 1**

59. A track style running surface includes a plurality of lateral segments, or slats, that are connected together by flexible bands, belt(s) or chain to form an endless loop. In the Power Transmission field these can also referred to as a hinged belt (PT Handbook, Ex. 1016, 6-4-6-5) and they have a resemblance to a tank track

as shown in Figure 1 of Schonenberger:

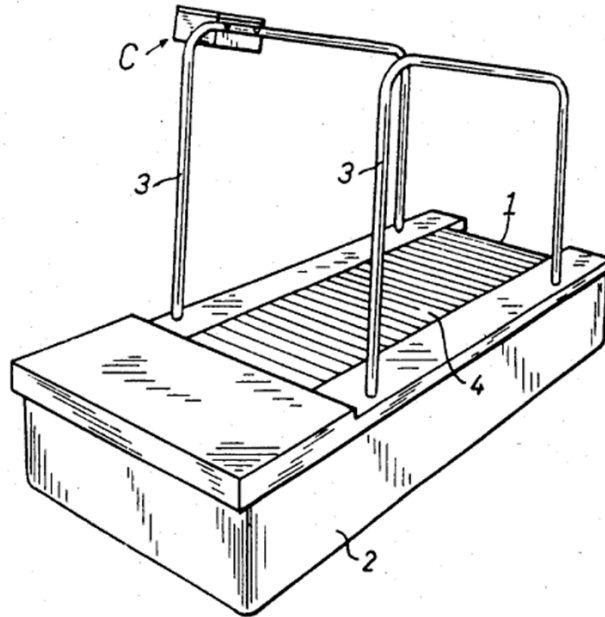


*Fig. 1*

**Schonenberger, Ex. 1010, Fig. 1**

60. Motorized treadmills also include drawbacks related to energy consumption and noise generation. Schmidt discloses a “noiseless” device. (Schmidt, Ex. 1009, 3:22-27.) And there are also reports that as of 2007 sustainable gyms had already started to emerge where it was seen as a benefit to generate energy

via exercise instead of consuming it. (Ex. 1024.<sup>3</sup>)

### **C. Curved vs Flat Treadmills**

61. Flat treadmills are understood to result in greater impact loading on the users' joints, unsmooth operation, as well as a likelihood of users falling off of the back:

In accordance with prior art exercise treadmills comprising a flat, horizontal or slightly inclined moveable surface, the endless belt supportably disposed in relation to the rollers will typically absorb the full impact force of the foot of a user repetitively depressed thereagainst. The impact force sustained by the endless belt of prior art exercise treadmills generally produces a breaking [SIC] effect which causes temporary stalling of the rotational movement of the belt. This undesirable stalling motion of the belt typically alters the continuity of the user's exercise routine and may further institute jerking movements with each step of the user. As the force or pressure associated with the impact of the user's feet on the flat, horizontal surface increases, the more likely prior art exercise treadmills will realize this breaking effect. In this regard, a heavy person running on a horizontal belt supported by rollers engaging a frame will more likely introduce a consistent

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<sup>3</sup> Inhabitat, "HUMAN-POWERED GYMS in Hong Kong" is a true and accurate copy of a webpage that is understand was posted by Inhabit on March 8, 2007. (Available at <https://inhabitat.com/human-powered-gyms-in-hong-kong/>)

breaking effect on the rotational movement of the belt, than a lighter person walking on the same treadmill.”

(Socwell, Ex. 1011, 2:12-29.)

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. Several attempts have been made to keep a user exercising on prior exercise treadmills from falling off the back end of the endless belt and from the treadmill frame. For example, prior art exercise treadmills were developed by those skilled in the art which include a belt for harnessing the user to the treadmill. Unfortunately, harnessing a user to the treadmill is often found to be as dangerous as falling off the back of the treadmill.

(Socwell, Ex. 1011, 2:45-55.)

Another meaningful disadvantage of prior art exercise treadmills is their general inability to reduce the physical impact to the joints and muscles of a user conducting general exercise routines in relation thereto. In this regard, an exercise treadmill which is capable of reducing the physical impact on the knees and back of a user will resolve several barriers left unsolved by known prior art devices, especially in light of providing an operative role in rehabilitative exercises.

(Socwell, Ex. 1011, 3:1-9.)

62. Treadmills having a curved running surface provide benefits, such as providing an inclined rear surface to push forward from, alleviating some of the risk

of falling off of the back end, as well as a shape that conforms to the natural path of the foot in relation to the body.

Another feature of the present invention not found in prior art structures is that, associated with the frictional resilient tread, is means whereby the tread surface may assume, under the action of the operator, a slightly curved surface, thereby greatly facilitating the operation of running or walking upon the exerciser and, at the same time, allowing the operator to maintain perfect equilibrium and balance.

(Schmidt, Ex. 1009, 1:50-59.)

In view of the foregoing, it is a primary object of the present invention to provide a novel curved deck treadmill which provides a structurally supported arcuate shaped, moveable surface on which a user may exercise.

(Socwell, Ex. 1011, 3:25-29.)

63. A user can adjust their running pace by adjusting the angle of the running surface:

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, or by elevating the forward end of the base 10 with jackscrews 11, or both. A slower pace is attained by reversing these operations.

(Chickering, Ex. 1013, 2:44-49.)

64. A runner may adjust their running speed by running on a different portion of a curved running surface:

A continuous belt has an upper course lying above and resting on these rollers, and a lower course below them, so that a person walking, jogging, or running on them automatically locates himself fore-and-aft of the exerciser by the balance between his weight, his speed, and the variation in inclination along the curved path of the continuous belt.

(Cutter, Ex. 1014, Abstract.)

#### **D. Treadmill Bearing Systems**

65. A bearing is a general term for a mechanical element that provides a means for low friction movement between two surfaces (PT Handbook, Ex 1016, 2-1). The motion between the elements may be rotary motion or “linear” motion (PT Handbook, Ex 1016, 2-1). The three most common and predominant bearing systems for supporting a treadmill running surface are: rotary plain/journal bearings, rotary rolling element bearings, and linear bearings/bearing surfaces.

66. The type of running surface that is used corresponds with the type of bearing system selected for the treadmill. The belt style treadmill generally implements rollers, a rotary style of bearing typically identified by its elongated form factor that may also incorporate journal bearings or rolling element bearings to manage its frictional qualities, or a bearing surface (i.e., a “deck” or slider bed) because the belt cannot resist the loads imparted to it from the operator so the belt relies on rollers or deck underneath the belt to provide rigidity to the running surface. On the other hand, small rolling element bearings are predominantly selected for the

track style running surface because the transverse slats are strong enough to resist the operator's loads without anything directly underneath the slats where the operator's foot is. Historically, treadmills that implement small rolling element bearings still include front and rear connections, such as a roller, drum, sheave, pulley or shaft assembly, between the two frontmost side bearings and also the two rearmost side bearings to ensure alignment of the endless belt(s). These common and well understood methods are also found in known Power Transmission technology, i.e., conveyor technology, see, for example PT Handbook, Ex 1016, 6-2, 6-4.

#### **1. Plain / Journal Bearings**

67. Plain rotary bearings are widely used in machinery and equipment. They function as a tight-fitting cylinder that encloses and supports a moving member, generally called the shaft or journal (PT Handbook, Ex 1016 at 2-1, 2-2). Plain / Journal Bearings are generally recognized by the characteristic that they are a single piece that provides low-friction rotary motion through sliding action. The low-friction interface can be achieved by the material of the plain bearing itself or it can be achieved by imparting a lubricant into or applying a coating to the surface of the bearing; some plain bearings are also intended to be lubricated. A bearing system that includes such a series of plain / journal bearings is described in Chickering (Ex. 1013):

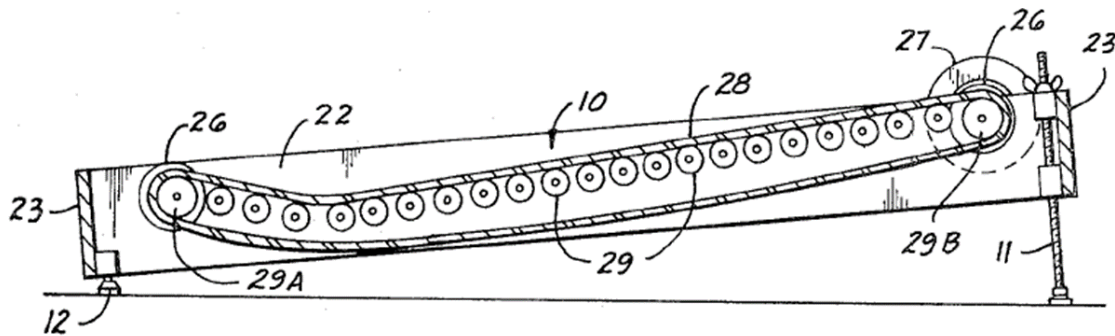
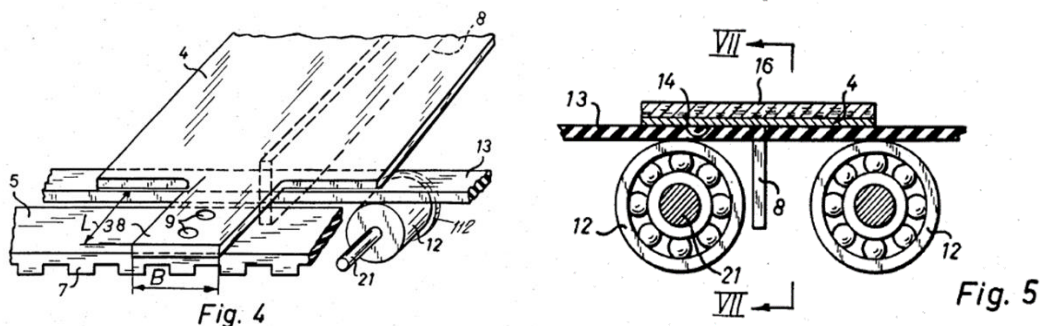


Fig-3

## 2. Rolling Element Bearings

Page 36 of 250

distributed two-dimensionally in a deck instead of using sliding contact on a deck surface. Rolling element bearings are usually found inside of other objects, as how they are found in skateboard wheels, however some rolling element bearings called cam followers, track followers, or stud bearings, are also common and these implement a thick outer ring so that they can be used as the contact surface themselves without an outer wheel or roller (PT Handbook, Ex 1016, 2-7.) A side bearing system typically includes rotary bearings that are disposed along the sides of the running surface to provide low friction motion between the running surface. The side bearing system is often used with track style running surfaces because track style running surfaces are typically much more rigid than a belt style and accordingly, are able to resist the loads from the user without a supplemental support structure beneath. Schonenberger (Ex. 1010) and U.S. Patent No. 6,042,514 to Abelbeck (Ex. 1015) disclose such side roller bearing systems.



Schonenberger, Ex. 1010, Figs. 4, 5

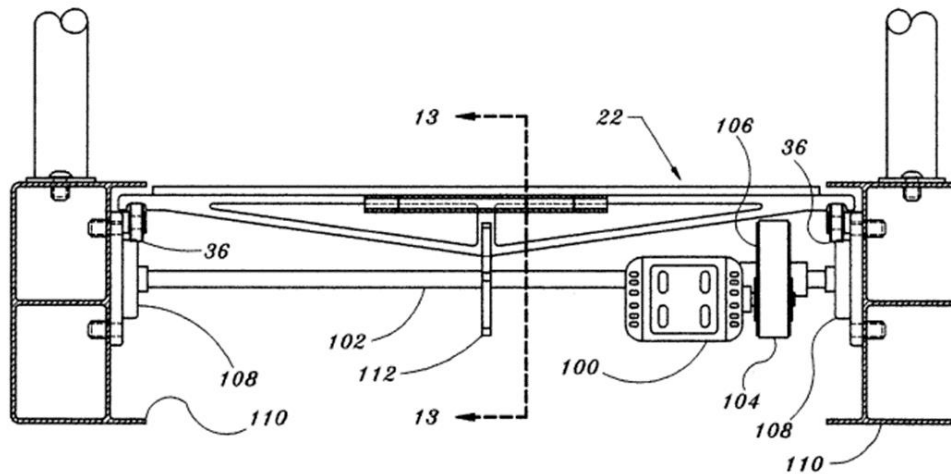


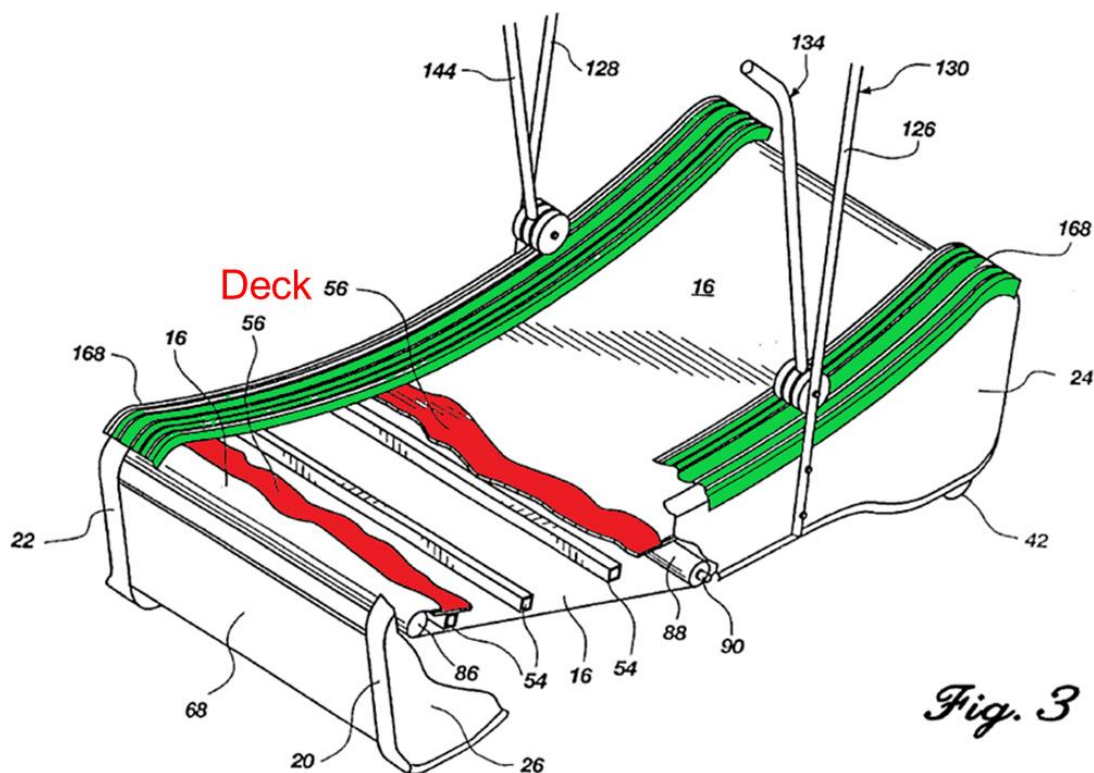
Fig. 12

**Abelbeck, Ex. 1015, Fig. 12**

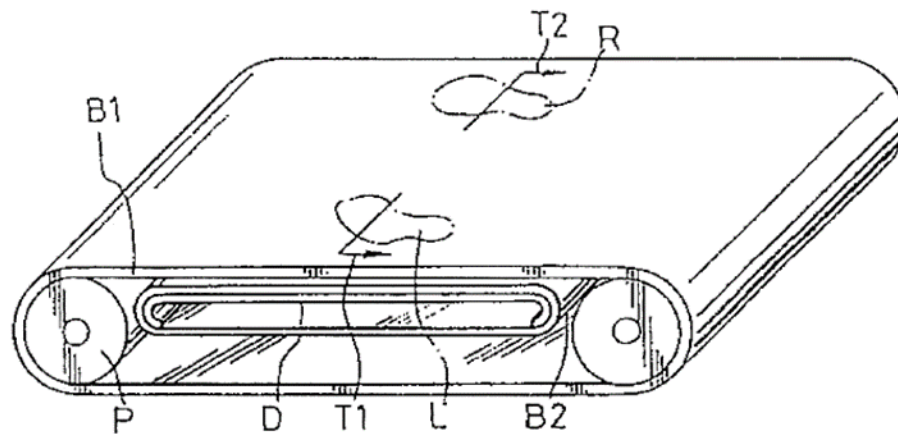
**3. Bearing Surface**

69. A bearing surface is a low friction surface that does not move relative to another surface that slides across it, and the bearing surface is typically more rigid than the moveable surface in treadmill art. “As with any other power transmission system, a linear motion system must be supported and guided. Forces generated by moving parts in a linear system must be resisted by bearings for the system to remain stable.” (PT Handbook, Ex. 1016, 10-11.) Bearing surfaces are also known as plain linear bearings or slider beds in general, and in the treadmill art they are known as a deck. The PT Handbook describes these plain linear bearings as being “the oldest device that lets one machine element, such as the bed of a planer, move easily on another.” (PT Handbook, Ex. 1016, 10-11.) Bearing surfaces are generally coupled

to a treadmill frame underneath the running surface to resist the loading applied by the user while still enabling a low friction sliding action between the deck and belt. The bearing surface may be formed of a low-friction material, a material impregnated with lubricant, or a lubricant may be applied to the bearing surface, just as with plain rotary bearings. Socwell and Magid disclose such bearing surfaces, *i.e.*, decks:



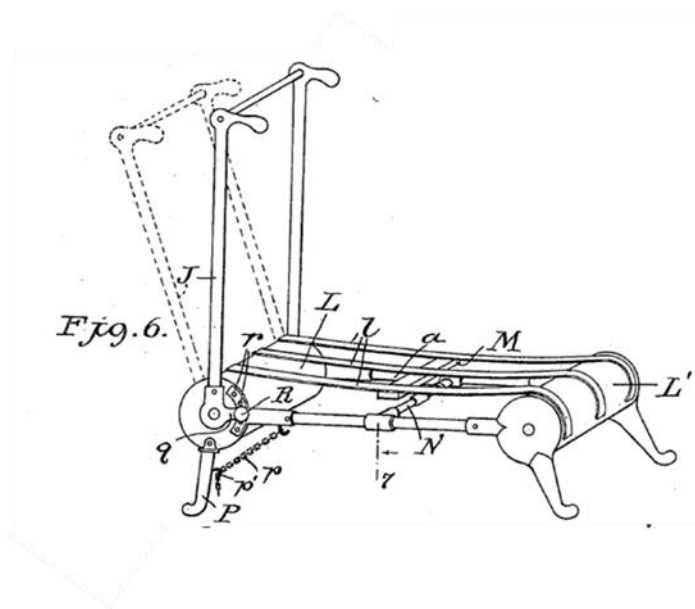
Socwell, Ex. 1011, Fig. 3 (Annotated)



PRIOR ART  
FIG. 1

**Magid, Ex. 1012, Fig. 1**

70. Schmidt discloses a bearing surface that includes a series of longitudinally extending suspension rods: “Thus, as the person operates the apparatus, he walks upon a resilient, springy suspension, and the flexible tread band glides, in frictional contact, over suspension rods *d* in a smooth and noiseless manner.” (Schmidt, Ex. 1009, 3:22-27.)



**Schmidt, Ex. 1009, Fig. 6**

## **E. Safety**

### **1. Safety Concerns**

71. It has long been recognized that users may be injured by falling off of a treadmill either while mounting or dismounting it or while using it. This may be due to the treadmill belt moving in an unexpected direction or in such a way that the user cannot regain their equilibrium. It could also be due to the incline of the surface causing the position of user to drift rearwards, and off, over time.

72. Chickering describes such a problem due to insufficient friction between a belt and rollers in a roller bearing system:

In Wood and Morairty, which exemplify the more common type of treadmills in general use today, the problem is just the opposite. There the support harness and railings are necessitated by the fact that the tread surface on each device is frictionless-comprising merely an

endless belt which is disposed about a series of frictionless rollers on an inclined base. 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. Thus, some external support is necessary to enable the user of such treadmills to maintain his balance, as well as his position on the moving belt.

(Chickering, Ex. 1013, 1:24-39.)

**a. Safety Solutions**

73. Socwell acknowledges this problem and proposes using rollers with sufficient friction:

In addition, if sufficient frictional resistance is not found in relation to the rotation of the free-moving rollers rotatably engaging the belt, a user attempting to exercise on the treadmill may suffer from injuries sustained as a result of an uncontrolled rotation of the anti-friction rollers engaging the belt. 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, 1:28-36.)

74. Magid describes using a one-way clutch (an external ratchet and pawl

clutch) to limit the belt to motion in one direction:

A unidirectional control means 6,6' is installed to permit only unidirectional movement of the left and right foot belts 4, 4'. In this embodiment, 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 to permit unidirectional rotation of the front rollers 451, thereby preventing bidirectional movement of the foot belts 4, 4'. A releasable means (not shown) may be provided to release selectively the pawls 62 from the ratchet gears 61 in a known manner to permit reciprocating movement of the foot belts 4, 4' when desired. Of course, the ratchet gears may be attached to the rear rollers 42 to achieve the same result.

(Magid, Ex. 1012, 4:46-60.)

Control Means

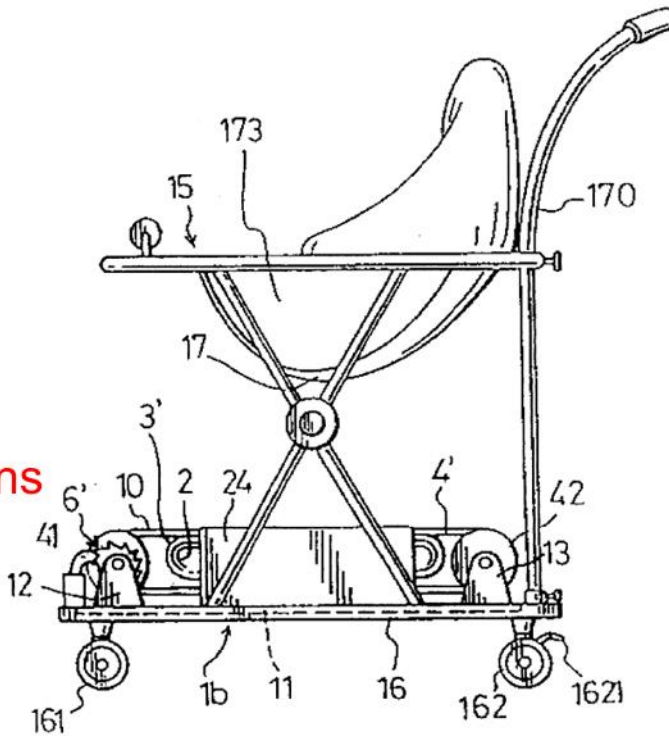


FIG. 5

**Magid, Ex. 1012, Fig. 5 (Annotated)**

75. A recognized issue with treadmill use is a user falling off the back of the treadmill due to an inability to move forward on the running surface:

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. Several attempts have been made to keep a user exercising on prior exercise treadmills from falling off the back end of the endless belt and from the treadmill frame. For example, prior art exercise treadmills were developed by those skilled in the art which include a belt for harnessing the user to the treadmill.

Unfortunately, harnessing a user to the treadmill is often found to be as dangerous as falling off the back of the treadmill.

(Socwell, Ex. 1011, 2:45-55.)

76. Treadmills include handrails or a curved track to prevent a user from falling off the back:

Additionally, exercise treadmills of the prior art may furnish a user with an upright handle to grasp while exercising. While somewhat useful in retaining the user's balance on the rotating endless belt, having to grasp a fixed handle may impede the natural body motion of a user attempting to exercise. Such an encumbrance may be feasible when a user is attempting to walk, but when a user begins to jog or run on prior art exercise treadmills, having to grasp a handle to keep centered on the treadmill may severely interfere with one's natural body motion and further abdicate the inherent physical advantages of the exercise routine.

(Socwell, Ex. 1011, 2:56-67.)

77. Several prior art exercisers have provided a solution to the user's inability to control their position relative to the running belt by shaping the running surface so that the rear of the running surface is inclined upward providing a surface to push forward from that is not reliant on frictional resistance:

Also, the surface 25a, due to its upward inclination, will support a forward component of force which enables the person using the exercise device to "push off" against surface 25a at the end of each step. These combined decelerating and forward force-supporting

characteristics of surface 25a enable a user of the device to both overcome the rearward motion and momentum imparted to his body during the first part of each step, and also to gain enough forward push to maintain his balance and position.

(Chickering, Ex. 1013, 2:64-72.)

**b. Safety Standards**

78. Several standards bodies have produced industry standards that provide guidance to manufacturers regarding both exercise equipment safety in general and specifically for treadmill safety. ASTM International published F2115 in 2005 (Standard Specification for Motorized Treadmills) (“ASTM Standard,”<sup>4</sup> Ex. 1019). This standard defines terminology such as deck, and foot rail, and usable moving surface. (ASTM Standard, Ex. 1019 at 1-2.) This standard also provides guidance regarding safety, including: the stability of the user on the treadmill, safety against pinch points, “[a]ll treadmills shall be equipped with foot rails to facilitate mounting and dismounting,” and “[a]ll treadmills shall be equipped with a handrail for user support during use to assist in dismount.” (ASTM Standard, Ex. 1019 at 3-4.) The ASTM Standard also invokes UL 1647 as part of its instruction that “Electrical

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<sup>4</sup> ASTM F2115-05, Standard Specification for Motorized Treadmills, (ASTM, 2005) (“ASTM Standard”) is a true and accurate copy of a standard that I understand was published by ASTM in 2005.

elements shall be guarded so as to meet or exceed UL1647.” *Id.* at 3. This standard also provides guidance regarding warnings, labeling, and the control panel, as well as how fast a support structure system may raise or lower the treadmill. (ASTM Standard, Ex. 1019 at 5.)

79. The international community also published a standard, ISO 20957-6, also in 2005 under the title Stationary training equipment – Part 6: Treadmills, additional specific safety requirements and test methods. (“ISO Standard<sup>5</sup>,” Ex. 1020.) This standard also requires “side handrails or front handlebar for user support and emergency dismount” and foot platforms with a “non slip surface” for safety. (ISO Standard, Ex. 1020 at 8.) Stationary Training Equipment is a true and accurate copy of a standard that I understand was published by ISO in 2005. Also like ASTM, ISO includes a clause regarding electrical safety where it invokes EN 60335 and EN 60601. (ISO Standard, Ex. 1020 at 8.)

80. Finally, the Australian Competition and Consumer Commission published a Product safety bulletin first published in 2010 and describes in common language the Australian Regulation that was enacted to apply to all treadmills in

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<sup>5</sup> ISO 20957-6 Stationary Training Equipment – Part 6: Treadmills, additional specific safety requirements and test methods. (ISO, 2005) (“ISO Standard”) is a true and accurate copy of a standard that I understand was published by ISO in 2005.

Australia enacted on June 4, 2009. (ACCC Product Safety Supplier Guide, Ex. 1007.)

## **F. Mechanical Clutches**

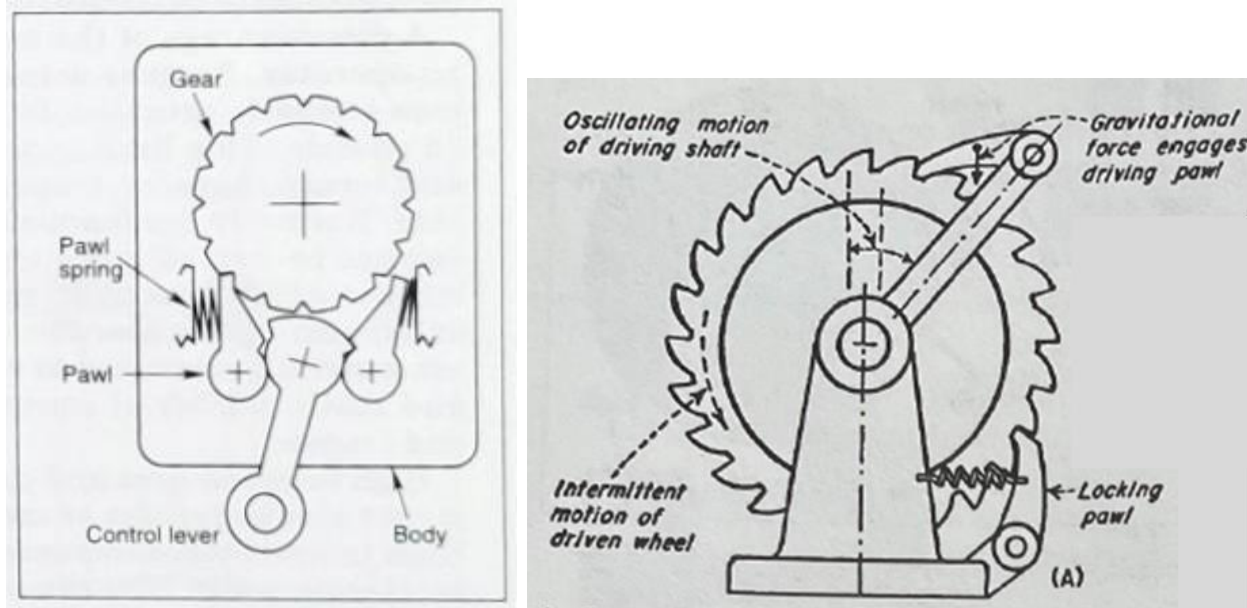
81. A mechanical clutch is used to control and transmit torque, speed, and power in a rotating drive system. (PT Handbook,<sup>6</sup> Ex. 1016 at 5-1.) An overrunning clutch transmits torque in one direction and freewheels, locks up, or reduces speed in the reverse direction. Some common mechanical clutches include ratchet clutches and cam type one-way clutches, such as sprag clutches.

### **1. Ratchet Clutch**

82. A ratchet clutch is typically a clutch where a spring-loaded pawl engages a notched wheel or gear, permitting rotation in only one direction. (PT Handbook, Ex. 1016 at 5-5.) A ratchet clutch may be used in low-speed overrunning, indexing, and backstopping modes of operation. (*Id.*) As shown in the figures below, the position of a control lever (left figure) or the gear tooth profile and pawl orientation (right figure) determines whether the clutch operates in forward, reverse, freewheeling (neutral), or locked modes.

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<sup>6</sup> Power Transmission Handbook, (Power Transmission Distributors Association 1993.) The PT Handbook is a true and accurate copy of a book that I understand was published by the Power Transmission Distributors Association in 1993.



**PT Handbook, Ex. 1016 at 5-5; Sclater,<sup>7</sup> Ex. 1017 at 316.**

83. A ratchet clutch having a pawl that contacts the gear during overrunning is loud, as compared to other mechanical clutches:

(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.

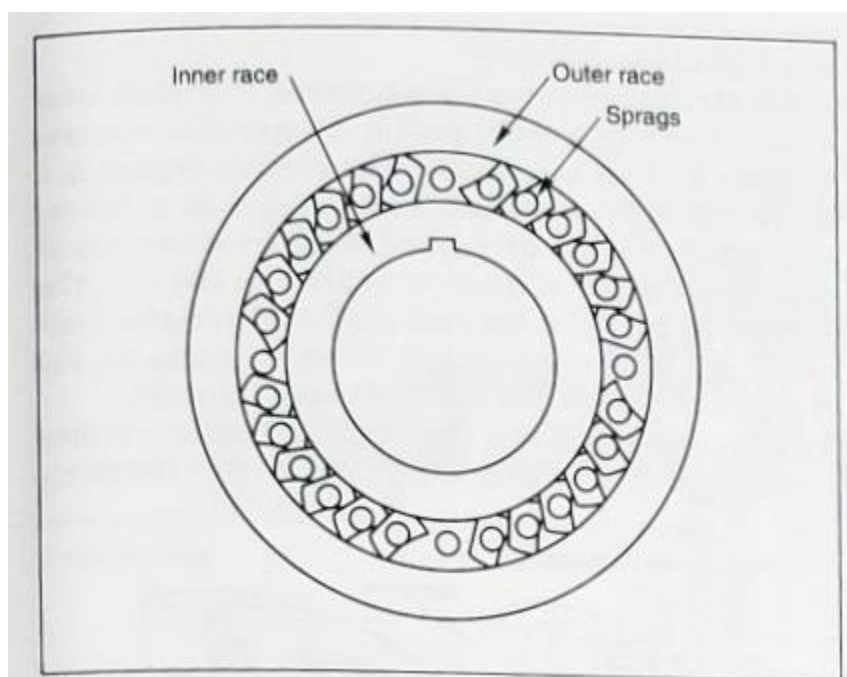
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<sup>7</sup> Neil Sclater and Nicholas P. Chironis, *Mechanisms & Mechanical Devices Sourcebook*, Third Ed., (McGraw-Hill 2001). Sclater is a true and accurate copy of a book that I understand was published by McGraw-Hill in 2001.

(Sclater, Ex. 1017 at 316.)

## 2. Sprag Type One-Way Bearing Clutch

84. A sprag type overrunning (one-direction) clutch includes cylindrical inner and outer races,<sup>8</sup> or rings, with sprags filling the space between. The inner race may be secured to a shaft by a key-keyway interface. Such a keyway is illustrated in the figure below.



**PT Handbook, Ex. 1016 at 5-5**

85. The sprags are “sized, shaped, and mounted in a manner that causes them to wedge between, and thereby link, the two races when rotation occurs in the

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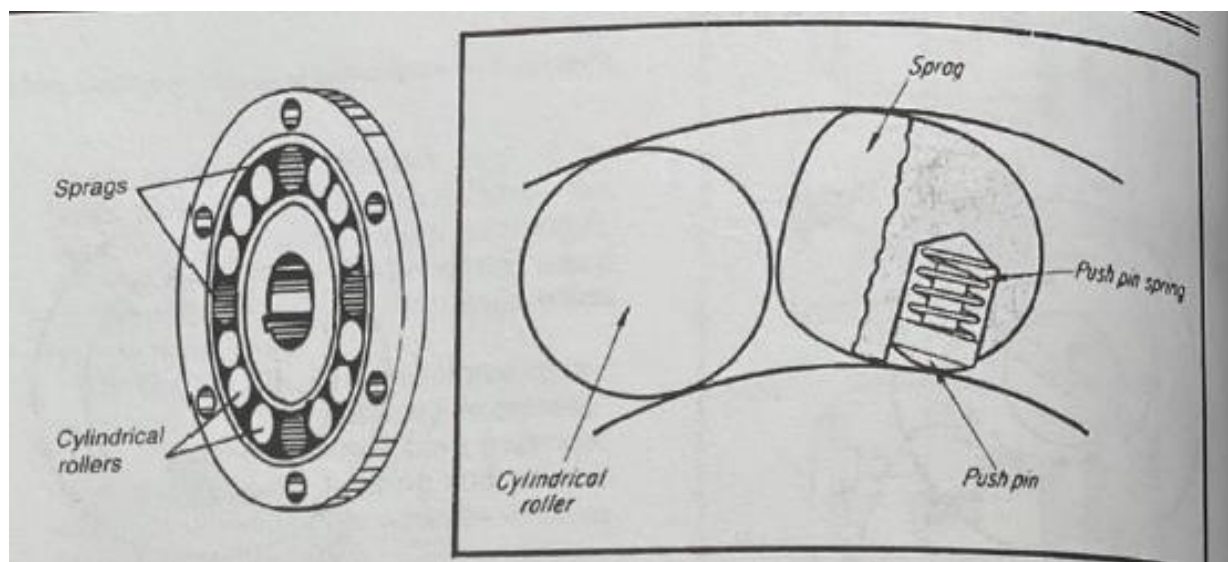
<sup>8</sup> A POSA would have understood that the terms “race” and “ring” are used interchangeably when describing bearing components.

proper direction.” (PT Handbook, Ex. 1016 at 5-4.) However, “[w]hen rotation is reversed, or when output overruns input in the driven direction, the sprags fall out of engagement.” (PT Handbook, Ex. 1016 at 5-5.) This wedging, or jamming, action is accomplished through frictional means.

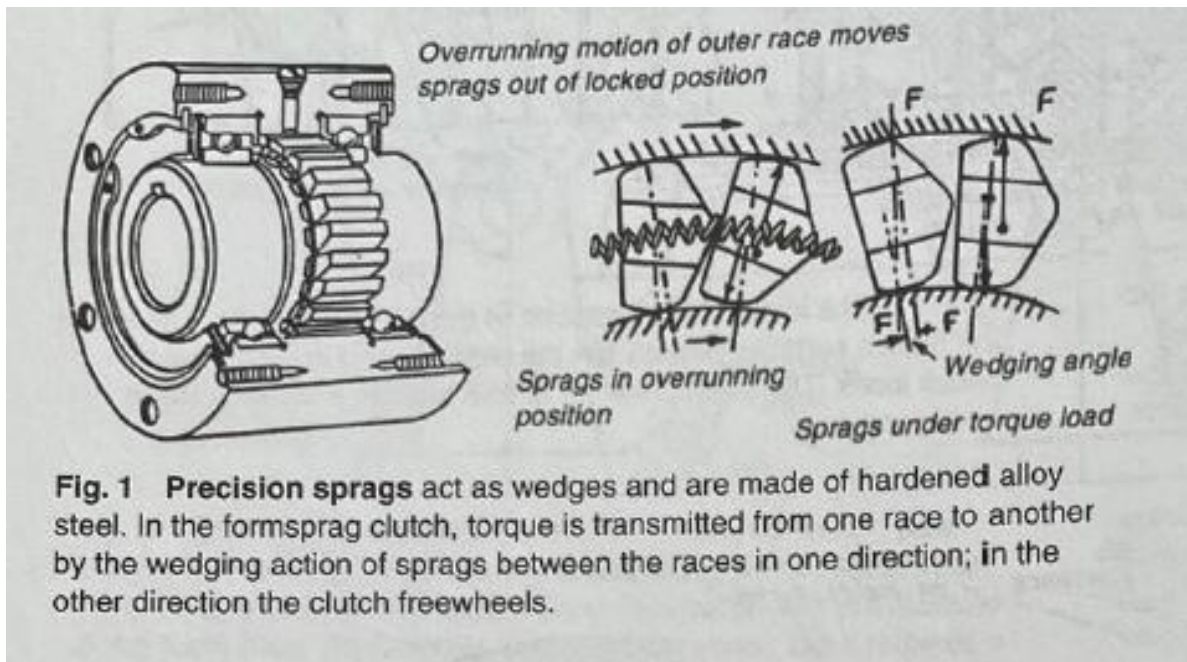
86. Sclater discloses a one-way bearing that includes sprags combined with rolling elements, such as cylindrical rollers or balls:

Sprags 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. Designed and built by Est. Nicot of Paris, this unit gives one-direction only torque transmission in an overrunning clutch. In addition, it also serves as a roller bearing.

(Sclater, Ex. 1017 at 312.)



**Sclater, Ex. 1017 at 312**



**Sclater, Ex. 1017 at 318**

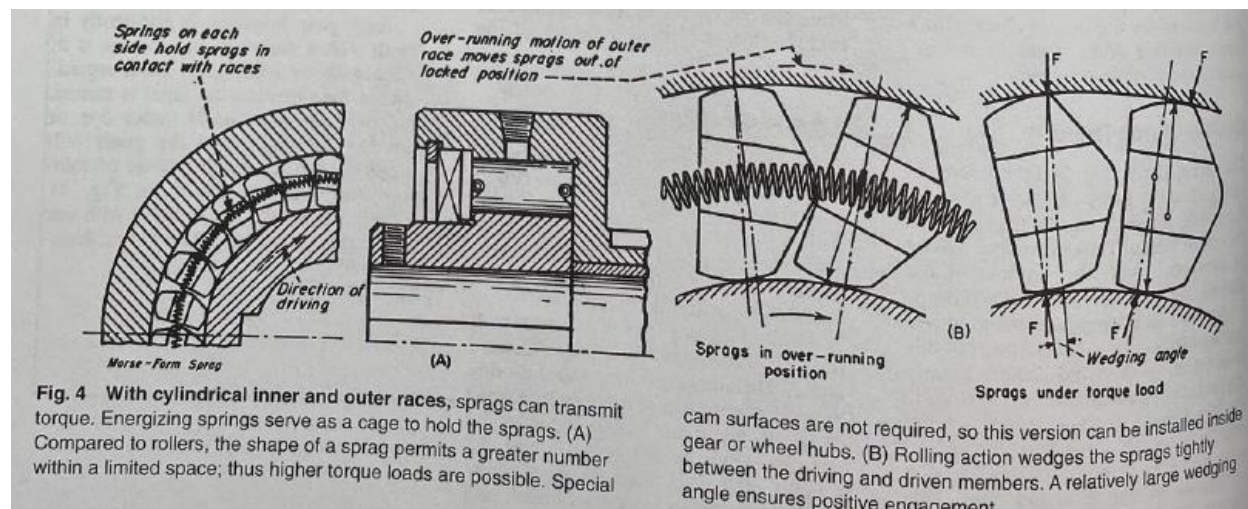
87. Sclater discloses that the inner and outer races are concentric but the sprags are nonconcentric, or asymmetric, to provide a locking ramp:

Races are concentric; a locking ramp is provided by the sprag profile, which is composed of two nonconcentric curves of different radius. A spring-loaded pin holds the sprag in the locked position until the torque is applied in the running direction.

(Sclater, Ex. 1017 at 312.)

88. As illustrated in the figure below on the left, when the inner race rotates in a first direction relative to the outer race, the sprags move out of the locked position such that an overrun condition occurs. However, as illustrated below right, when the inner race rotates in the opposite direction relative to the outer race, the sprags move, jamming within the races, locking the outer and inner race into rotating

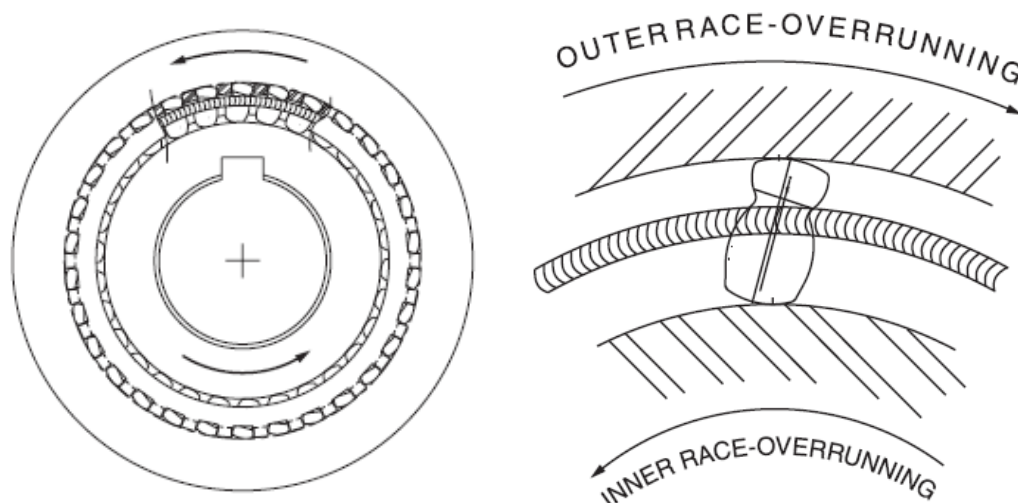
together, or not rotating at all if the outer race is fixed (*i.e.*, a backstop mode of operation).



**Sclater, Ex. 1017 at 316**

### **3. Modes of Operation**

89. Mechanical lockup devices, *i.e.*, clutches, are some of the oldest and most basic clutching methods, and offer a simple design for no-slip registry and indexing. (PT Handbook, Ex. 1016 at 5-3.) They operate in three basic modes of operation: overrunning, indexing, and backstopping. During an overrunning operation, the clutch allows one or both members to rotate freely (freewheel) without transferring torque to the other.

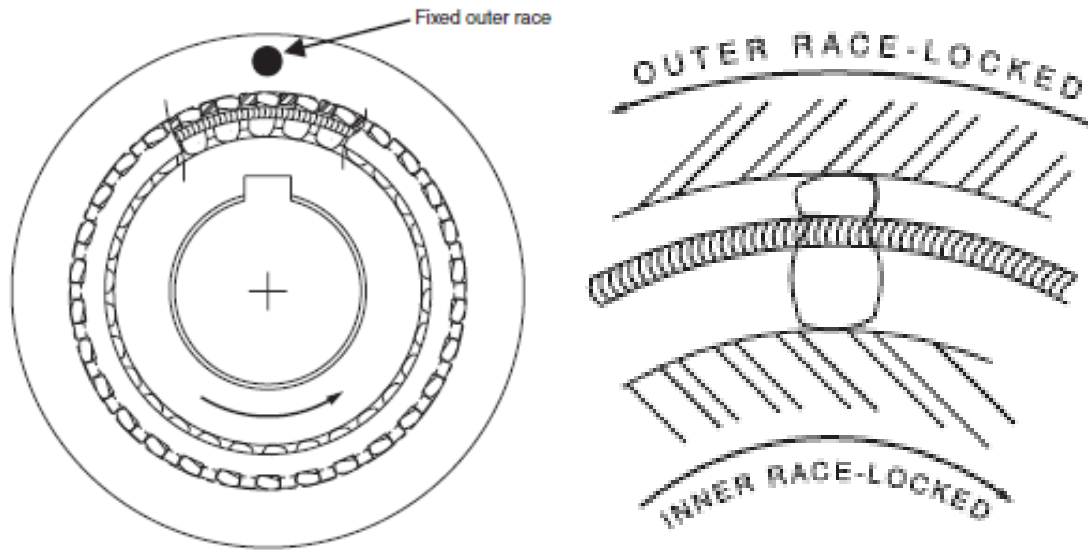


**Emerson<sup>9</sup>, Ex. 1018 at 8, 9**

90. During a backstopping or lock up operation, the clutch is used to prevent reverse rotation. For example, U.S. Patent No. 4,635,771 to Shoji issued in 1987 and describes a sprag-type “one-way clutch bearing” for a backstop mode of operation. (Ex. 1029.) For such an application, the outer race is typically fixed to a frame and the inner race is coupled to a rotating shaft:

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<sup>9</sup> Emerson, Mechanical Clutches and Torque Overload Devices, (Emerson Industrial Automation, 2001.) Emerson is a true and accurate copy of a catalog that I understand was published by Emerson Industrial Automation in 2001.



**Emerson, Ex. 1018 at 8, 9**

#### **4. Applications**

91. Sprag-type one-way clutch bearings are used in multiple applications, as illustrated in Emerson Industrial Automation’s Mechanical Clutches and Torque Overload Devices from 2001. (Emerson, Ex. 1018.) For example, Emerson describes its NSS Series sprag type one-way clutch as an option for multiple “Field Applications,” including “Exercise equipment,” “Food processing equipment,” “Printing presses,” and “Roll conveyors.” (Ex. 1018 at 52-53.) Emerson offers their commercially available one-way clutches with keyways on the inner race and also on the outer race, as illustrated below. Emerson describes the sprag clutches as “often referred to as freewheel, sprag, overrunning, backstop or one-way clutches, depending upon their application.” (Emerson, Ex. 1018 at 3.) Emerson advertises

their bearings as designed with the same dimensions as standard metric light series ball bearings, available with keyed inner races, and furnished with grease to increase life. (*Id.* at 5). Emerson also describes torque arms for mounting the bearings to an underlying surface. (*Id.* at 38-43.)

**Morse** NSS Series  
 Models NSS-8 - NSS-60

The NSS Series clutch is available in 12 sizes and is designed with the same overall dimensions as a light metric series ball bearing. The inner race offers a key seat and the outer race press fits into the housing. The clutch is furnished with protective oil and must be lubricated before operating. These clutches do not have bearings to support radial force, so additional bearing support is required. The NSS Series clutch is excellent for applications where space is restricted, and is suitable for overrunning.

**Lubrication**

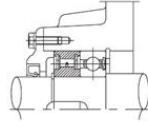
1. Oil lubrication is recommended.
2. Do not use greases or lubricants with EP additives.



| Model Number | Torque Capacity |       | Maximum Overrunning Torque |            | Drop Torque | Bore Size H7 |        | Keyway |        | Dimensions  |          |
|--------------|-----------------|-------|----------------------------|------------|-------------|--------------|--------|--------|--------|-------------|----------|
|              | In - Lb         | Nm    | Inner Race                 | Outer Race |             | In - Lb      | Nm     | Inches | mm     | Inches      | mm       |
| NSS-8        | 4.9             | 6.7   | 6,000                      | 3,000      | 0.004       | 0.003        | 0.3150 | 8      | 0.1250 | 0.08 x 0.04 | 2 x 1.0  |
| NSS-10       | 8.9             | 12.0  | 4,000                      | 2,000      | 0.006       | 0.007        | 0.3607 | 10     | 0.1250 | 0.12 x 0.06 | 3 x 1.4  |
| NSS-12       | 12.5            | 17.0  | 4,000                      | 2,000      | 0.007       | 0.008        | 0.4724 | 12     | 0.1250 | 0.16 x 0.07 | 4 x 1.8  |
| NSS-15       | 16.2            | 22.0  | 3,500                      | 1,800      | 0.007       | 0.010        | 0.5000 | 15     | 0.1250 | 0.20 x 0.08 | 5 x 1.2  |
| NSS-20       | 30.2            | 41.0  | 2,800                      | 1,300      | 0.007       | 0.010        | 0.7874 | 20     | 0.1250 | 0.24 x 0.08 | 6 x 1.8  |
| NSS-25       | 41.3            | 55.0  | 2,200                      | 1,100      | 0.010       | 0.008        | 0.9843 | 25     | 0.1250 | 0.30 x 0.08 | 8 x 2.0  |
| NSS-30       | 77.4            | 105.0 | 1,800                      | 900        | 0.008       | 0.008        | 1.1811 | 30     | 0.1250 | 0.36 x 0.08 | 8 x 2.0  |
| NSS-35       | 100.3           | 136.0 | 1,600                      | 800        | 0.008       | 0.008        | 1.3780 | 35     | 0.1250 | 0.36 x 0.10 | 10 x 2.4 |
| NSS-40       | 210.3           | 286.0 | 1,400                      | 700        | 0.008       | 0.008        | 1.5748 | 40     | 0.1250 | 0.47 x 0.08 | 12 x 2.0 |
| NSS-45       | 255.8           | 347.0 | 1,200                      | 600        | 0.008       | 0.010        | 1.7717 | 45     | 0.1250 | 0.50 x 0.08 | 14 x 2.0 |
| NSS-50       | 397.2           | 535.0 | 1,200                      | 600        | 0.008       | 0.008        | 1.9686 | 50     | 0.1250 | 0.50 x 0.08 | 14 x 2.0 |
| NSS-60       | 476.7           | 645.0 | 910                        | 450        | 0.008       | 0.008        | 2.3623 | 60     | 0.1250 | 0.71 x 0.08 | 18 x 2.0 |

**Installation and Usage**

1. The NSS series cam clutch is designed for press fit installation. Correct interference dimensions must be maintained to obtain maximum clutch performance.
2. Make sure the housing has enough strength to withstand the pressure required for the press fitting installation of the clutch. The internal diameter of the housing should meet the H7 tolerance.



**Morse** NSS Series  
 Models NSS-8 - NSS-60

**Features:**

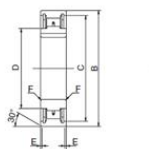
- Sprag type one way clutch
- High torque and longer life than roller ramp clutches
- Full metric design
- Overrunning speed is higher than roller ramp clutches

**Industries Served**

- Food and beverage
- Gearing
- Printing
- Textile

**Field Applications**

- Exercise equipment
- Food processing equipment
- Printing presses
- Roll conveyors



| Model Number | B      |     | C      |       | D      |      | E      |     | F      |     | Weight |     |
|--------------|--------|-----|--------|-------|--------|------|--------|-----|--------|-----|--------|-----|
|              | Inches | mm  | Inches | mm    | Inches | mm   | Inches | mm  | Inches | mm  | Lb     | g   |
| NSS-8        | 0.944  | 24  | 0.874  | 22.2  | 0.448  | 11.4 | 0.004  | 0.0 | 0.024  | 0.6 | 0.03   | 14  |
| NSS-10       | 1.233  | 30  | 1.063  | 27.0  | 0.614  | 15.6 | 0.004  | 0.0 | 0.020  | 0.6 | 0.1    | 27  |
| NSS-12       | 1.311  | 32  | 1.161  | 29.5  | 0.709  | 18.0 | 0.004  | 0.0 | 0.020  | 0.6 | 0.1    | 30  |
| NSS-15       | 1.424  | 36  | 1.260  | 32.0  | 0.811  | 20.6 | 0.004  | 0.0 | 0.020  | 0.6 | 0.1    | 36  |
| NSS-20       | 1.856  | 47  | 1.575  | 40.0  | 1.051  | 26.7 | 0.003  | 0.0 | 0.030  | 0.8 | 0.3    | 115 |
| NSS-25       | 2.131  | 53  | 1.772  | 45.0  | 1.260  | 32.0 | 0.003  | 0.0 | 0.030  | 0.8 | 0.3    | 140 |
| NSS-30       | 2.541  | 63  | 2.165  | 55.0  | 1.575  | 40.0 | 0.003  | 0.0 | 0.040  | 1.0 | 0.5    | 215 |
| NSS-35       | 2.850  | 72  | 2.417  | 60.0  | 1.772  | 45.0 | 0.003  | 0.0 | 0.040  | 1.0 | 0.7    | 300 |
| NSS-40       | 3.275  | 80  | 2.805  | 72.0  | 2.060  | 50.0 | 0.003  | 0.0 | 0.040  | 1.0 | 0.9    | 425 |
| NSS-45       | 3.494  | 88  | 2.972  | 75.0  | 2.244  | 57.0 | 0.003  | 1.2 | 0.040  | 1.0 | 1.1    | 495 |
| NSS-50       | 3.989  | 99  | 3.228  | 82.0  | 2.441  | 62.0 | 0.003  | 1.2 | 0.040  | 1.0 | 1.2    | 340 |
| NSS-60       | 4.528  | 115 | 3.937  | 100.0 | 3.149  | 80.0 | 0.003  | 1.2 | 0.060  | 1.5 | 2.1    | 860 |

**Installation and Usage (continued)**

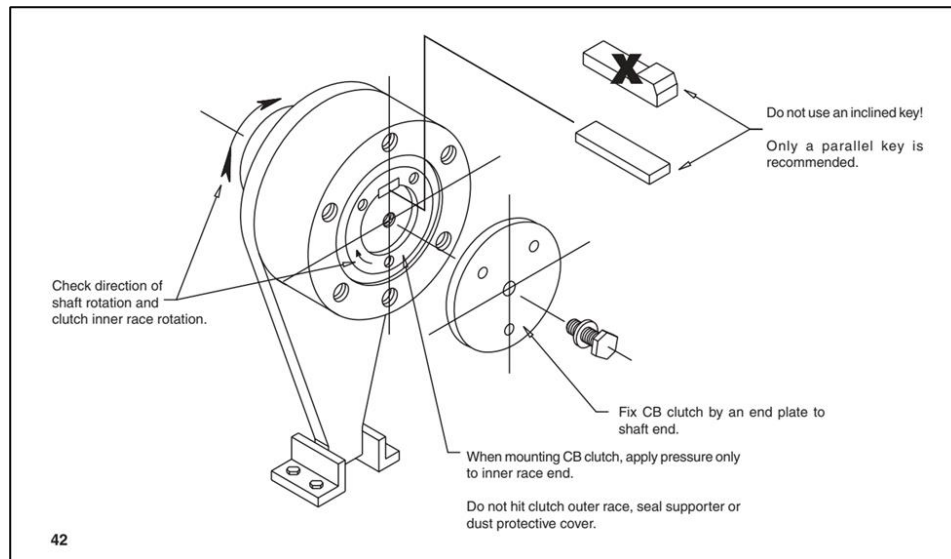
3. When installing the clutch, mount it with a type 62 bearing to avoid radial force, since this clutch does not have any bearings inside.
4. Confirm the direction of rotation before installation.
5. The recommended shaft tolerance is H7, and the key profile should be in accordance with the following standard.
6. NSS-8 - 12 ..... DIN 6885, 1
7. NSS-15 - 60 ..... DIN 6885, 3
8. Suitable surface pressure of the key should be selected according to your company design standards.

For selection assistance, call Application Engineering at 1-800-626-2093 or visit [www.emerson-epi.com](http://www.emerson-epi.com)

Emerson, Ex. 1018 at 52-53



Emerson, Ex. 1018 at 6 (Annotated)

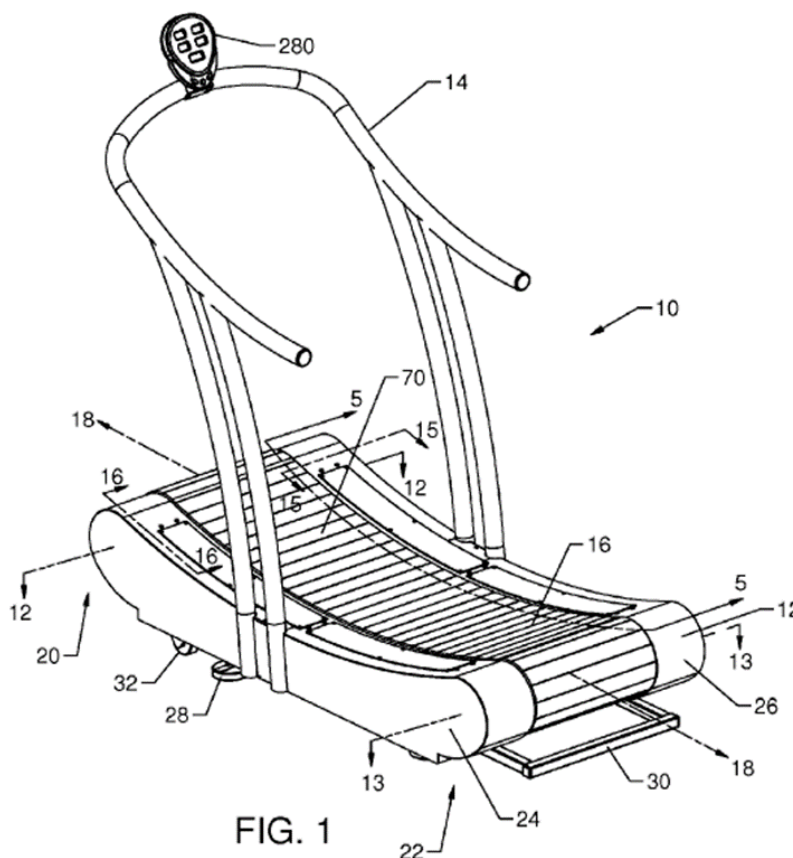


**Emerson, Ex. 1018 at 42**

## **VII. U.S. 10,561,884 to Bayerlein et al.**

### **A. Overview of the '884 Patent**

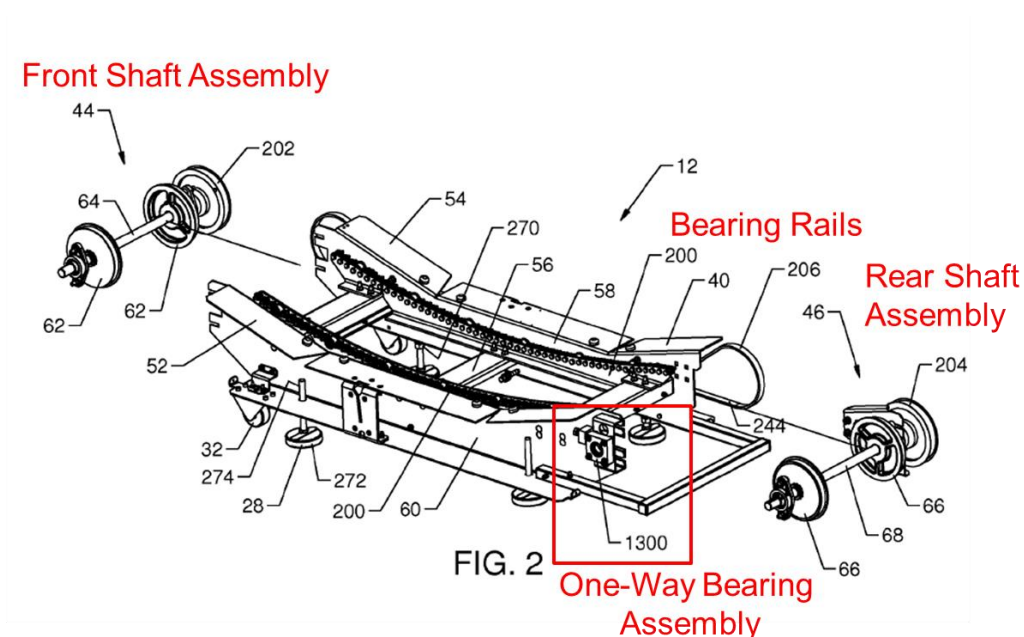
92. The '884 Patent relates generally to manually operated treadmills and mechanisms for controlling the motion of a running belt of the treadmill. ('884 Patent, Ex. 1001, Abstract.) With reference to Figure 1, the '884 Patent discloses a manual treadmill 10 with “a running belt 16 that extends substantially longitudinally along a longitudinal axis 18” of a base 12. ('884 Patent, Ex. 1001, 4:52-54.)



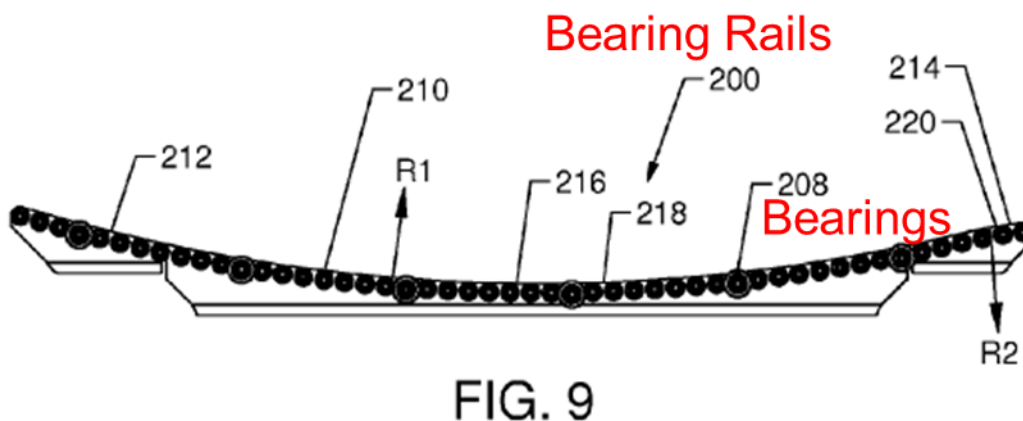
**‘884 Patent, Ex. 1001, Fig. 1**

93. The treadmill includes a “front shaft assembly 44 [that] includes a pair of front running belt pulleys 62 interconnected with . . . a shaft 64, and the rear shaft assembly 46 includes a pair of rear running belt pulleys 66 interconnected with, and preferably directly mounted to, a shaft 68.” (‘884 Patent, Ex. 1001, 5:34-39.) The treadmill also includes bearing rails 200 that include a plurality of bearings 208. (‘884 Patent, Ex. 1001, 11:20-23.) The “running belt 16 is disposed about the front and rear running belt pulleys 62, 66” and “moves substantially along the top profile 210 of the bearing rails 200.” (‘884 Patent, Ex. 1001, 5:41-43, 11:36-39.) “Accordingly, the running surface 70 has a shape that substantially corresponds to

the shape of the top profile 210 of the bearing rails 200.” (‘884 Patent, Ex. 1001, 11:50-54.)



‘884 Patent, Ex. 1001, Fig. 2 (Annotated)



‘884 Patent, Ex. 1001, Fig. 9 (Annotated)

94. As illustrated in Figure 2 above, and Figure 36 below, the treadmill 12 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.” (‘884 Patent, Ex. 1001, 27:13-19.) The ‘884 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.*, 27:22-26.) 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.*, 27:26-27.) Although the ‘884 Patent does not show the sprags, it states that each sprag has an “asymmetric” shape to “provide for motion in one direction and prevent rotation in the opposite direction.” (*Id.*, 27:21-23.) 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.*, 27:61-64.)

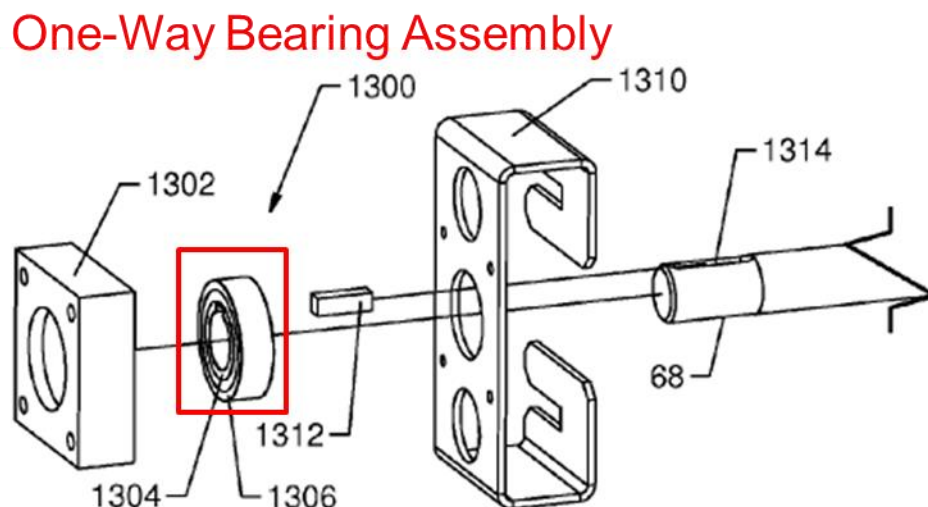


**FIG. 36**

**‘884 Patent, Ex. 1001, Fig. 36 (Annotated)**

95. Independent claims 30, 37, 50, and 57 of the '884 Patent are directed to a common manual treadmill topology that includes a belt that is 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. Independent claim 37 is representative and reproduced below:

37. A **manually powered treadmill**, comprising:

a frame;

**a first plurality of bearings coupled to the frame;**

a second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings;

**a front shaft assembly** coupled to the frame;

a rear shaft assembly coupled to the frame;

**a running belt** at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies, and **comprising a running surface, at least a portion of which is curved;** and

**a safety device** coupled to the frame and the running belt, the safety device **having a first rotatable element and a second rotatable element**, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;

wherein one of the first and second rotatable elements of the safety device and the running belt **freely rotate** relative to the other of the one of the first and second rotatable elements of the safety device **in a first**

**direction** of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, **interference** between the safety device and at least one of the first rotatable element and the second rotatable element substantially **prevents rotation of the running belt** and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.

96. In my opinion, the technology of the challenged independent claims of the '884 Patent was old and well-known in the art by March 2009. The treadmill topology of claims 30, 37, 50, and 57 is a straightforward manual treadmill with a curved running surface. This topology has existed for human exercise since at least 1917. (See e.g., Schmidt, Ex. 1009, Fig. 1.) The use of shaft assemblies and a plurality of bearings to support the running belt is also old and well known. (See e.g., Chickering, Ex. 1013, Fig. 1; Schonenberger, Ex. 1010, Fig. 7.)

97. The need to limit the motion of the treadmill belt motion for user stability and safety was also well known. (See, e.g., Chickering, Ex. 1013, 1:24-39; Socwell, Ex. 1011, 1:28-41; ASTM Standard, Ex. 1019 at 3-4.)

98. The wherein clause is unclear because it requires “*interference between the **safety device** and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt,*” without identifying a third element of the safety device to create the interference.

99. The '884 Patent does not provide much detail on the structure of the

safety device. For example, it describes the safety device as a one-way bearing assembly that includes a “plurality of sprags (not shown) [that] are disposed between the inner ring 1304 and the outer ring 1306,” 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.*, 27:26-27, 27:56-58.)

100. Therefore the “*safety device*” and subsequent “*wherein*” clause, appears to be a verbose way of claiming a sprag-type one-way bearing assembly arranged in a backstop mode of operation. A POSA would have understood that a conventional sprag-type one way bearing assembly, such as that disclosed in Sclater would teach the “*safety device*” limitations. (See Sclater, Ex.1017 at 316.)

101. Further, using one-way clutches to limit treadmill belt motion to one direction dates back to at least 1996. (See e.g., Magid, Ex. 1012, 4:46-59, Fig. 5.) And sprag-type one-way bearings were commercially available for exercise equipment since at least 2001. (Emerson, Ex. 1018 at 52-53.)

102. The dependent claims add additional common treadmill features, such as pulleys (claims 39, 41, 42, 43, 52, 53), electrically insulating plastic pulleys (claims 44, 51), cross-members (claims 31, 48), one-way bearings (claims 33, 38, 54), and support structures to adjust elevation (claim 34, 45, 59).

## **B. Priority Claim**

103. It is my understanding that the '884 Patent is part of an extensive family of patents and pending patent applications. The '884 Patent claims priority to several patent applications within this large patent family. A graphic of the '884 Patent Family is provided below, with the '884 Patent highlighted in yellow and the related asserted patents shaded in gray:

|     |                                                                          |                                                      |                                                |
|-----|--------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------|
| PRV | 61/161,027 - 17MAR2009                                                   |                                                      |                                                |
| PCT | PCT/US2010/027543 - 16MAR2010<br>WO2010/107840 - 23SEPT2010              |                                                      |                                                |
| CIP | CIP - Abandoned<br>13/235,065 - 16SEPT2011<br>US2012/0010053 - 12JAN2012 |                                                      |                                                |
|     | 14/243,716 - 2APRIL2014<br>US8,986,169                                   | 14/076,912 - 11NOV2013<br>US9,114,276                |                                                |
|     | 14/656,942 - 13MAR2015<br>US9,039,580 - 26MAY2015                        | 14/832,708-21AUG2015<br>US10,265,566                 |                                                |
|     |                                                                          | 15/958,339 - 20APRIL2018<br>US10,561,884 - 18FEB2020 | 15/957,721-19APRIL2018<br>US10,561,883         |
|     |                                                                          | 16/792,426 - 17FEB2020<br>US10,799,745 - 13OCT2020   | 16/792,444-17FEB2020<br>US10,850,150           |
|     |                                                                          |                                                      | 17/247,101-30NOV2020<br>US11,465,005-11OCT2022 |

### The '884 Patent Family

104. The earliest application filing date in the priority claim is March 17, 2009 and is associated with provisional Application No. 61/161,027 (“the '027 Provisional Application”). The '884 Patent also claims priority to PCT Application No. PCT/US2010/027543 (“the PCT Application”) filed March 16, 2010 and a continuation-in-part (“CIP”), U.S. Patent Application No. 13/235,065 (“the '065 CIP Application”) filed September 16, 2011.

105. For purposes of my analysis below, I have assumed a priority date of March 17, 2009 because the effective filing date of the challenged claims is not relevant to the specific grounds of unpatentability forming the basis of this challenge.

**C. File History**

**1. The ‘884 Patent File History**

106. U.S. Patent Application No. 15/958,339 was filed on April 20, 2018 with a request for accelerated examination under Track 1. (‘884 File History, Ex. 1002 at 1-115.) The application was filed with 30 claims, including independent claims 1, 8, 21, and 28, and each included a broad “*safety device*” limitation. For example, claim 1 as filed required:

a safety device coupled to at least one of the front shaft and the rear shaft, wherein the safety device is structured to restrict movement of at least one of the running belt, the front shaft, and the rear shaft in a first rotational direction while permitting movement of the at least one of the running belt, the front shaft, and the rear shaft in a second rotational direction opposite the first rotational direction

(*Id.* at 62.)

107. On July 19, 2018, the Examiner issued an office action rejecting most claims as obvious over US 5,492,517 to Bostic, US 3,642,279 to Cutter and US

4,334,676 to Schonenberger (“Schenkenberger ‘676”)<sup>10</sup>. The Examiner also rejected claims 15 and 22 as obvious over Bostic, Cutter, Schonenberger ‘676 and US 6,923,746 to Skowronski (Ex. 1030). (*Id.* at 136, 141.) The Examiner relied on Bostic’s disclosure of a one-way clutch for satisfying the “safety device” limitations. (*Id.* at 136.)

108. On October 18, 2018, Patent Owner filed a response with significant amendments to the “*safety device*” limitations to specify that the safety device “*freely rotates*” in a first direction and “*substantially prevents rotation*” in an opposite direction. (*Id.* at 568.) Patent Owner argued that Bostic did not teach this limitation because:

[T]he one-way clutch of Bostic does not provide for rotation in only one direction. The Bostic one-way clutch freewheels in one direction and transmits torque in the other direction. As a result, the treadmill belt of Bostic is free to move in both directions.

(Ex.1002 at 581.)

109. The Examiner issued a final office action on February 20, 2019 rejecting most claims as obvious over Bostic, Cutter, Schonenberger ‘676, and US 5,538,489 to Magid (Ex. 1012.) The Examiner now relied on Magid’s control means disclosure for satisfying the “*safety device*” limitations. (*Id.* at 2225.) Patent Owner

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<sup>10</sup> Schonenberger ‘676 is related to Schonenberger (Ex. 1010).

filed a response on April 22, 2019 amending the independent claims to require that “*interference*” between the “*safety device*” and a “*housing*” or “*rotatable elements*” prevents rotation in the second direction. (*Id.* at 2263-2274.) Patent Owner argued that Magid does not disclose such “*interference.*” (*Id.* at 2278, 2281.)

110. On August 5, 2019, the Examiner issued another office action rejecting most claims over Bostic, Cutter, Schonenberger ‘676 and US 2005/0009668 to Savettiere. (*Id.* at 2335.) The Examiner now relied on Savettiere, not Magid, for satisfying the “*safety device*” limitations. (*Id.* at 2235-2236.) On October 16, 2019 Patent Owner filed a response arguing that Savettiere does not teach “enabling or allowing only one rotational direction of movement” and accordingly does not teach a “‘safety device’ that ‘substantially prevents rotation of the running belt’.” (*Id.* at 2463-2464.)

111. On January 3, 2020 the Examiner issued a notice of allowance without explaining the reasons for allowance. (*Id.* at 2492-2494.)

112. Intentionally left blank.

113. Intentionally left blank.

## **2. The ‘169 Patent File History**

114. U.S. Patent Application No. 14/243,716 was filed on April 2, 2014 with a request for accelerated examination under Track 1. (‘169 File History, Ex. 1021, 1-114.) The application as filed included independent claims 1, 10, and 14, with

many similar limitations as those in the ‘884 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.*)

115. On June 11, 2014 the USPTO issued an office action rejecting claims 1-11 as obvious over US 2006/0287165 to Pasqualin in view of US 3,642,279 to Cutter in view of 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 Magid’s disclosure of control means for satisfying the “*one-way bearing*” claim limitations. (Ex. 1021 at 126, 132.)

116. On September 11, 2014, Patent Owner filed a response with minor amendments to the independent claims, including changing the term “*one-way bearing*” to “*safety device.*” (*Id.* at 150, 152, 153.) Patent Owner argued that: 1) Magid’s disclosure of two-belts teaches away from one belt references (“Magid specifically teaches away from the use of a single, wide belt because a twisting moment is applied to either the left foot or the right foot when treading the left-side or right side parts of the belt”); 2) the combination of Magid with a curved running surface would render Magid inoperable “a curved running surface would add difficulty walking for uncoordinated, thereby rendering Magid unsatisfactory for its intended purpose.” (*Id.* at 160-163.) The Patent Owner also submitted a declaration

from one of the inventors to support these arguments. (*Id.* at 173-180.) For example, the declarant stated that moving the safety device to the rear shaft provides improvements, i.e., “Placing the safety device on the rear shaft greatly reduces the amount of slack that needs to be taken up before the safety device engages. This reduces the amount of time and distance of unexpected motion.” (Ex.1021 at 176.)

117. On October 17, 2014 the Examiner issued a final office action, allowing a few dependent claims, including claim 16 with the “*bearing rail*” limitations; and rejecting all of Patent Owner’s arguments over Magid. (*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 accidentally or unexpectedly propelling the belt the wrong direction. By Applicant’s own admission, Applicant acknowledges this risk.

(*Id.* at 202-203.)

118. On January 16, 2015, the Patent Owner filed an amendment amending the independent claims to include the allowable subject matter of a few dependent claims, including amending claim 14 to include the allowable “*bearing rail*” limitations of claim 16. (*Id.* at 211.) The Examiner issued a notice of allowance on February 2, 2015, and the ‘169 Patent issued on March 24, 2015. (*Id.* at 223-225,

245.)

**D. Construction of Terms in the Challenged Claims**

119. I have been asked to review claims 30-34, 37-54, 57, 59 of the ‘884 Patent.

120. In order to properly evaluate these claims, I understand that the terms of the claims must first be construed. For purposes of this declaration, I am applying the following claim constructions for my analysis regarding unpatentability for Grounds 3 and 6.

121. I understand that the proposed construction of the term “*shaft*,” as recited in claims 30, 37, 39-43, 52, and 53 is “a rotating element used to transmit power from one part to another.”

122. I understand that the proposed construction of the term “*safety device*,” as recited in claims 30, 33, 37, 38, 50, 54, and 57 is a “device having two ring-shaped components.”

123. I understand that the proposed construction of the term “*substantially prevent*[],” as recited in claims 30, 37, 50, and 57 is “prevent any movement after allowing no or minimal movement.”

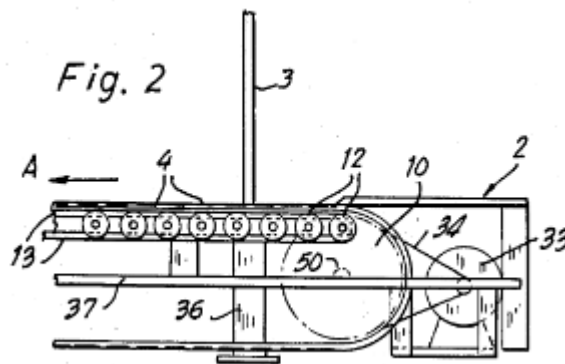
**VIII. Patentability Analysis of the Challenged Claims**

**A. Overview of the prior art**

1. **U.S. Patent No. 4,614,337 (“Schonenberger,” Ex. 1010)**

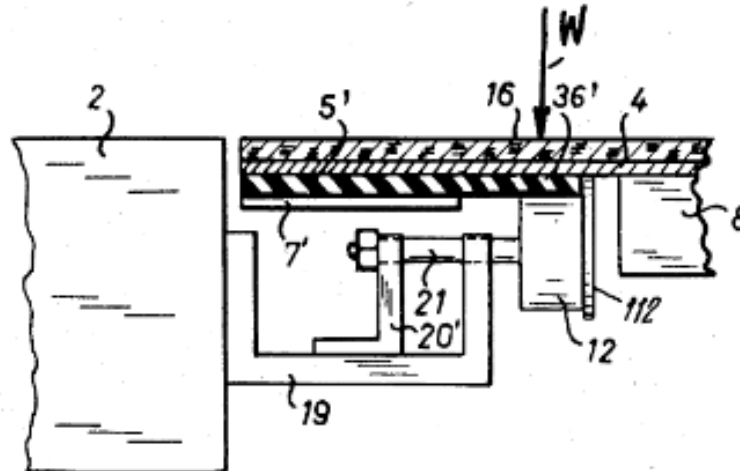
124. Schonenberger is a U.S. patent that issued on September 30, 1986. I understand that Schonenberger is prior art to all claims of the '884 Patent under 35 USC § 102(b).

125. Schonenberger discloses a manual treadmill having a movable surface looped around drums mounted on front and rear shafts. (Schronenberger, Ex. 1010, 4:14-17, 6:16-18.)



**Schronenberger, Ex. 1010, Fig. 2**

126. The movable surface is supported by rollers positioned under the belt along the left and right sides. The rollers are mounted to brackets, which are connected to the frame. The brackets extend longitudinally along the left and right sides of the frame. (Schronenberger, Ex. 1010, 8:34-51.)

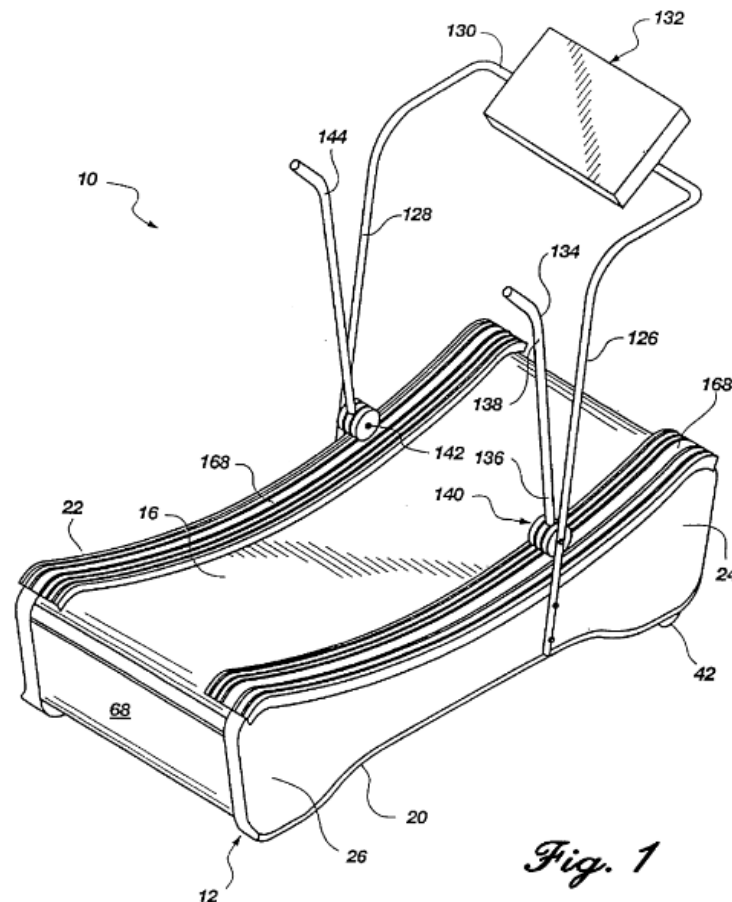


**Schonenberger, Ex. 1010, Fig. 10**

**2. U.S. Patent No. 5,897,461 (“Socwell,” Ex. 1011)**

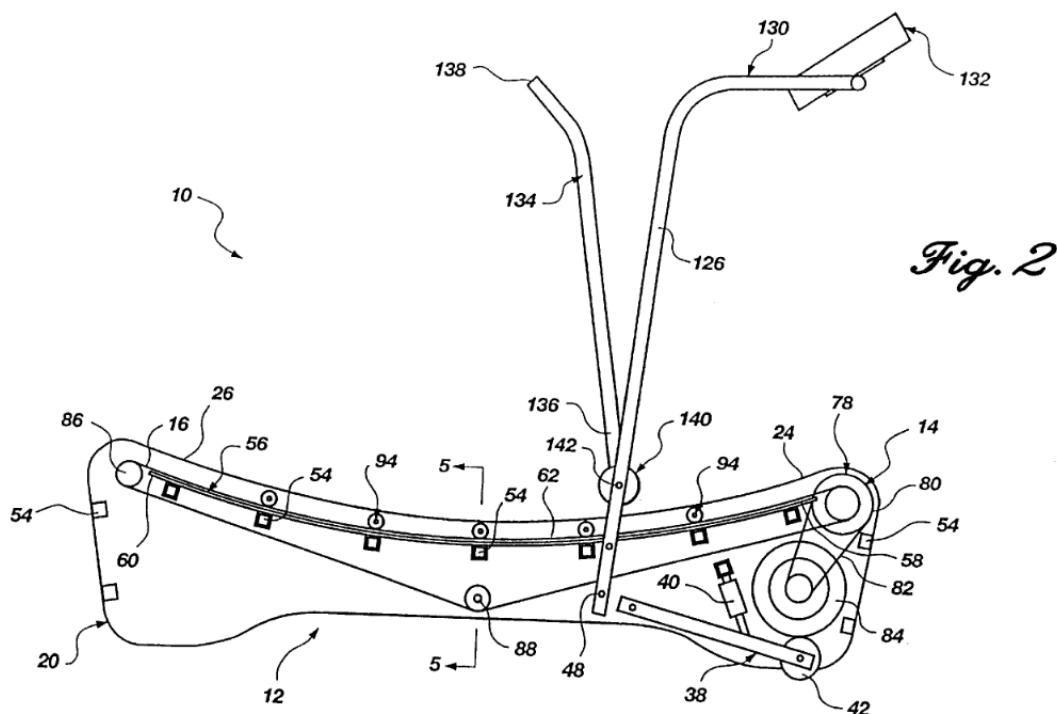
127. Socwell is a U.S. patent that issued on April 27, 1999. I understand that Socwell is prior art to all claims of the ‘884 Patent under 35 USC § 102(b).

128. Socwell discloses a manual, curved treadmill having a belt that forms the running surface. (Socwell, Ex. 1011, 11:52-60.)



**Socwell, Ex. 1011, Fig. 1**

129. The belt is looped around front and rear rollers, is supported from beneath by a curved deck, and is maintained in the curved shape by upper rollers positioned longitudinally along the left and right sides of the belt. (Socwell, Ex. 1011, 3:30-36, 5:20-44, 7:31-42, 10:17-31.) The rollers are arranged curvilinearly to match the curvature of the deck.



**Socwell, Ex. 1011, Fig. 2**

130. The bearings are mounted to their respective side of the frame by secondary supports that are elongate and extend longitudinally. The secondary supports are bolted to the frame. (Socwell, Ex. 1011, 10:49-60, 11:15-33.)

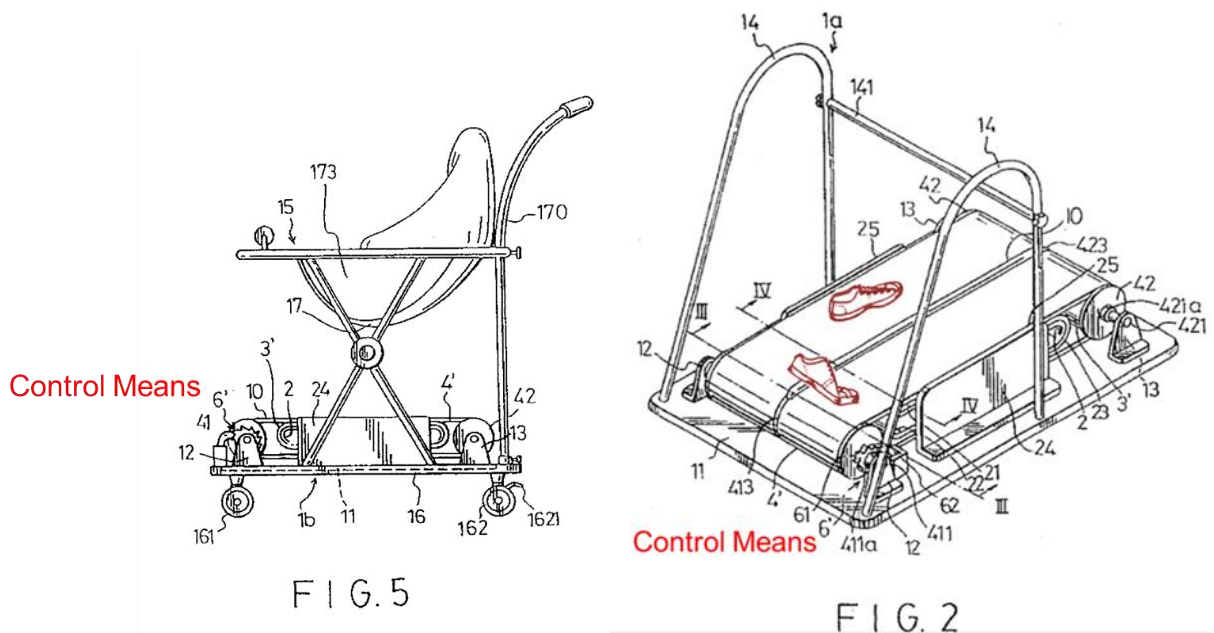
131. Socwell discloses support feet used for changing an inclination of the running surface. The support feet are pivotal relative to the frame to adjust the height and include wheels. (Socwell, Ex. 1011, 9:29-56.)

### **3. U.S. Patent No. 5,538,489 (“Magid,” Ex. 1012)**

132. Magid is a U.S. patent that issued on July 23, 1996. I understand that Magid is prior art to all claims of the ‘884 Patent under 35 USC § 102(b).

133. Magid discloses a manual treadmill with a belt that is supported by a

plurality of rollers or a flat bearing surface. (Magid, Ex. 1012, Figs. 8, 1.) Magid also discloses a one-way clutch that is coupled to a front shaft or a rear shaft to permit only unidirectional movement of the belt. (Magid, Ex. 1012, Fig. 5, 4:46-59.)



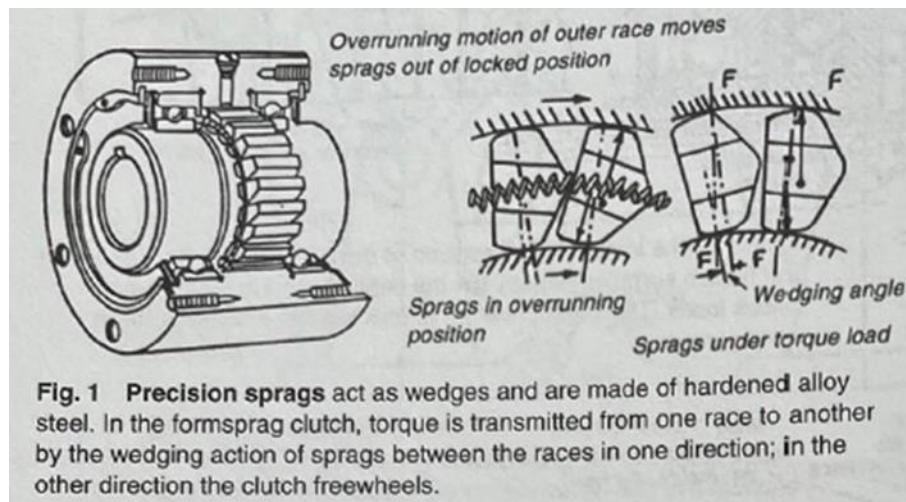
**Magid, Ex. 1012, Figs. 5 and 2 (Annotated)**

**4. Neil Sclater and Nicholas P. Chironis, Mechanisms & Mechanical Devices Sourcebook, Third Ed., (McGraw-Hill 2001) (“Sclater,” Ex. 1017)**

134. Sclater is a reference sourcebook that published in 2001. I understand that Sclater is prior art to all claims of the ‘884 Patent under 35 USC § 102(b).

135. 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.” (Sclater, Ex. 1017 at 24, 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. (Sclater, Ex. 1017 at 311-312.)



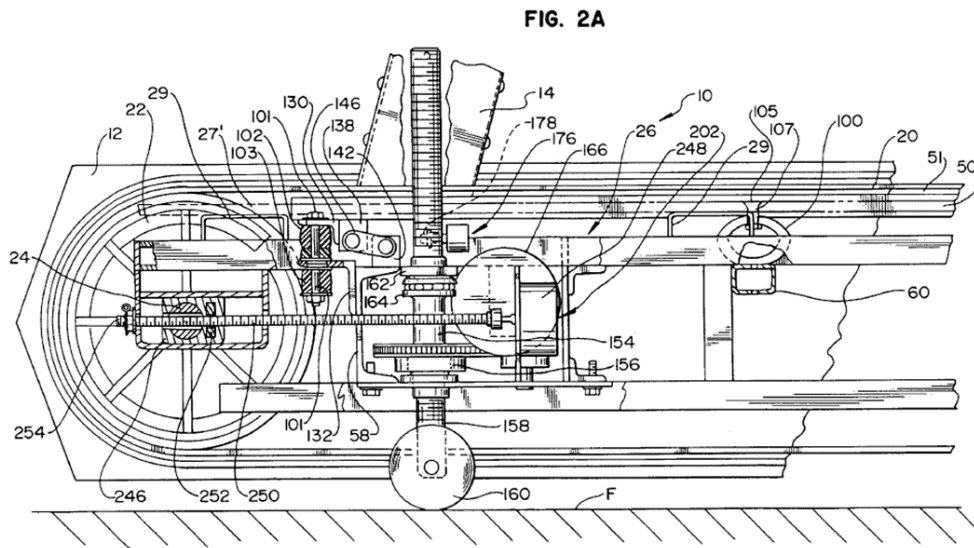
**Sclater, Ex. 1017 at 318**

136. Sclater also discloses some of the deficiencies of pawl and ratchet clutches as compared to roller and friction type clutches, including noise and speed limitations. (Sclater, Ex. 1017 at 302-303, 316.)

**5. U.S. Patent No. 6,923,746 (“Skowronski,” Ex. 1030)**

137. Skowronski is a U.S. patent that issued on August 2, 2005. I understand that Skowronski is prior art to all claims of the ‘884 Patent under 35 USC § 102(b).

138. Skowronski discloses a treadmill having front and rear pulleys that support a belt. (Skowronski, Ex. 1030, 6:46-52.) The pulleys are “preferably of a molded plastic construction.” (Skowronski, Ex. 1030, 7:49-50.)



**Skowronski, Ex. 1030, Fig. 2A**

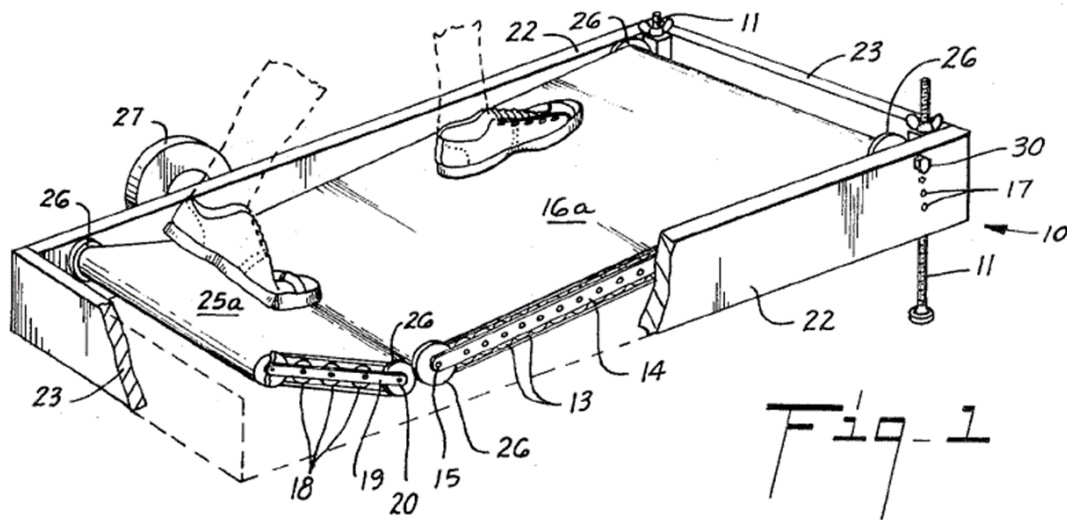
139. One benefit from using plastic is that the size of the pulleys can be increased, which in turn, allows for a thicker and heavier belt. (Skowronski, Ex. 1030, 7:20-31.) Another benefit of larger pulleys is enhanced gripping between the pulleys and the belt due to increased contact area. (Skowronski, Ex. 1030, 7:32-39.) Skowronski further explains that plastic pulleys are lighter and less expensive than metal pulleys. (Skowronski, Ex. 1030, 2:10-15.)

## **6. U.S. Patent No. 3,637,206 (“Chickering,” Ex. 1013)**

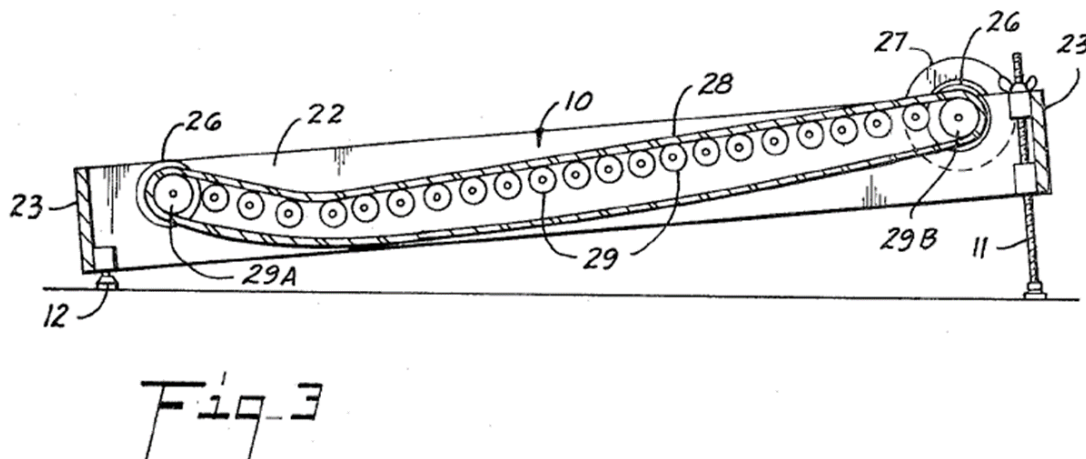
140. Chickering is a U.S. patent that issued on January 25, 1972. I understand that Chickering is prior art to all claims of the ‘884 Patent under 35 USC § 102(b).

141. Chickering discloses a manual treadmill with a belt that is supported by a plurality of rollers to form a curved running surface. (Chickering, 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. (Chickering, Ex. 1013, 1:72-2:12, Fig. 1.)



### Chickering, Ex. 1013, Fig. 1



### Chickering, Ex. 1013, Fig. 3

## IX. Grounds for Challenge

- A. Ground 1 – The Combination of Schonenberger, Socwell, Magid, and Sclater Teaches all of the Limitations of Claims 30-34, 37-54, 57, 59**

**1. Independent Claim 30**

142. I have given each of the limitations of claim 1 a unique numerical identifier, as shown in the chart below:

| <b>U.S. Patent No. 10,561,884</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>[30.0]</b>                     | A manually powered treadmill, comprising:                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>[30.1]</b>                     | a frame having a front end and a rear end positioned opposite the front end;                                                                                                                                                                                                                                                                                                                                                        |
| <b>[30.2]</b>                     | a front shaft coupled to the frame proximate the front end;                                                                                                                                                                                                                                                                                                                                                                         |
| <b>[30.3]</b>                     | a rear shaft coupled to the frame proximate the rear end;                                                                                                                                                                                                                                                                                                                                                                           |
| <b>[30.4]</b>                     | a plurality of bearings coupled to the frame;                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>[30.5]</b>                     | a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                                                                                                                                                                                          |
| <b>[30.6]</b>                     | a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                                                                                       |
| <b>[30.7]</b>                     | wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first |

direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.

... *[30.0] A manually powered treadmill, comprising:*

143. Schonenberger discloses a “physical exercise apparatus” and notes that “[s]uch apparatus, often referred to as ‘treadmills’, are suitable for physical exercise and training in sports and physical conditioning; and for physical rehabilitation after accident or disease have stricken a user.” (Schonenberger, Ex. 1010, 1:17-22.)

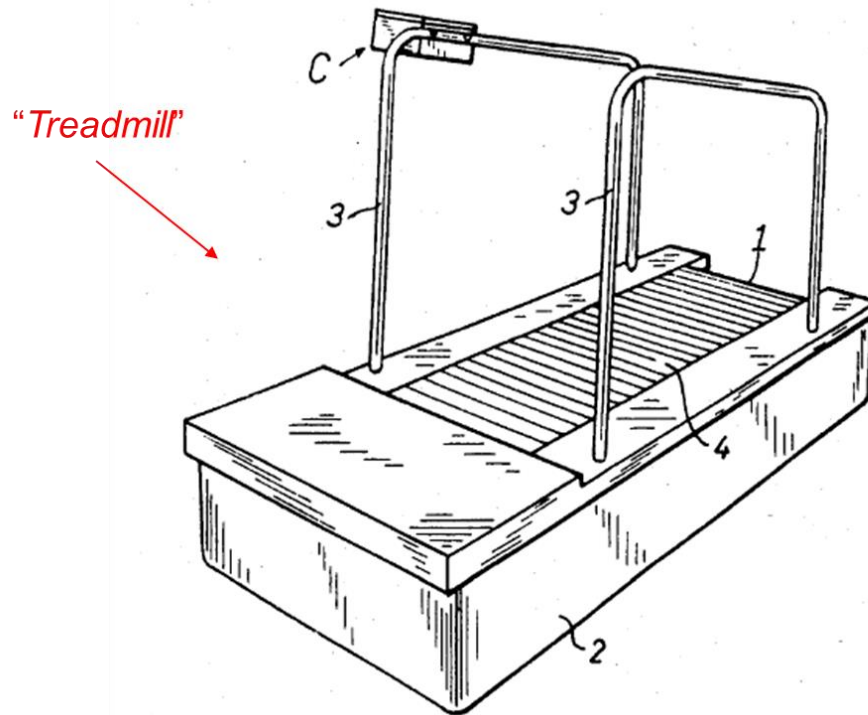


*Fig. 1*

**Schonenberger, Ex. 1010, Fig. 1 (Annotated)**

144. Schonenberger discloses that the “physical exercise apparatus illustrated in FIG. 1 is driven by a motor 33” however:

This invention allows a runner to use the apparatus at a 5% elevation position **without any external motor power**.

(Schonenberger, Ex. 1010, 4:1-6, 6:16-18.)

One of the drums 10 is driven by motor 33, or **by gravity of earth** or by any other suitable motive drive apparatus by means of a drive belt 34 (FIGS. 2, 3), preferably with interposition of a step-down gearing.

(Schonenberger, Ex. 1010, 4:34-37.)

145. A POSA would have understood that a treadmill that is driven by a runner without any other external motor power is a “*manually powered treadmill.*”

... [30.1] *a frame having a front end and a rear end positioned opposite the front end;*

146. Schonenberger discloses a housing 2 (“*frame*”) with frame members having opposing ends:

**The housing 2** includes frame members 36, 37 (FIG. 2) which provide for physical and structural support. The frame members 36, 37 are only shown schematically. They may have any suitable structure or profile. **At either end** of the apparatus (see FIGS. 3 and 12), and within the housing 2 are located rotatable drums, rollers, sheaves, sprockets, or the like, about which the surface 1, which is an endless loop, is placed.

(Schoenenberger, Ex. 1010, 4:10-17.)

147. As illustrated in Figure 1 below, Schonenberger discloses that the housing 2 (“*frame*”) includes “*a front end and a rear end positioned opposite the front end.*”

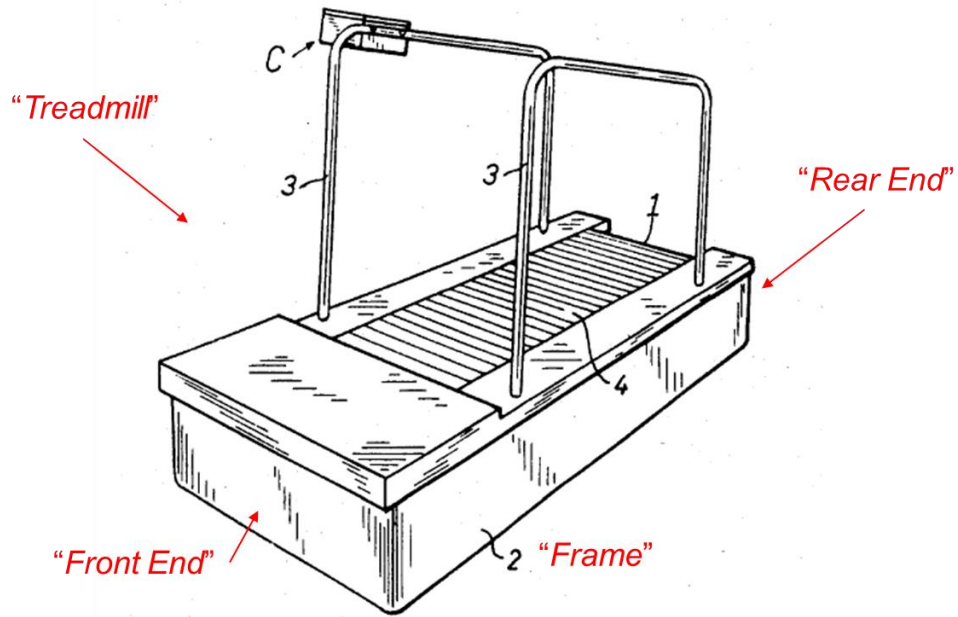
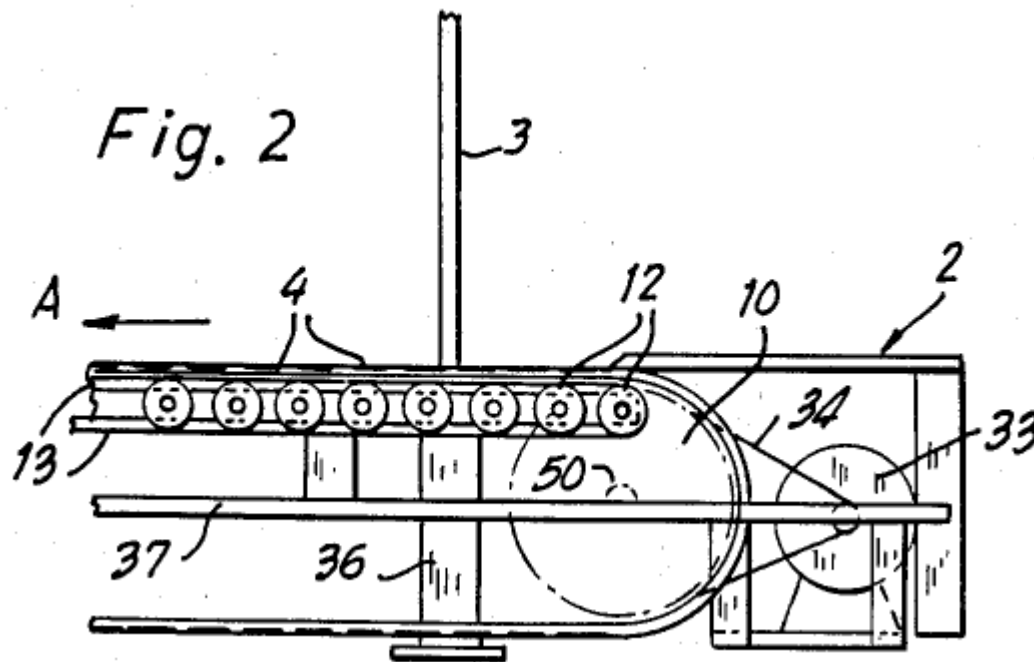


Fig. 1

Schonenberger, Ex. 1010, Fig. 1 (Annotated)



Schonenberger, Ex. 1010, Fig. 2

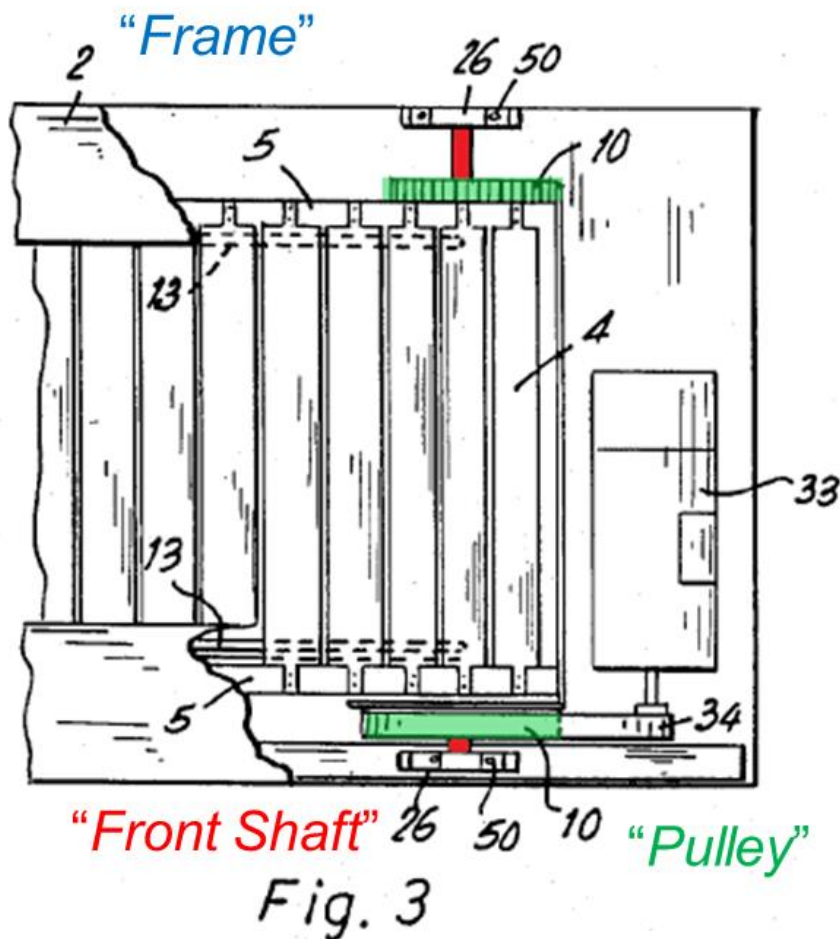
148. Thus, Schonenberger discloses “a frame [housing 2] having a front end and a rear end positioned opposite the front end.”

... [30.2] a front shaft coupled to the frame proximate the front end;

149. Schonenberger discloses a pair of front pulleys 10 that are each supported by a transverse shaft 26 (“front shaft”). Schonenberger further discloses that the pulleys 10 are “rotatable elements” that are “journalled in the frame”:

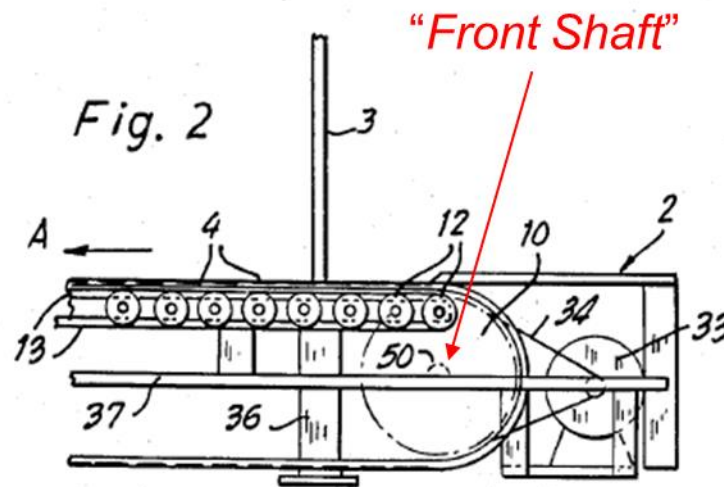
At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 **are located rotatable drums, rollers, sheaves, sprockets, or the like**, about which the surface 1, which is an endless loop, is placed. The **rotatable elements**, preferably in the form of two **operating drums or rollers 10**, are suitably journalled in the frame as seen at 50, FIG. 3. If two sheaves or **pulleys** are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by **a transverse shaft 26** (FIG. 8).

(Schronenberger, Ex. 1010, 4:10-23.)



Schonenberger, Ex. 1010, Fig. 3 (Annotated)

150. With reference to Figure 3 above, Schonenberger illustrates the pair of front pulleys 10 that are interconnected by a **transverse shaft 26** that extends between the left and right sides of the frame proximate the front end. The shaft 26 is journaled to the frame 2 by mounts 50, as shown in Figure 3. A journal or sleeve bearing is a plain bearing in which a journal shaft rotates. (PT Handbook, Ex. 1016 at 2-1, 2-2.)

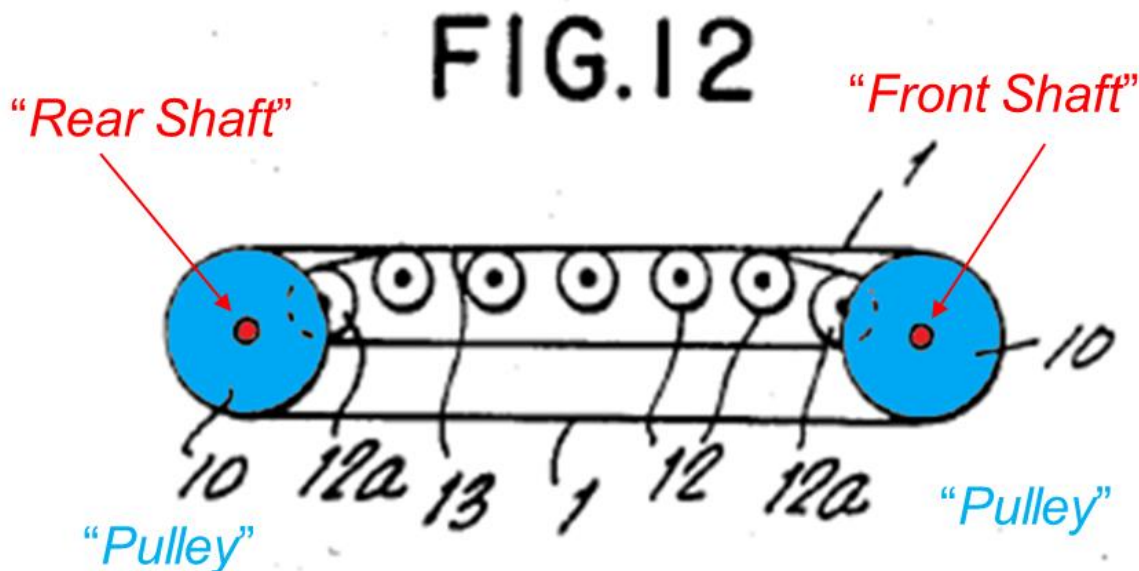


**Schonenberger, Ex. 1010, Fig. 2 (Annotated)**

151. Thus, Schonenberger discloses *“a front shaft [transverse shaft 26] coupled to the frame proximate the front end.”*

*... [30.3] a rear shaft coupled to the frame proximate the rear end;*

152. Schonenberger discloses that the transverse shaft 26 and pulleys 10 are located *“at either end of the apparatus.”* (Schonenberger, Ex. 1010, 4:14-23.)



Schonenberger, Ex. 1010, Fig. 12 (Annotated)

153. Thus, Schonenberger discloses *"a rear shaft [transverse shaft 26] coupled to the frame proximate the rear end."*

... [30.4] *a plurality of bearings coupled to the frame;*

154. Schonenberger discloses a plurality of rollers 12, 12' (*"bearings"*), that support and guide the movable surface 1. (Schonenberger, Ex. 1010, 4:67-5:05.) The rollers 12, 12' are provided on both the left and right sides of the frame 2 as shown, for example, in 19, reproduced below.

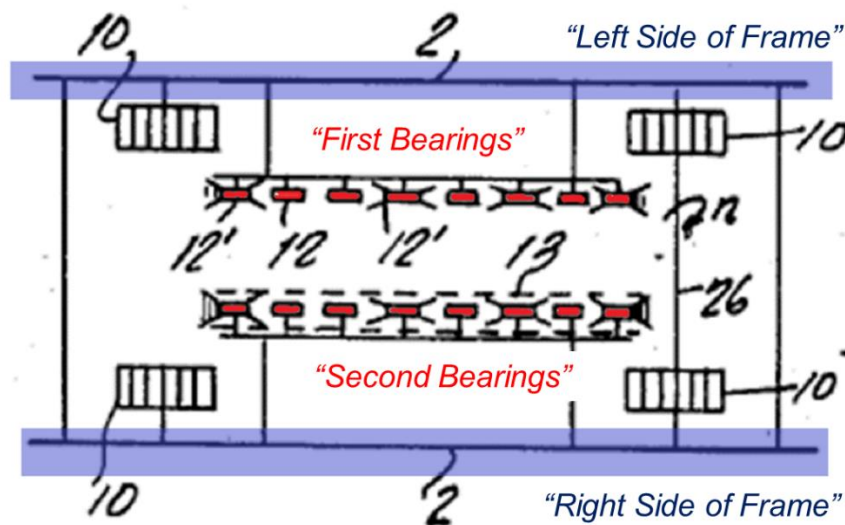


**FIG. 19**

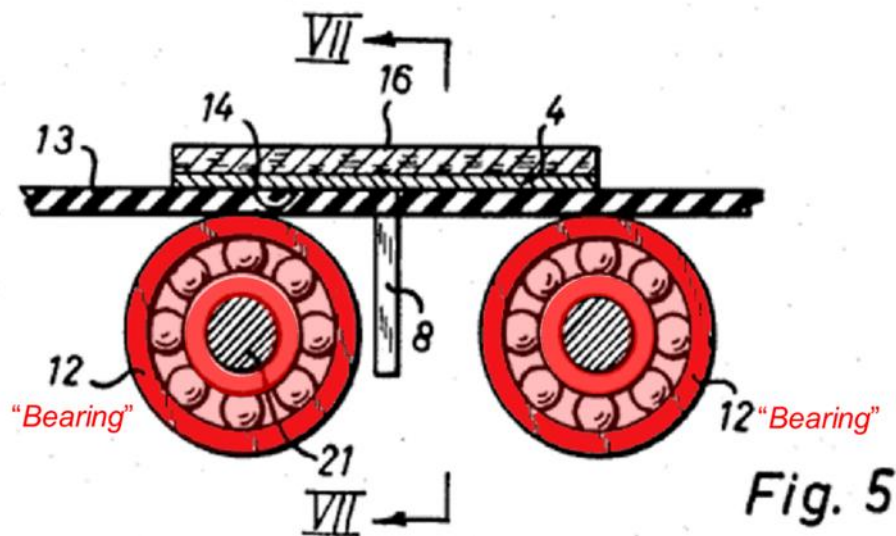
**Schonenberger, Ex. 1010, Fig. 19 (Annotated)**

155. The rollers 12 are journaled by bearings:

The support rollers 12, 12' are journaled by means of **low-friction bearings, for example needle bearings or ball bearings** (FIG. 5) although sleeve bearings operating with low friction with respectable 21 may also be used.

(Schonenberger, Ex. 1010, 5:47-51.)

156. Figure 5, reproduced below, shows a conventional ball-bearing construction with each roller 12 having an inner race received on the shafts 21, an outer race supporting the movable surface (slats 4), and ball bearing rolling elements radially interposed between the inner and outer races.

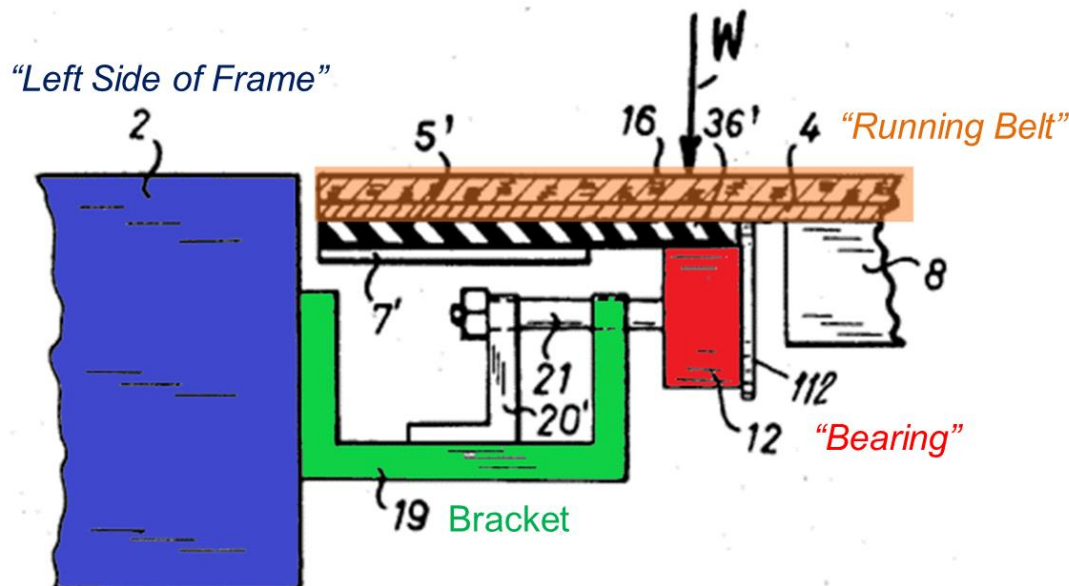


Schonenberger, Ex. 1010, Fig. 5 (Annotated)

157. Schonenberger discloses rollers 12, 12' ("*plurality of bearings*") that are "*coupled to the frame*" by a bracket 19:

**Rollers 12, 12'**, respectively are **carried on shafts 21 secured to a bracket 19 which is attached to the sidewall 2 of the apparatus**; a second arm 20' provides for lateral guidance of the bolt 21. The connections of the bracket elements to each other and to the sidewall, or to the **frame** of the apparatus, may be by welding, for example."

(Schonenberger, Ex.1010, 8:45-51.)



Ex.1010, Fig. 10 (Annotated)

158. Thus, Schonenberger discloses “a plurality of bearings [rollers 12, 12'] coupled to the frame [housing 2].”

... [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and

159. Schonenberger discloses a movable surface 1 (“running belt”) that is looped around the “pulleys” 10: “An elongated support frame has rotatable driving elements, such as drums, sheaves, pulleys or the like at either end, around which the movable surface is looped.” (Ex. 1010, 2:6-9.)

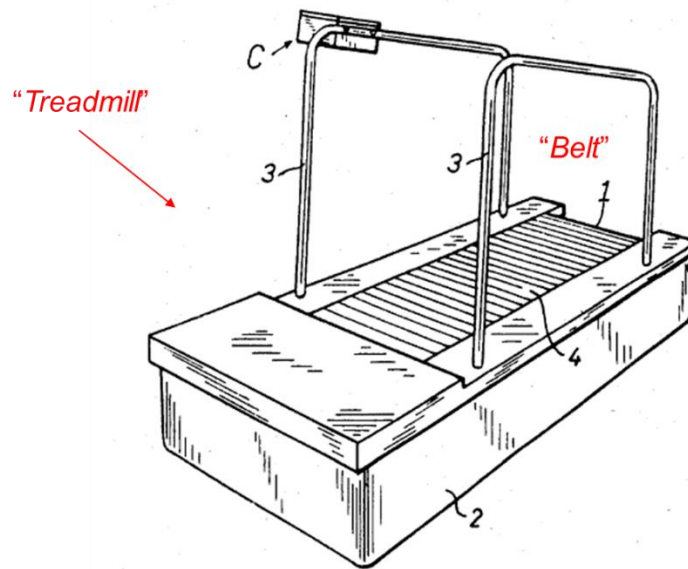


Fig. 1

**Schonenberger, Ex. 1010, Fig. 1 (Annotated)**

160. The movable surface 1 is formed of a plurality of individual slats 4 that secured to a belt 5:

The tooth belts 5 (FIG. 4) have a group of step **slats 4** secured thereto by means of rivets 9, so that **the belts connect the slats 4 to form the endless surface 1.**

(Schonenberger, Ex. 1010, 4:38-41.)

161. Each of the slats 4 is covered with a cushioning material or cover 16.

The upper surface of the slats 4 is covered with an **impact-reducing cover 16 . . .** Provide for soft initial engagement when stepping on the surface and to provide a pleasant yielding top surface and to reduce stress on joints and ligaments. **The material for cover 16 may be rubber, cork, dense sponge rubber, plastic foam, artificial lawn**

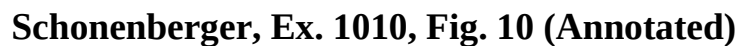
**surfacing, indoor/outdoor carpeting, particularly with rubber backing, or the like.**

(Schonenberger, Ex. 1010, 4:57-66.)

162. The movable surface 1 (“*running belt*”) is supported by the rollers 12, 12’ (“*plurality of bearings*”):

Embodiment of FIG. 10: The resilient, elastic cushion support 5 has been replaced by a belt 5’ which has a tooth or ripped at section 7’ similar to the ribbed belt 5 with the teeth 7, **and a smooth portion 36’, against which support roller 12 can bear.** The belt 5’ thus, at the same time, forms the resilient cushion between the slats 4 and the support rollers 12, 12’ respectively, as well as the longitudinal stiffening element which holds the slats 4 in adjacent alignment in the right position (rightangle position with respect to the running direction, at the ends respectively in the area of driving elements 10).

(Schonenberger, Ex. 1010, 8:34-44.)



164. Schonenberger does not expressly disclose that the *running belt comprises a curved running surface*.

In view of the foregoing, it is a **primary object of the present invention to provide a novel curved deck treadmill** which provides a structurally supported arcuate shaped, moveable surface on which a user may exercise.

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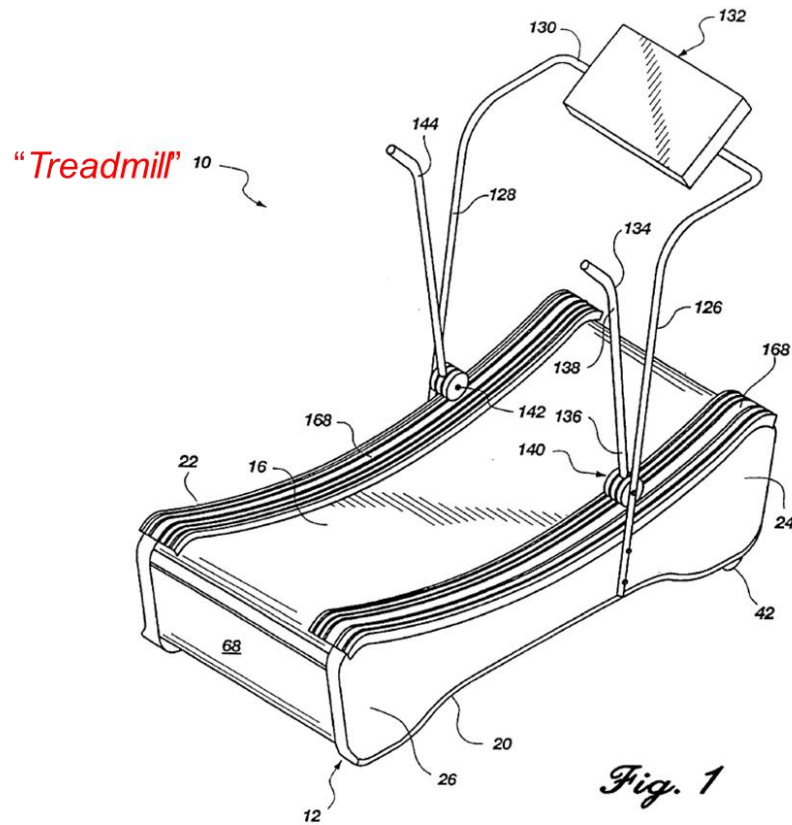
As shown, **the curved deck treadmill 10** comprises a support frame 12 having a first side 20 and a second opposing side 22 and having a deck 56 supportably disposed therebetween.

(Socwell, Ex. 1011, 5:23-26.)

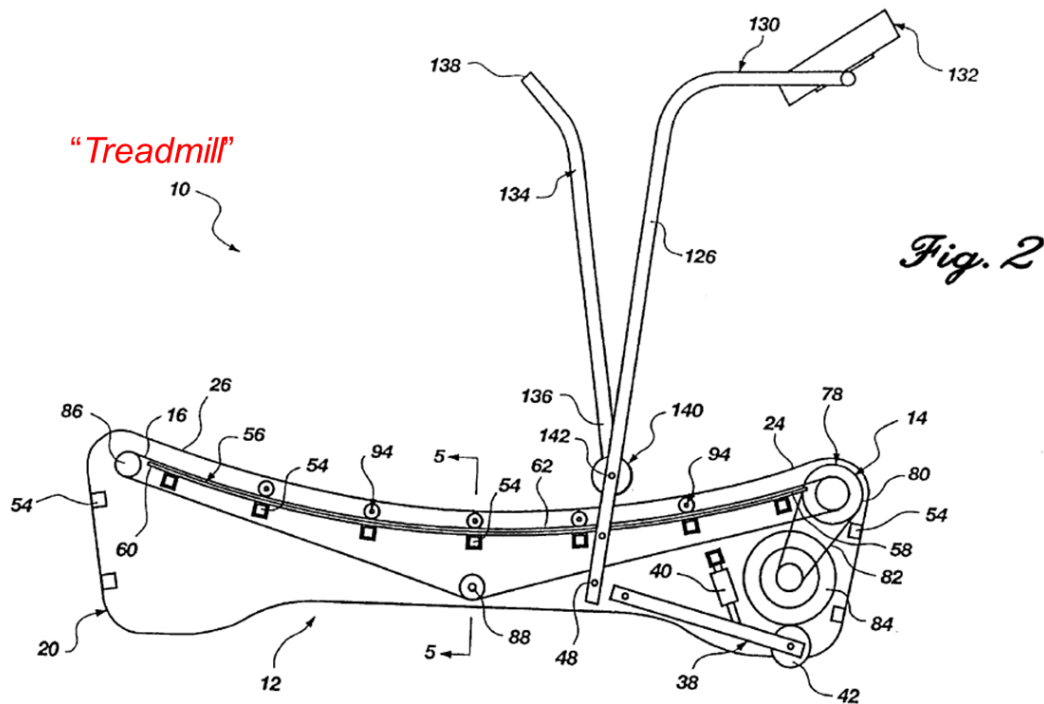
In an alternate embodiment, **the curved deck treadmill 10** or the present invention may be implemented **without a driving means** engagably disposed to a roller in order to facilitate the forced rotation of the belt 16. If so implemented, the rollers 78, 86 and 88 and the deck 56 should be generally calibrated in relation to the belt 16 to provide an optimal frictional resistance to enable a user to safely walk, jog, and/or run thereon, while still providing sufficient resistance to enable a user to exercise.

(Socwell, Ex. 1011, 11:53-61.)

166. As explained in ¶¶ 168-179, it would have been obvious to a POSA to modify Schonenberger's rollers 12, 12' ("*bearings*") to provide a curved support surface such that the movable surface 1 ("*running surface*") "*follows a curved running surface.*"



Socwell, Ex. 1011, Fig. 1. (Annotated)



**Socwell, Ex. 1011, Fig. 2. (Annotated)**

167. Thus, the combination of Schonenberger and Socwell teaches “a running belt [movable surface 1] at least partially supported by the plurality of bearings, wherein the running belt follows a curved running surface [as taught by Socwell].”

## **2. Rationale to Combine Schonenberger with Socwell**

168. It would have been obvious to a POSA to combine the flat manual treadmill topology of Schonenberger with the curved manual treadmill topology of Socwell to increase safety and reduce impact loading of the user’s joints. (Socwell, Ex. 1011, 2:11-29, 2:45-55, 3:1-9.)

169. Schonenberger and Socwell are from the same field – manual treadmills for exercise. (Socwell, Ex. 1011, 1:10-12; Schonenberger, Ex. 1010, 1:64-68.) Both

Schonenberger and Socwell disclose treadmills with a belt supported by front and rear shafts. (Schonenberger, Ex. 1010, 4:14-17, 6:16-18; Socwell, Ex. 1011, 5:33-44; 8:8-27, Fig. 3.)

170. It has long been recognized that users may be injured by falling off the back of the treadmill:

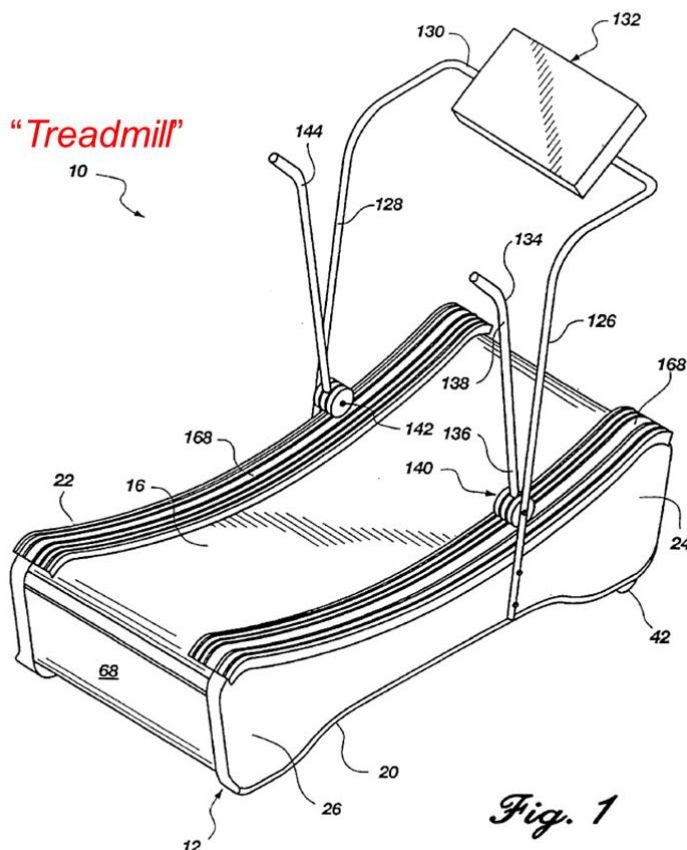
Another meaningful disadvantage of exercise treadmills of the prior art is the inherent danger associated with users tending to fall off the back end of the treadmill and become injured.

(Socwell, Ex. 1011, 2:45-48; *see also* 3:40-45.)

171. A POSA would have recognized that the flat running surface of Schonenberger does not inhibit a user from falling off the back. Indeed, Schonenberger's flat movable surface 1 does not inform the user when they are about to fall off the back by shape, nor does it provide frictional resistance of the belt motion to resist a user unintentionally drifting rearward by gravity and falling off the back. Schonenberger discloses support bars 3, but, according to Socwell, "having to grasp the handle [while running] severely interferes with one's natural body motion and further abdicate the inherent physical advantages of the exercise routine." (Schonenberger, Ex. 1010, 4:1-6; Socwell, Ex. 1011, 2:56-67.) Thus, most users do not hold the handle when running on a treadmill.

172. The curved belt of Socwell solves these problems. The curvature of the running surface "substantially prevents a user from falling off the back end of the

treadmill and whereby serving to keep the user centered on the upper surface of the treadmill without encumbering the natural body motion of the user exercising thereon.” (Socwell, Ex. 1011, 3:40-45.)

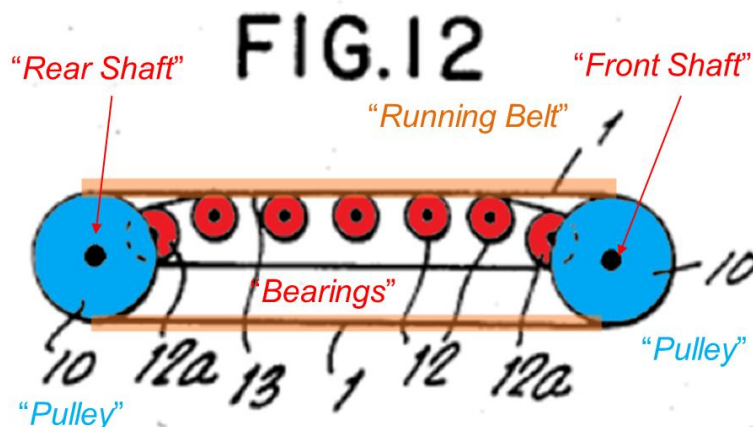


**Socwell, Ex. 1011, Fig.1 (Annotated)**

173. A POSA would have further recognized that the flat running surface of Schonenberger is harder on the user’s joints than a curved running surface. Whereas Socwell’s “curved deck treadmill . . . is capable of reducing the physical impact to the joints and muscles (e.g., the knees and back) of a user, thus providing an operative device having rehabilitative functionality.” (Socwell, Ex. 1011, 3:53-57.)

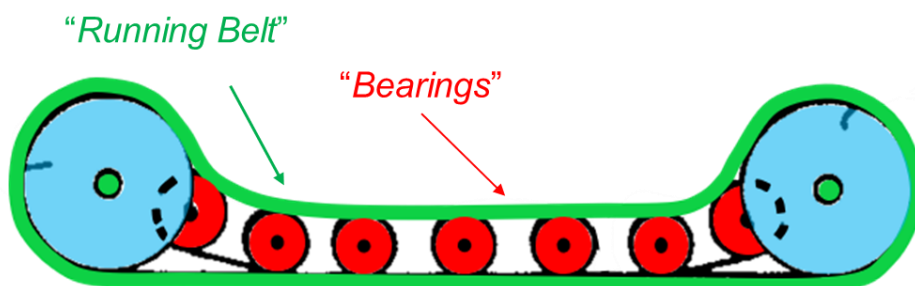
Socwell also teaches that its curved running surface “provides a continuous, smooth exercising motion capable of providing meaningful exercise comfort, thereby facilitating an upper surface which supportably provides for a longer stride with more flexibility.” (Socwell, Ex. 1011, 13:43-47.) Thus, a POSA would have understood that modifying the movable surface 1 of Schonenberger to provide a curved running surface would result in not only a more comfortable treadmill that is less taxing on the human body, but also a more versatile treadmill that can be used for exercise and rehabilitation. (Socwell, Ex. 1011, 3:53-57.)

174. It was well within the ordinary skill in the art to modify the flat running surface of Schonenberger with the curved running surface of Socwell. In both Schonenberger and Socwell, the running surface is supported from underneath by bearings: rollers 12 in Schonenberger; and a linear bearing, curved deck 56, combined with rotary bearings, rollers 94 in Socwell. A POSA would have understood that by arranging the rollers 12 of Schonenberger in a curved alignment, similar to the curved deck 56 of Socwell, a curved running surface would result. As shown in Figure 12, Schonenberger discloses arranging the rollers 12 along a curved profile such that the end rollers 12 adjacent to the pulleys 10 are located lower than the central rollers 12 to accommodate the path of support belt 1.



**Schonenberger, Ex. 1010, Fig. 12 (Annotated)**

175. A POSA would have understood that lowering the rollers 12 relative to the front and rear shaft assemblies would result in a curved running surface, as shown below, and such that the movable surface 1 ("running belt") follows the profile defined by the rollers 12.



**Schonenberger, Ex 1010, Fig. 12 (Modified)**

176. The movable surface 1 of Schonenberger is comprised of individual slats 4 that are relatively heavy, relatively rigid, interconnected, and movable relative to each other. As such, the movable surface 1 ("running belt") would conform to the profile of the supporting rollers 12. (Schonenberger, Ex. 1010, 4:38-66, Fig. 3.)

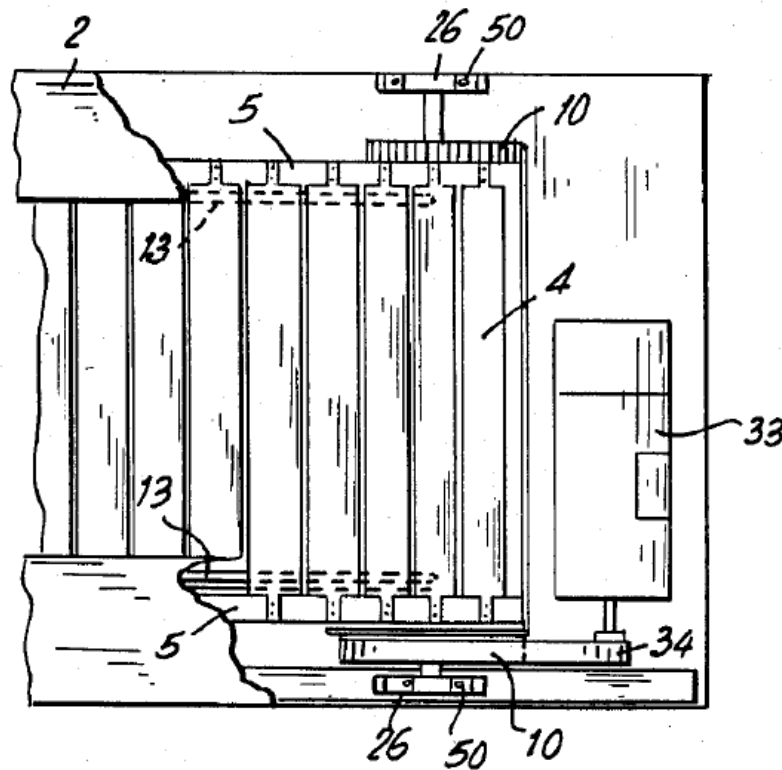
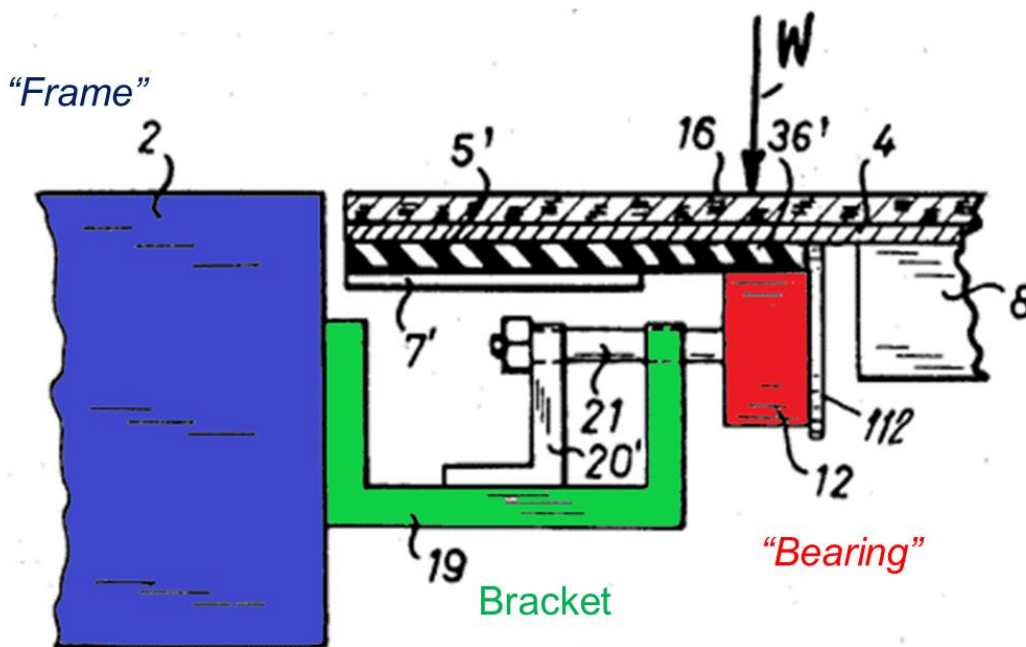


*Fig. 3*

**Schonenberger, Ex. 1010, Fig. 3**

177. Schonenberger discloses mounting the rollers 12, 12' to the sidewalls of the housing 2 ("frame") with brackets 19. (Schonenberger, Ex.1010, 8:45-51.)



Schonenberger, Ex.1010, Fig. 10 (Annotated)

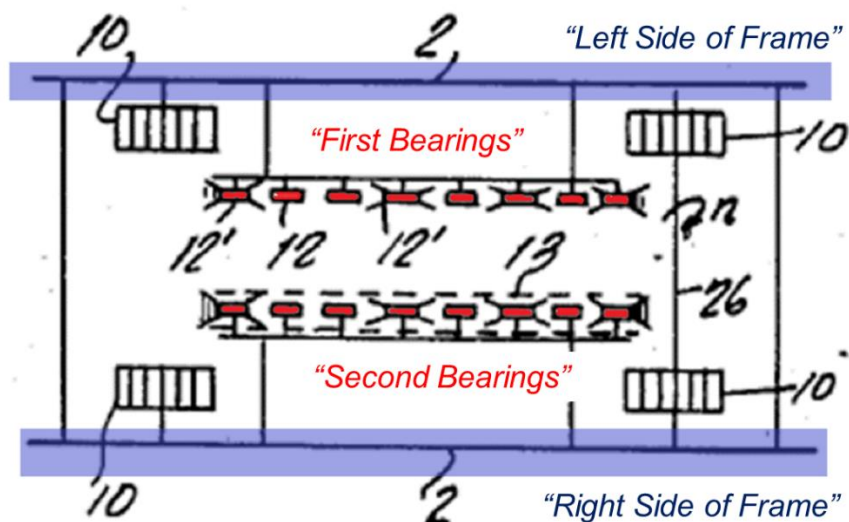


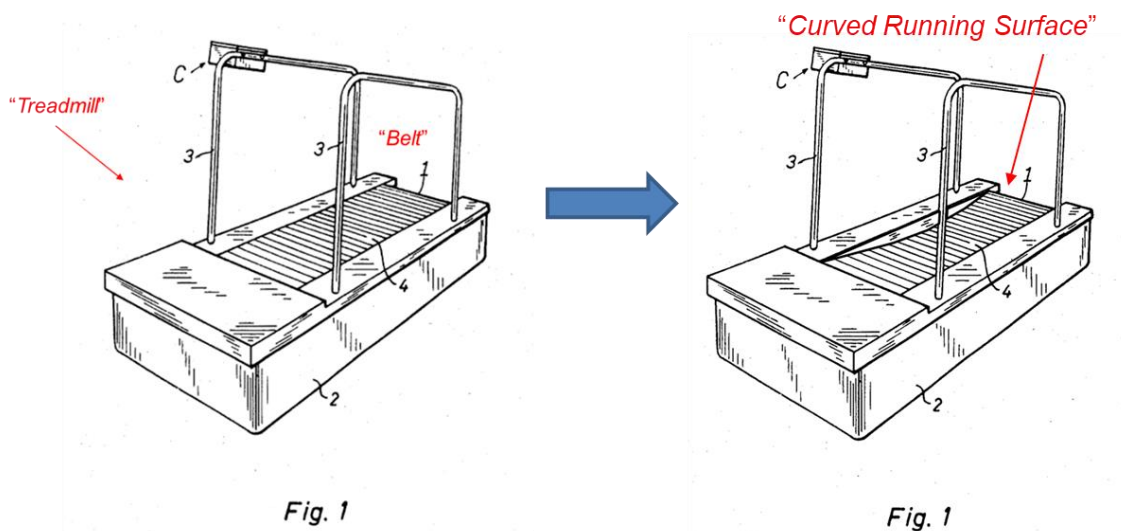
FIG. 19

Schonenberger, Ex. 1010, Fig. 19 (Annotated)

178. A POSA would have known how to modify these brackets 19 to have a curved shape to arrange the rollers 12 in a curved profile. The modification would

be the use of known technique—using a curvilinear arrangement of bearings, as taught by Socwell - to improve similar devices (treadmills), in the same way, i.e., to produce a curved running surface. Schonenberger discloses a well-known type of flat treadmill. As I explained in my state-of-the-art section, curved deck treadmills were also well known. (See ¶¶ 61-64.)

179. Thus, Schonenberger modified by the teachings of Socwell would have a belt 1 with a curved running surface in which a central portion of the belt would be closer to the ground than front and rear belt portions.



Schonenberger, Ex. 1010, Fig.1, Fig. 1 (Modified)

... [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;

180. Magid discloses a walker apparatus with adjacent left and right foot

FIG. 1

“Safety Device”

Control Means

Front Roller

Rear Roller

15, 17, 173, 170, 17, 3', 2, 24, 4', 42, 13, 12, 161, 162, 16, 11, 1b

### Magid, Ex. 1012, Fig. 5 (Annotated)

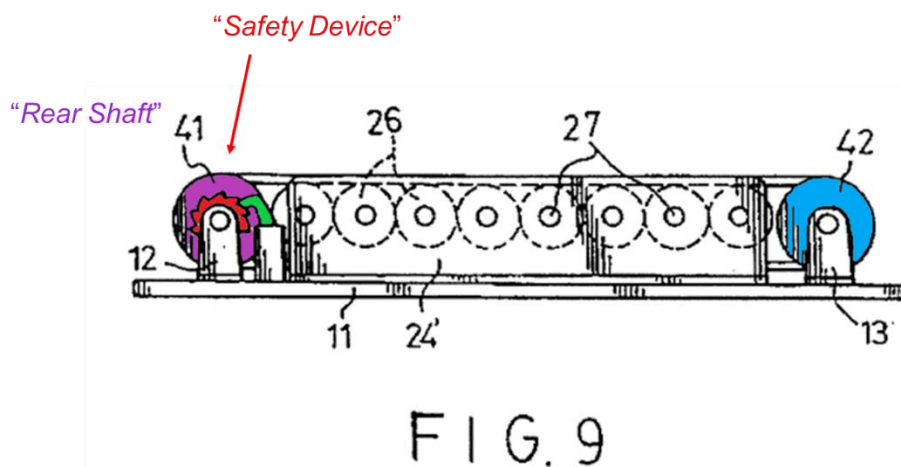
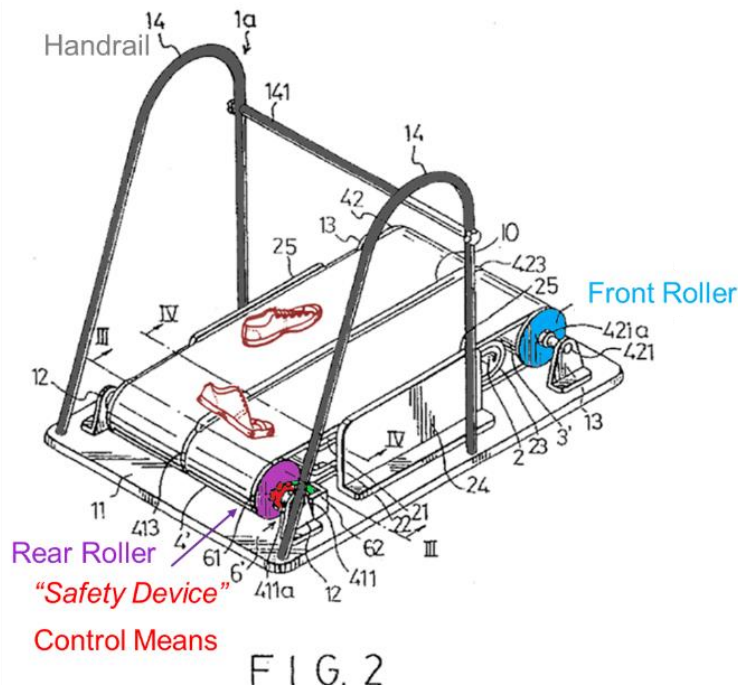
A unidirectional control means 6, 6' is installed to permit only unidirectional movement of the left and right foot belts 4, 4'. In this embodiment, the control means 6, 6' includes a pair of ratchet gears 61 attached to outer ends of the front rollers 41 and mounted rotatably on the first shaft 411, and a pair of pawls 62 secured to the base 11 and engaging one of the ratchet gears 61 to permit only unidirectional rotation of the front rollers 41, thereby preventing bidirectional movement of the foot belts 4, 4'. A releasable means (not shown) may

be provided to release selectively the pawls 62 from the ratchet gears 61 in a known manner to permit reciprocating movement of the foot belts 4, 4' when desired. Of course, the ratchet gears may be attached to the rear rollers 42 to achieve the same result.

(Magid, Ex. 1012, 4:46-59.)

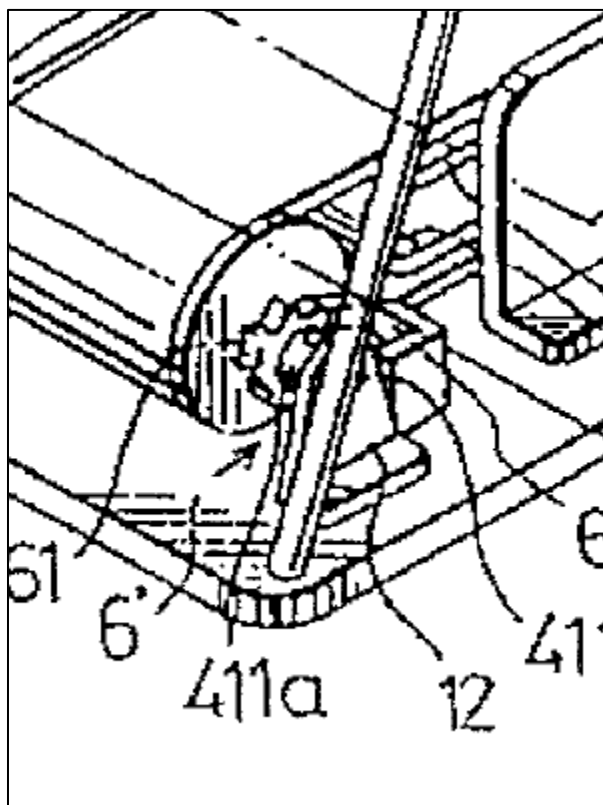
182. Magid discloses that the ratchet gear 61 (*“first rotatable element”*) rotates with the front or rear shaft and relative to the frame, and the pawl 62 (*“second rotatable element”*) pivots, or rotates, to engage the ratchet gear 61. (*Id.*)

183. Magid illustrates the control means 6, 6' coupled to the rear rollers in Figures 2 and 9 below. Although Magid mislabels the front roller and the rear roller with the wrong reference numeral in these figures, a POSA would have understood, from the orientation of the handrail 14, and the ratchet gear 61, that the control means 6, 6' are mounted to the rear roller. Figure 2 of Magid is annotated to include a user's feet to further illustrate front and rear rollers of the treadmill.



**Magid, Ex. 1012, Figs. 2 and 9 (Annotated)**

184. Additionally, the gear profile of the ratchet and orientation of the pawl in Figure 2 would prevent the rear roller from rotating clockwise, which corresponds with the belt being blocked from moving to the right on the page, or forward.



**Magid, Ex. 1012, Fig. 2 (Enlarged)**

185. A POSA would have known that mounting a one-way clutch in this manner improves the stability of the user on the treadmill by preventing forward treadmill belt motion. It would have been obvious to a POSA to combine the modified Schonenberger treadmill with Magid's control means to permit only unidirectional movement of the running belt to reduce the risk of a user stepping onto the running belt of the treadmill and losing their balance when the belt moves in the forward direction. Magid's control means 6, 6' provide a "*safety device*" by preventing the left and right foot belts 4, 4' from moving forward.

186. Thus, the combination of references teaches "*a safety device* [Magid's

control means 6, 6'] *coupled to the frame [housing 2] and the running belt [movable surface 1], the safety device having a first rotatable element [ratchet gear] and a second rotatable element [pawl], wherein at least one of the first and second rotatable elements [ratchet gear] are adapted for rotation relative to the frame.*"

### **3. Rationale to Combine Schonenberger and Socwell with Magid**

187. It would have been obvious to a POSA to combine the above-explained manual treadmill with a curved running surface of Schonenberger in view of Socwell ("the modified Schonenberger treadmill"), with the known technique of a one-way clutch to prevent treadmill belt motion in a forward direction as disclosed in Magid.

188. Schonenberger, Socwell, and Magid are from the same field – Exercise Equipment, more specifically treadmills for home exercise use. (Schoenenberger, Ex. 1010, 1:63-68; Socwell, Ex. 1011, 1:10-12; Magid, Ex. 1012, 1:53-56; 3:23-28.) Schonenberger, Socwell, and Magid disclose treadmills with a moving endless running belt. (Schoenenberger, Ex. 1010, 4:14-17, 6:16-18; Socwell, Ex. 1011, 5:33-44; 8:8-27, Fig. 3; Magid, Ex. 1012, 4:64-5:18, Fig. 2.)

189. It has long been recognized that users may be injured by falling off of a treadmill while mounting or dismounting it, or while using it. This may be due to the treadmill belt moving in an unexpected direction or in such a way that the user cannot regain their equilibrium. It could also be due to the incline of the surface causing the position of user to drift rearwards, and off, over time. (See ¶ 71-72.)

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, 1:30-36.)

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, 1:32-35.)

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.

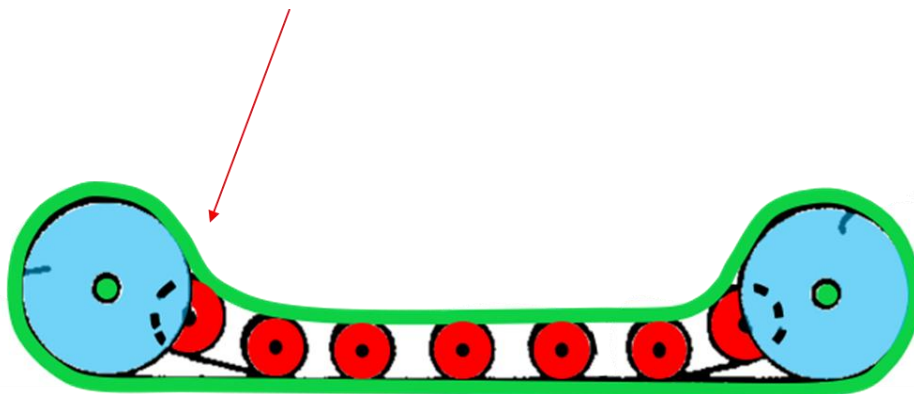
(Socwell, Ex. 1011, 2:45-48.)

190. Several professional organizations have produced standards to provide guidance to manufacturers regarding both exercise equipment safety in general and other standards specifically for treadmill safety. *See* ASTM Standard, Ex. 1019; ISO Standard, Ex. 1020; and ACCC Product Safety Supplier Guide, Ex. 1007. These standards establish requirements for foot rails and handrails on treadmills to address stability. (ASTM Standard, Ex. 1019 at 3-4; ISO Standard, Ex. 1020 at 8.)

191. Socwell recognizes that it is difficult to stabilize the movement of the

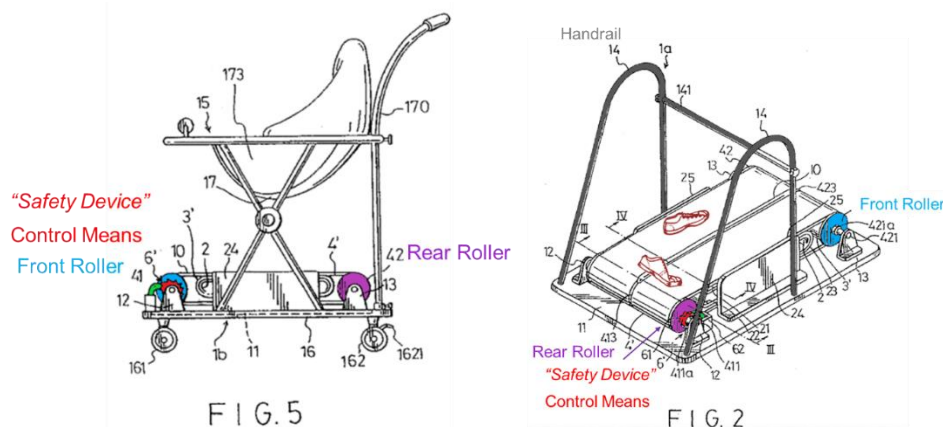
running belt in manual treadmills. According to Socwell, this is due to the difficulty in balancing the frictional and inertial qualities of belt supporting devices. (Socwell, Ex. 1011, 1:28-56). The modified treadmill of Schonenberger in view of Socwell include a curved running surface, which inhibits a user from falling off the back of the treadmill. (Socwell, Ex. 1011, 3:40-45.)

192. However, the modified treadmill of Schonenberger in view of Socwell does not fully address the risk of a user falling forward due to reverse rotation of the running surface. For example, with a manual curved running surface, such as that disclosed in modified Schonenberger, forward motion is likely to occur if a user were to step onto the rearward end of the running surface (indicated by the red arrow), causing the foot to unexpectedly move towards the lowest portion of the treadmill. In the condition where the user adjusts the frame to a generally horizontal position using the front elevating mechanism, as depicted in the image below, this unexpected motion would be exacerbated and could result in a fall.



**Schonenberger, Ex. 1010, Fig. 12 (Modified, Annotated)**

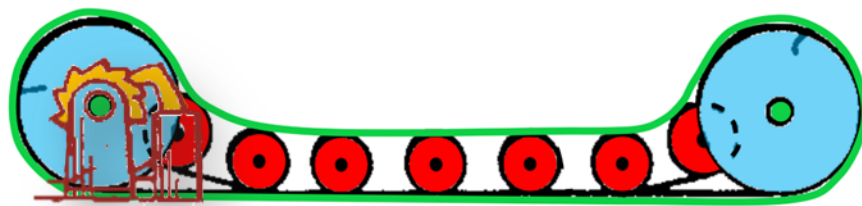
193. Magid discloses a one-way clutch (unidirectional control means 6, 6') that is coupled to a front shaft (Fig. 5) or a rear shaft (Fig. 2) to permit only unidirectional movement of the belt. (Magid, Ex. 1012, Fig. 5, 4:46-59.)



**Magid, Ex. 1012, Figs. 5 and 2**

194. It would have been obvious to a POSA to combine the modified Schonenberger treadmill with Magid's control means to permit only unidirectional movement of the running belt to reduce the risk of a user stepping onto the running belt of the treadmill and losing their balance when the belt moves unexpectedly in the forward direction.

195. Accordingly, a POSA would have been motivated to further modify Schonenberger to include Magid's control means mounted to the front axle or the rear axle. For example, the below image shows Magid's control means attached to Schonenberger rear shaft 26. The safety device could also be mounted to the front shaft (not shown).



**Schonenberger, Ex. 1010, Fig. 12 (Modified, Annotated)**

196. The modification would include mounting a one-way ratchet clutch between the shaft 26 and the frame 2. The ratchet gear would be mounted coaxially with the shaft 26 and the pawl is rotationally coupled to the frame.

197. This modification would have been a simple combination of known elements in the prior art: the modified Schonenberger manual treadmill with a curved running surface and Magid's one-way ratchet clutch. The pawl is arranged forward of the ratchet gear and biased to engage the ratchet between adjacent teeth. The well-known swept forward saw-tooth profile of the ratchet gear yields predictable results: allowing the ratchet gear to overrun in a first direction with rearward motion of the belt and providing a backstop in the opposite direction to prevent forward motion of the belt. (See ¶¶ 71, 82-83, 89-91.)

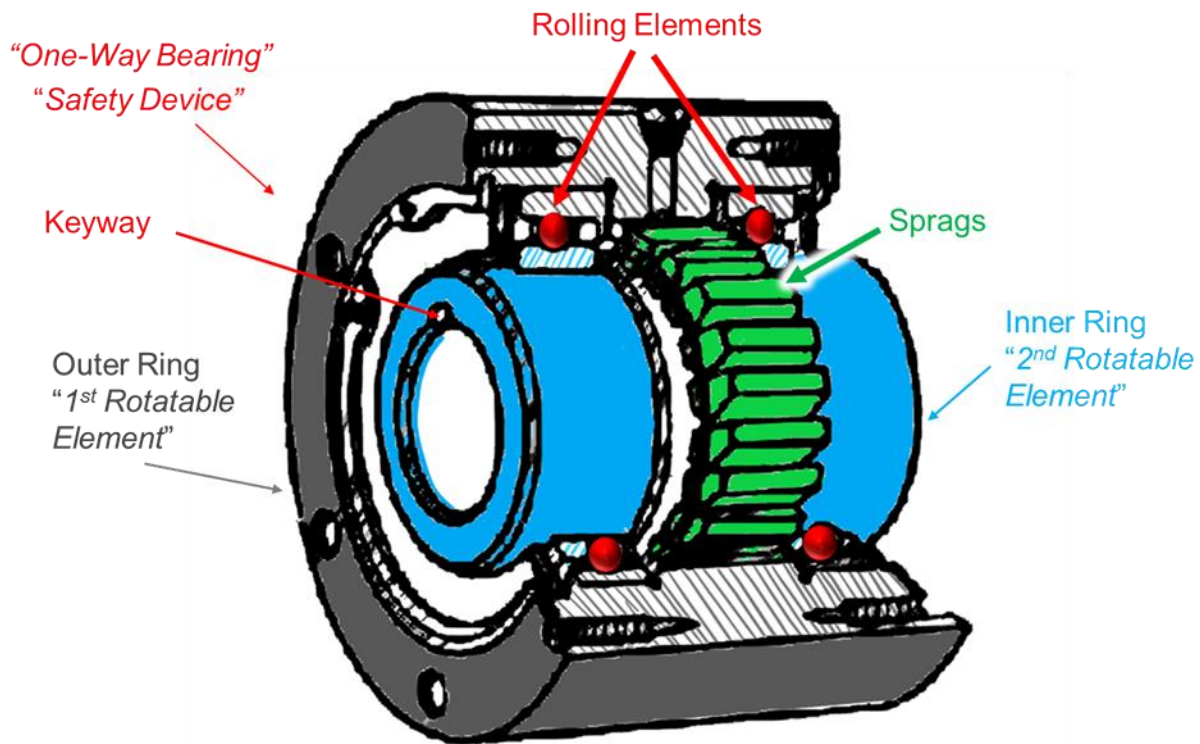
198. The modification also implements the use of a known technique—using a one-way clutch in a backstopping mode of operation—to improve similar devices, i.e., treadmills and conveyor belts, in the same way, i.e., to provide unidirectional belt motion. (See ¶¶ 89-91; Magid, Ex. 1012 at 4:48-54.)

***... [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.***

199. Magid does not expressly disclose that the control means (“safety device”) includes a third element to create “interference” with the ratchet gear 61 (“first rotatable element”) or the pawl 62 (“second rotatable element”).

200. Sclater discloses sprag-type one-way bearing assemblies that include sprags combined with rolling elements, such as cylindrical rollers or balls. “Sprags 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.” (Sclater, Ex. 1017 at 312.)

201. As illustrated in the image below, Sclater discloses that the sprag-type one-way bearing assembly includes an inner ring, an outer ring, and a plurality of sprags and rolling elements disposed between the inner ring and the outer ring.



**Sclater, Ex. 1017 at 318 (Annotated)**

202. Sclater discloses that the inner ring defines a center hole that is sized to receive a shaft and defines a keyway on the inner diameter. The keyway provides means for rotatably coupling the inner ring to a shaft via a key. The inner ring and/or the outer ring of a one-way bearing assembly rotate about a central axis; therefore both rings are “rotatable elements.”

203. Sclater further discloses that this sprag-type bearing assembly functions as a one-way bearing by providing “one-direction only torque transmission in an overrunning clutch.” (Ex. 1017 at 312.)

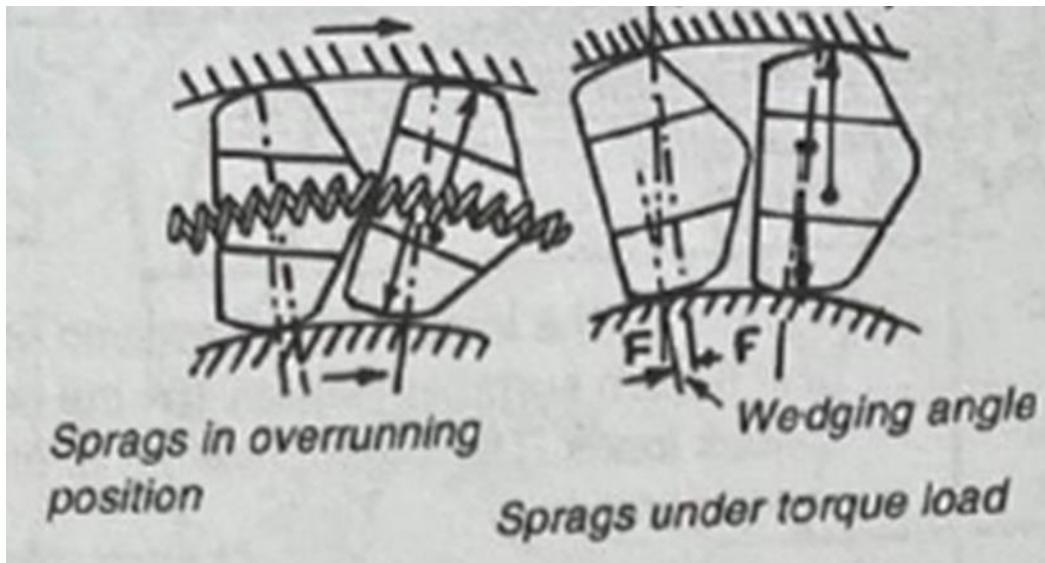
204. Sclater discloses that the sprags have a “sprag profile, which is

composed of two nonconcentric curves of different radius” that provide “a locking ramp.” (Sclater, Ex.1017 at 312.) Sclater further discloses that the:

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.

(Sclater, Ex.1017 at 318.)

205. The movable surface 1 (“*running belt*”) is coupled to the inner ring (“*second rotatable element*”) through the front shaft assembly or the rear shaft assembly. As illustrated in the figure below on the left, the movable surface 1 (“*running belt*”) and the inner ring (“*second rotatable element*”) rotate in a first direction relative to the outer ring (“*first rotatable element*”) to overrun. However, as illustrated in the figure below on the right, wedging or “*interference*” between the sprags and the inner and outer rings prevents rotation of the inner ring in an opposite direction, which prevents the movable surface 1 (“*running belt*”) from moving forward.



**Sclater, Ex. 1017 at 318**

206. Thus the combination of references teaches “*wherein the running belt [movable surface 1] and one of the first and second rotatable elements of the safety device [inner ring] freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device [outer ring], but interference between the safety device [sprags] and at least one of the first and second rotatable elements [inner and outer rings] substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.*”

**4. Rationale to Combine Schonenberger, Socwell, and Magid with Sclater**

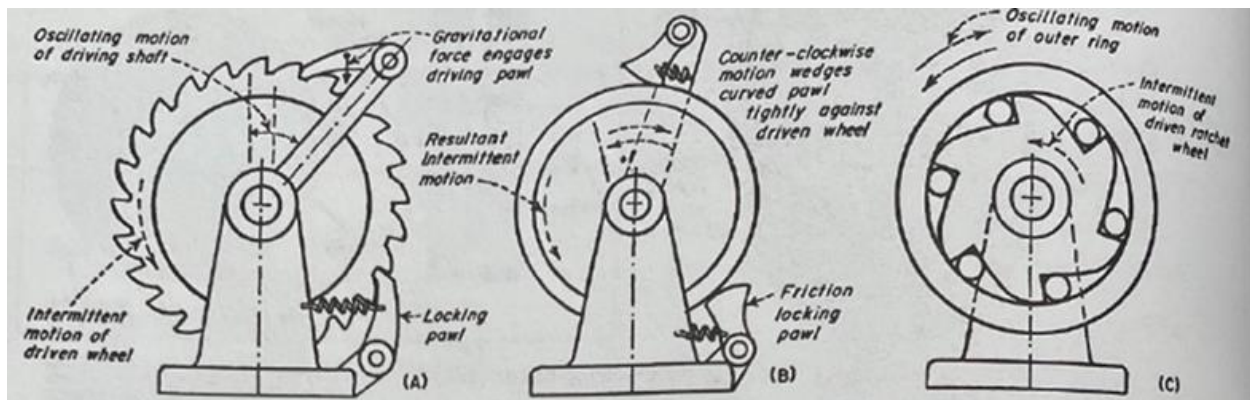
207. A POSA would have been motivated to substitute Sclater’s one-way sprag-type bearing assembly for Magid’s ratchet-and-pawl one-way clutch

mechanism to obtain predictable results, e.g., reduced noise and improved durability.

208. Ratchet and pawl clutch mechanisms make noise during operation. The pawl is spring-loaded to engage each gear tooth of the ratchet and it would make an audible “click” when colliding with the gear tooth root after overrunning or passing over each gear tooth. For example, a POSA would have been aware of this noise from other common ratchet clutches, such as those included in rear bicycle wheels, a ratchet wrench, and an automotive parking brake. Sclater acknowledges that a “friction-type clutch” is quieter than a ratchet type clutch:

Fig. 1 Elementary overriding clutches: (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.

(Sclater, Ex. 1017 at 316.)



**Sclater, Ex. 1017 at 316**

209. Sclater further discloses that roller clutches are better suited for high speed freewheeling than pawl-and-ratchet clutches. 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 wait for a gear tooth to engage. Additionally because there are multiple sprags, they distribute the load over a larger surface area:

Fig. 9 Cam and Roller Clutch: This over-running clutch is better suited for higher-speed free-wheeling than a pawl-and-ratchet clutch. The inner driving member has cam surfaces on its outer rim that hold light springs that force the rollers to wedge between the cam surfaces and the inner cylindrical face of the driven member. While driving, friction rather than springs force the rollers to wedge tightly between the members to provide positive clockwise drive. The springs ensure fast clutching action. If the driven member should begin to run ahead of the driver, friction will force the rollers out of their tightly wedged positions and the clutch will slip.

(Sclater, Ex. 1017 at 303.)

Overrunning sprag clutches transmit torque in one direction and reduce speed, rest, hold, or free-wheel in the reverse direction. Applications include overrunning, back stopping and indexing. Their selection – similar to other mechanical devices – requires a review of the torque to be transmitted, overrunning speed, type of lubrication, mounting characteristics, environmental conditions, and shock conditions that might be encountered.

(Sclater, Ex. 1017 at 320.)

210. Sclater further describes a backstopping mode of operation for a conveyor:

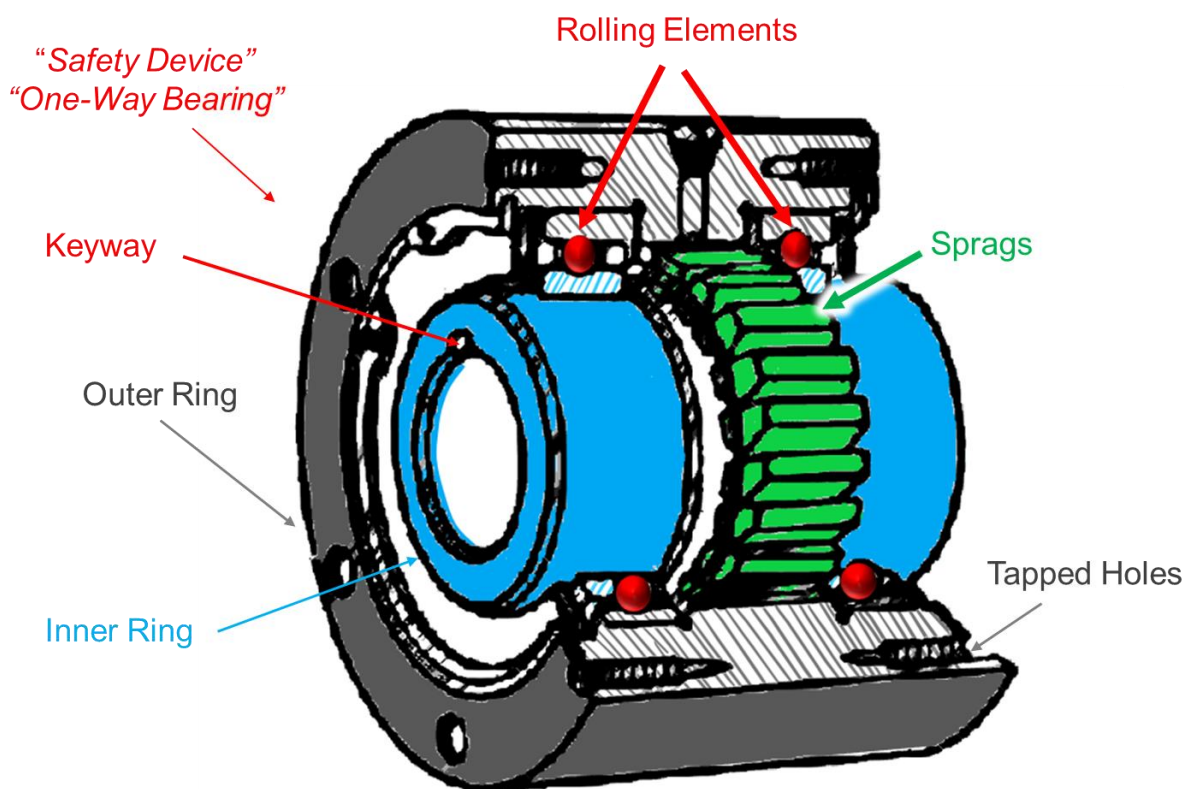
An example is a clutch mounted on the headshaft of a conveyor. The outer race is restrained by torque-arming the stationary frame of the conveyor.

(Sclater, Ex. 1017 at 320.)

211. A POSA would have considered a sprag-type one-way clutch bearing for an exercise equipment application, such as a treadmill. For example, Emerson is a bearing catalog from 2001 that describes its NSS Series sprag type one way clutch as an option for multiple “Field Applications,” including “Exercise Equipment,” “Food processing equipment,” “Printing presses,” and “Roll conveyors.” (Ex. 1018 at 52-53; Ex. 1003, ¶ 90.)

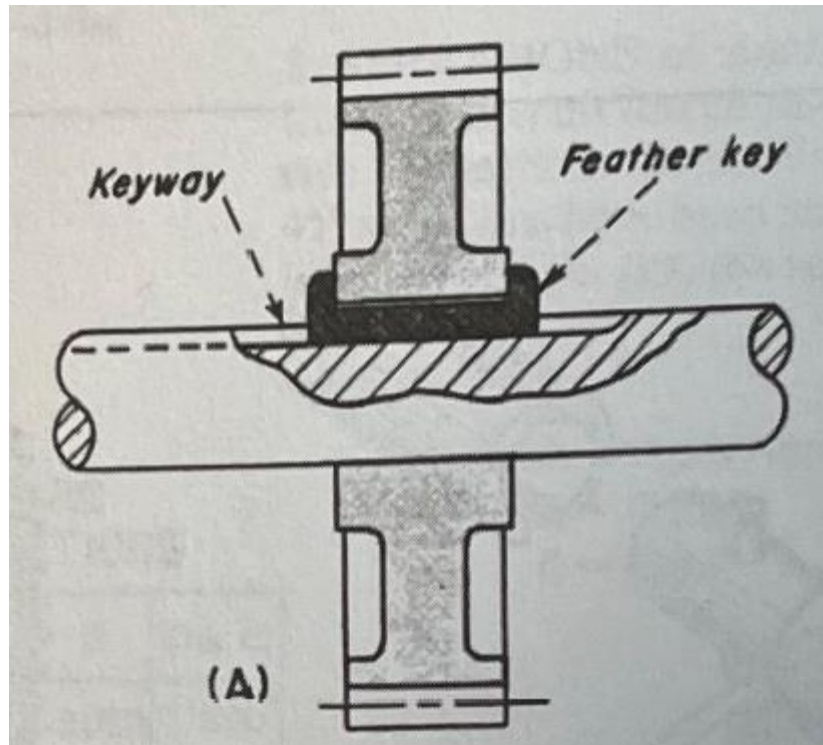
212. Accordingly, a POSA would have known how to replace Magid’s control means with Sclater’s one-way bearing assembly. For example, the outer ring

would be fixed to the frame either directly or through one or more intermediaries, e.g., a bracket, support structure, or torque arm. For example, Sclater illustrates below that the outer ring includes tapped holes for receiving fasteners for mounting the one-way bearing to a support structure, and Emerson describes examples of commercially available brackets or torque arms. (See Ex. 1018 at 38-43.).



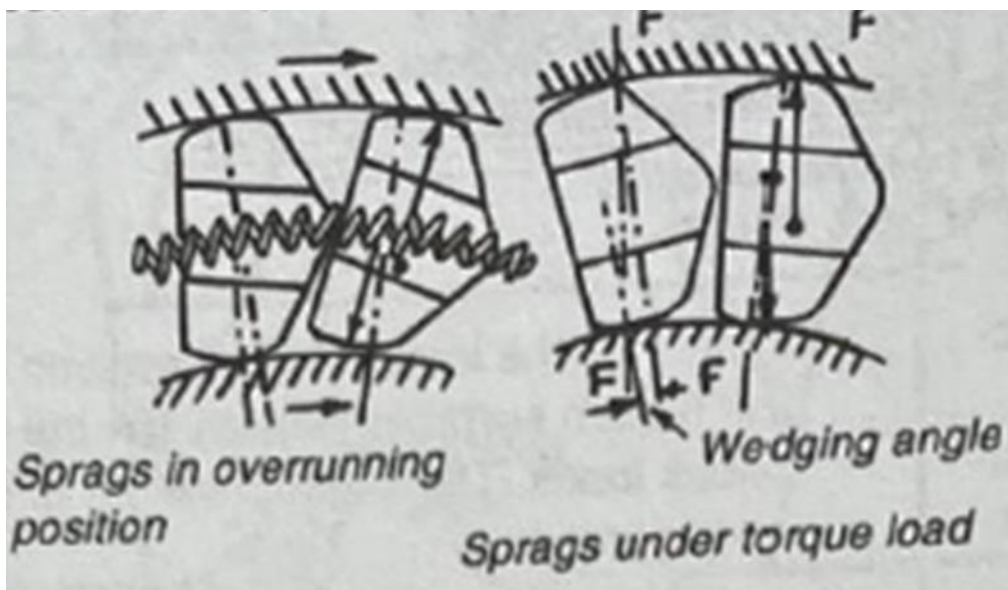
**Sclater, Ex. 1017 at 318 (Annotated)**

213. The inner ring of the one-way bearing would be secured to the front roller or rear roller, e.g., with a traditional key/keyway interface, such as that disclosed by Sclater:



**Sclater, Ex. 1017 at 420**

214. With this arrangement, rearward motion of the movable surface 1 would rotate the front/rear roller and inner ring in a first direction and the inner ring would overrun and move the sprags out of the locked position. However, forward motion of the movable surface 1 would rotate the inner ring in a second direction and wedge the sprags into the locked position to backstop and prevent forward motion of the movable surface.



**Sclater, Ex. 1017 at 318**

215. 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.

#### **5. Dependent Claims 31, 32, 33, 34**

216. Claims 31, 32, 33, and 34 depend directly or indirectly from claim 30, which I understand means that claims 31, 32, 33, and 34 require all of the limitations of claim 30 and the limitations of any intervening claims in addition to their additional limitations.

217. The combination of Schonenberger, Socwell, Magid, and Sclater teaches all of the limitations of claim 30 as described above. (See ¶¶ 143-215.)

***... [31.][a] The manually powered treadmill of claim 30, wherein the frame includes a left side member, a right side member, and at least one cross-member extending between the left side member and the right side member,***

218. Schonenberger discloses that the housing 2 (“*frame*”) “includes frame members . . . which provide for physical and structural support.” (Schoenenberger, Ex.1010, 4:10-17.) As illustrated in Figures 1 and 2 below, the housing 2 (“*frame*”) includes “*a left side member, a right side member, and at least one cross-member extending between the left side member and the right side member.*”

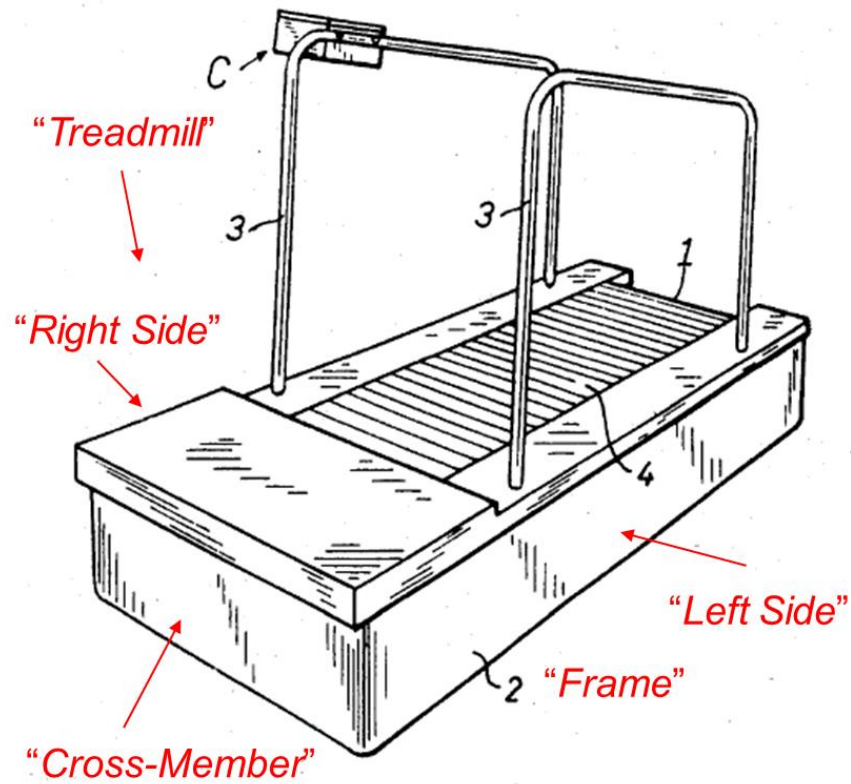
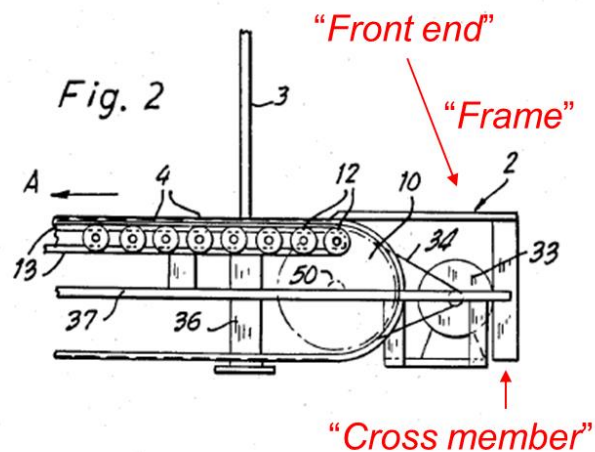


**Fig. 1**

Schonenberger, Ex. 1010, Fig. 1 (Annotated)



Schonenberger, Ex. 1010, Fig. 2 (Annotated)

... [31.][b] wherein the plurality of bearings includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame.

219. As illustrated below, Schonenberger discloses rollers 12, 12' ("a first plurality of bearings") that are coupled to the left side of the "frame" and rollers 12, 12' ("a second plurality of bearings") that are coupled to the right side of the "frame."

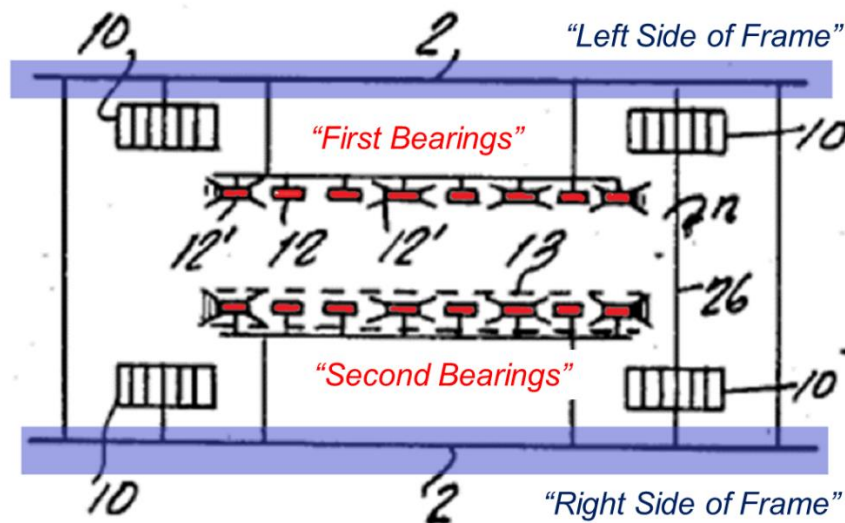


FIG. 19

Schonenberger, Ex.1010, Fig.19 (Annotated)

220. The rollers 12 may be mounted to brackets 19 that are in turn coupled to their respect left and right sides of the frame 2.

Rollers 12, 12', respectively are carried on shafts 21 secured to a bracket 19 which is attached to the sidewall 2 of the apparatus; a

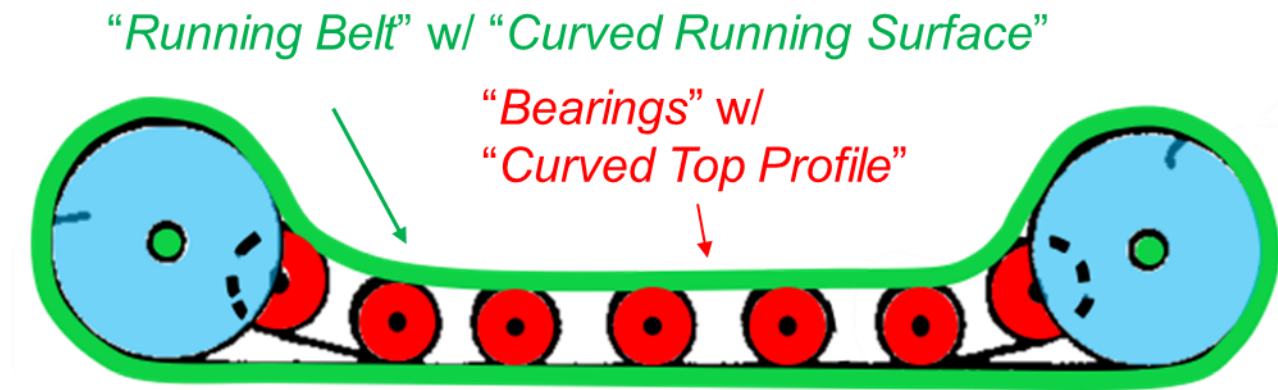
second arm 20' provides for lateral guidance of the bolt 21. The connections of the bracket elements to each other and to the sidewall, or to the **frame** of the apparatus, may be by welding, for example.”

(Schonenberger, Ex. 1010, 8:45-51.)

221. Thus, the combination of references teaches “*wherein the frame [housing 2] includes a left side member, a right side member, and at least one cross-member extending between the left side member and the right side member, wherein the plurality of bearings [rollers 12] includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame.*”

*... [32.] The manually powered treadmill of claim 31, wherein the first plurality of bearings and the second plurality of bearings each at least partially define a curved top profile, wherein the curved top profile substantially corresponds to at least a portion of the curved running surface.*

222. As discussed above with reference to claim 30, the rollers 12 of modified Schonenberger treadmill are arranged in a curved alignment to define a “*curved top profile.*” The movable surface 1 (“*running belt*”) follows the profile defined by the rollers 12 to provide the “*curved running surface.*”

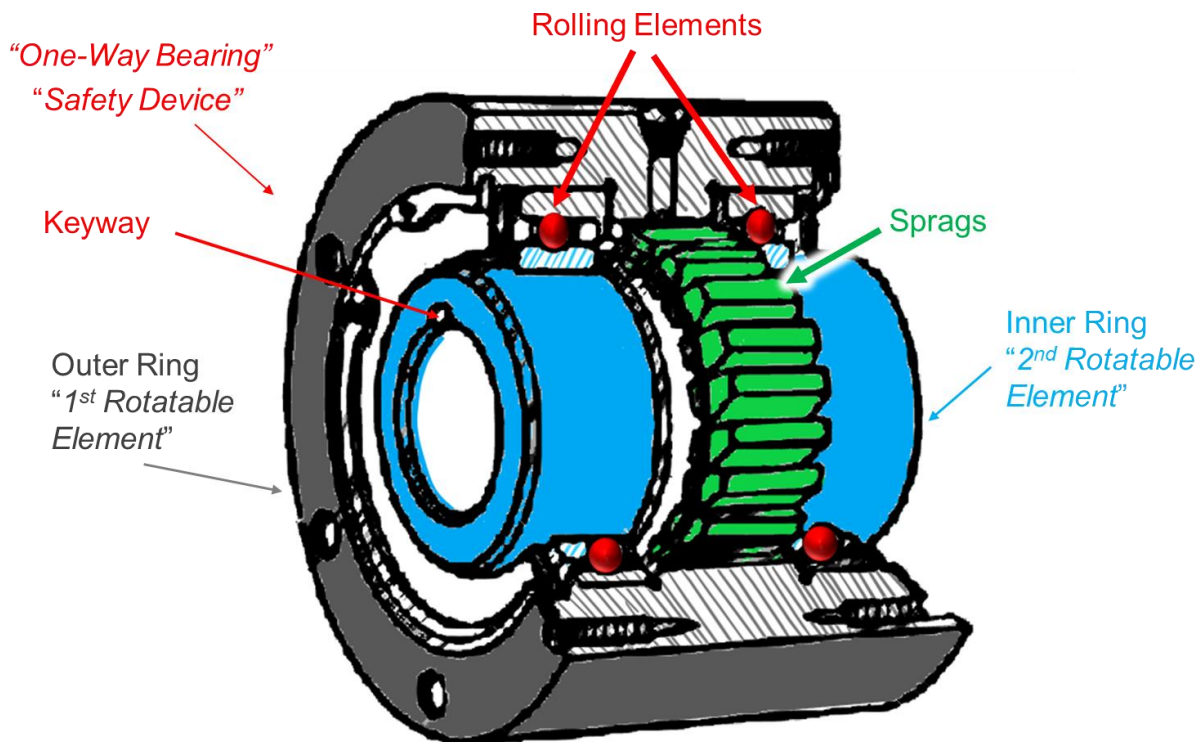


**Ex 1010, Fig. 12 (Modified and Annotated)**

223. Thus, the combination of references teaches “*the first plurality of bearings [rollers 12, 12’] and the second plurality of bearings [rollers 12, 12’] each at least partially define a curved top profile, wherein the curved top profile substantially corresponds to at least a portion of the curved running surface.*”

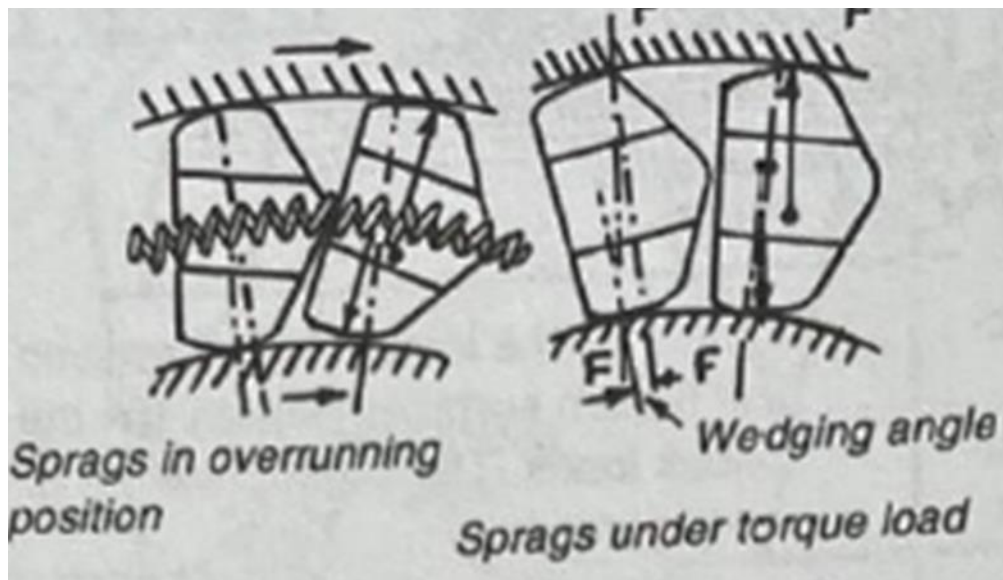
***... [33.] The manually powered treadmill of claim 30, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing.***

224. Sclater discloses a bearing assembly that includes sprags. “Sprags 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 at 312.) As illustrated below, Sclater discloses that the sprag-type one-way bearing assembly includes sprags that are disposed between an inner ring (“*second rotatable element*”) and an outer ring (“*first rotatable element*”).



**Ex. 1017 at 318 (Annotated)**

225. Sclater discloses that the sprags have a “sprag profile, which is composed of two nonconcentric curves of different radius” that provide “a locking ramp.” (Ex.1017 at 312.) Sclater further discloses that “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.) The bearing assembly is a “one-way bearing” due to the interaction of the sprags and the races (“rotatable elements”).



**Sclater, Ex. 1017 at 318**

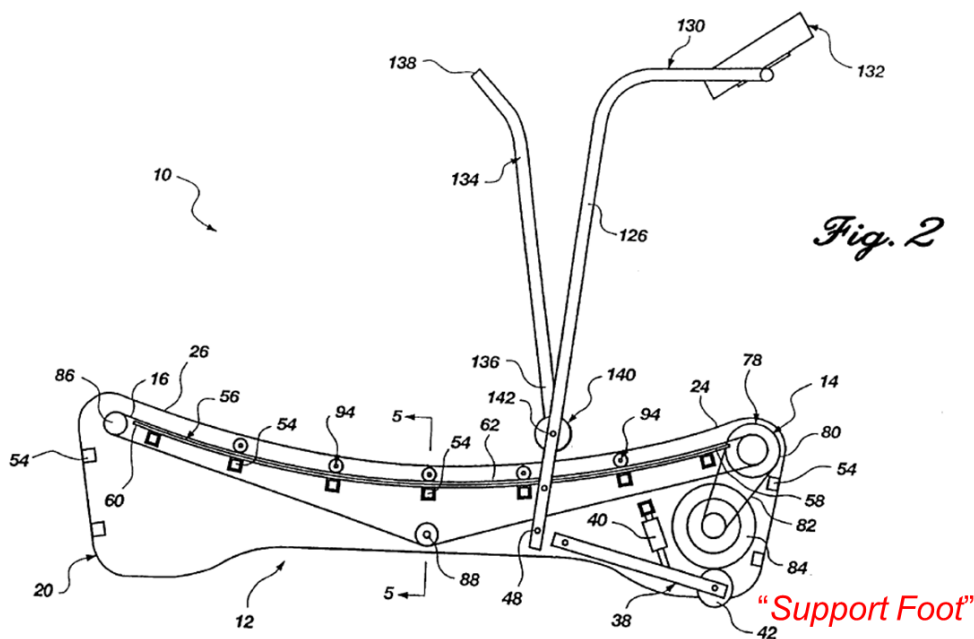
226. Thus, the combination of references teaches, “wherein the first and second rotatable elements [inner and outer rings] of the safety device at least partly form a one-way bearing.”

*... [34.] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.*

227. Schonenberger suggests adjusting the elevation of the treadmill, but does not disclose a mechanism for such adjustment. “This invention allows a runner to use the apparatus in a 5% elevation position without any external motor power.” (Schonenberger, Ex. 1010, 6:16-18.)

228. Socwell discloses foot roller assemblies 38 for adjusting the inclination

of the belt 16. (Socwell, Ex. 1011, 9:29-40.) Each foot roller assembly 38 has an elongate support member (unlabeled) having an upper end pivotally attached to the frame 12 and a lower end supporting a wheel 42 (“support feet”).



Socwell, Ex. 1011, Fig. 2 (Annotated)

In one presently preferred embodiment of the present invention, the **first side 20 of the support frame 12 may comprise at least one conventional foot roller assembly 38 mountably disposed in relation thereto, as best shown in FIG. 2. The 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. The foot roller assembly 38 may further comprise a force absorbing member 40 disposed in relation thereto which provides a means for absorbing any forces or shocks**

sustained while moving the present invention from one location to another.

(Socwell, Ex. 1011, 9:29-40.)

229. A first one of the foot roller assemblies 38 is attached to the first side 20 of the frame 12. (*Id.*) Another foot roller assembly is attached to the second side 22 of the frame 12.

As mentioned **above, the second opposing side 22 of the support frame 12 is correspondingly similar in dimensional structure and configuration to that of the first side 20.** Accordingly, the **components disposed on or in relation to the first side 20 of the support frame 12 are preferably disposed on or in relation to the second side 22.** The incorporation of substantially comparable sides 20, 22 of the support frame 12 comprises one presently preferred embodiment . . . Accordingly, the utilization of a support frame having correspondingly similar sides is thus by way of illustration only and not by way of limitation.

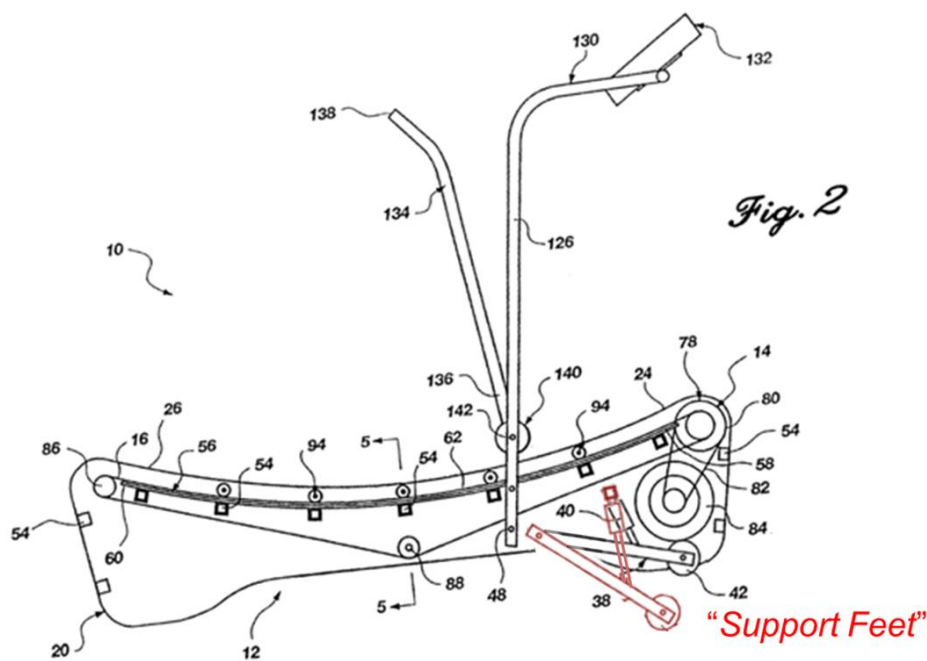
(Socwell, Ex. 1011, 9:57-10:4.)

230. Each foot roller assembly 38 has a wheel 42 resting on the ground surface and supporting the front end of the treadmill 10; thus, they are support feet. Each support foot is pivotally connected to their respective frame side 20, 22 using element 40 as a liner actuator to vertically adjust the support foot and adjust the incline of the treadmill relative 10 to the ground surface.

The force absorbing member 40 may also include a 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. In this regard, the force absorbing member 40 may comprise a gas or oil filled shock or, in the alternative, an electric gear motor having a locking shaft which elevates the front end 24 of the support frame 12.

(Socwell, Ex. 1011, 9:44-51.)

231. The incline of the belt 16 is increased by pivoting the wheel 42 away from the frame. The incline of the belt 16 is increased by pivoting the wheel 42 towards the frame.



Socwell, Ex. 1011, Fig. 2 (Annotated)

232. A POSA would have known that with a manual treadmill, the incline

of the running surface combined with gravity affects the user's pace or speed. For example, Chickering discloses that:

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, or by elevating the forward end of the base 10 with jackscrews 11, or both. A slower pace is attained by reversing these operations.

(Chickering, Ex. 1013, 2:44-49.)

233. Accordingly, a POSA would have been motivated to further modify Schonenberger to include Socwell's foot roller assemblies 38 for adjusting the inclination of movable surface 1. Such a modification would involve simply coupling the foot roller assemblies 38 to the bottom of the frame.

234. Thus, the combination of references teaches *“at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.”*

## **6. Independent Claim 37**

235. Independent claim 37 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 37. Claim 37 is “marked up” to show the minor differences.

| '884 Patent Claim 30                                                                                                                              | '884 Patent Claim 37                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                                                                                  | [37.0] A manually powered treadmill, comprising:                                                                                                                                                   |
| [30.1] a frame having a front end and a rear end positioned opposite the front end;                                                               | [37.1] a frame;                                                                                                                                                                                    |
| [30.2] a front shaft coupled to the frame proximate the front end;                                                                                | [37.4] a front shaft <b>assembly</b> coupled to the frame;                                                                                                                                         |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                                                                                  | [37.5] a rear shaft <b>assembly</b> coupled to the frame;                                                                                                                                          |
| [30.4] a plurality of bearings coupled to the frame;                                                                                              | [37.2] a <b>first</b> plurality of bearings coupled to the frame;<br>[37.3] a <b>second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings;</b> |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and | [37.6] a running belt at least partially supported by the <b>first</b> plurality of bearings <b>and the second plurality of bearings, the running belt being at least</b>                          |

|                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                      | partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved; and                                                                                                                                                                                                                           |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                 | [37.7] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                 |
| [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements | [37.8] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate relative to the other of the one of the first and second rotatable elements of the safety device in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

236. As illustrated above, limitations [37.0]-[37.8] are substantially similar to corresponding limitations of claim 30. The main difference being claim 37 claims front and rear shaft assemblies, where claim 30 claims the front and rear shafts.

... **[37.0] A manually powered treadmill, comprising:**

237. Claim limitation [37.0] is identical to limitation [30.0]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 143-145.)

... **[37.1] a frame;**

238. Claim limitation [37.1] is recited in limitation [30.1]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is

met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 146-148.)

... [37.2] *a first plurality of bearings coupled to the frame;*

... [37.3] *a second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings;*

239. As illustrated below, Schonenberger discloses rollers 12, 12' ("a first plurality of bearings") that are coupled to the left side of the "frame" and rollers 12, 12' ("a second plurality of bearings") that are coupled to the right side of the "frame." As shown below, the "second plurality of bearings" are "spaced a distance from the first plurality of bearings."

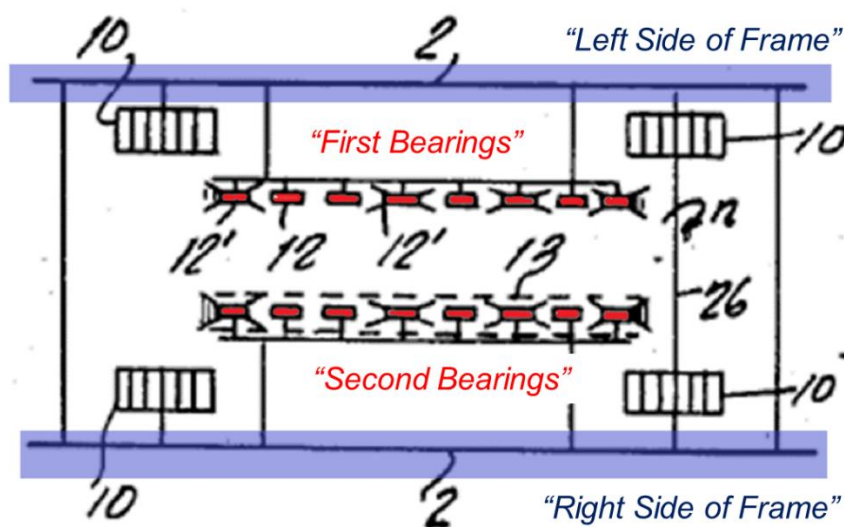


**FIG. 19**

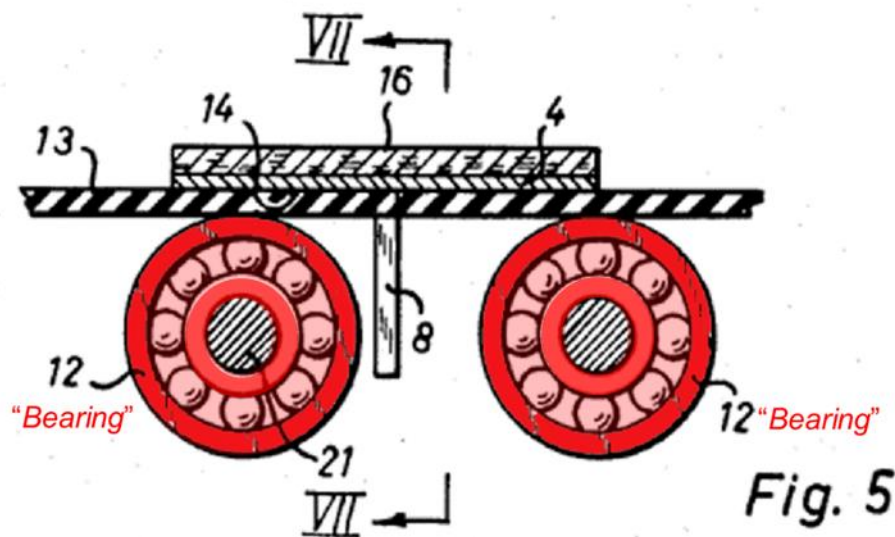
**Schonenberger, Ex. 1010, Fig. 19 (Annotated)**

240. The rollers 12 are journaled by bearings:

The support **rollers 12, 12'** are journaled by means of **low-friction bearings, for example needle bearings or ball bearings** (FIG. 5) although sleeve bearings operating with low friction with respectable 21 may also be used.

(Schonenberger, Ex. 1010, 5:47-51.)

241. Figure 5, reproduced below, shows a conventional ball-bearing construction with each roller 12 having an inner race received on the shafts 21, an outer race supporting the movable surface (slats 4), and ball bearings radially interposed between the inner and outer races.

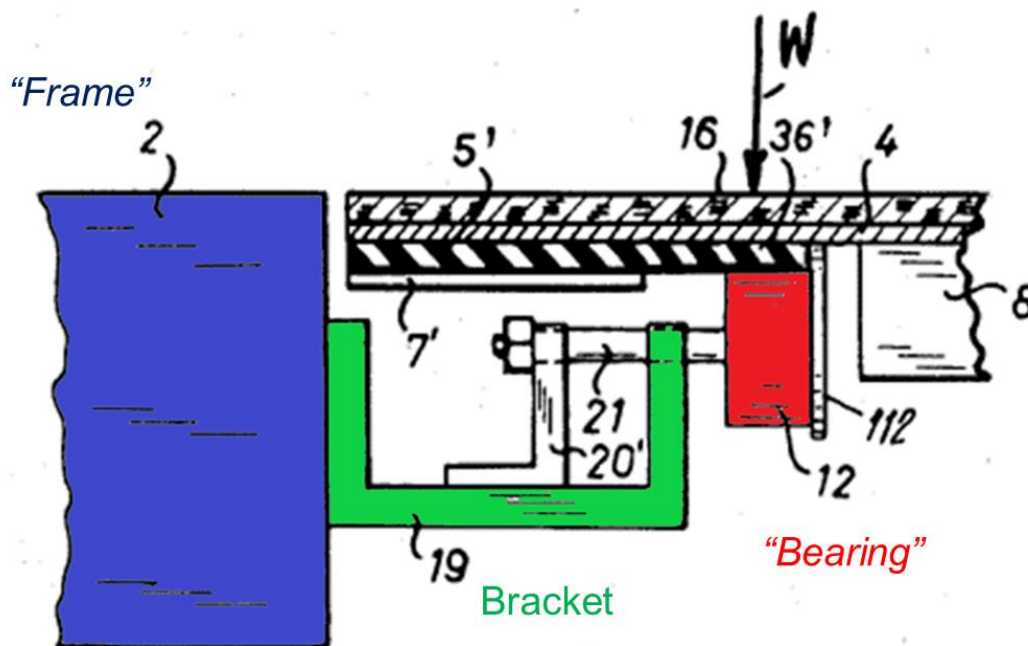


**Schonenberger, Ex. 1010, Fig. 5 (Annotated)**

242. Schonenberger discloses rollers 12, 12' ("*plurality of bearings*") that are "*coupled to the frame*" by a bracket 19:

**Rollers 12, 12'**, respectively are **carried on shafts 21 secured to a bracket 19 which is attached to the sidewall 2 of the apparatus;** a second arm 20' provides for lateral guidance of the bolt 21. The connections of the bracket elements to each other and to the sidewall, or to the **frame** of the apparatus, may be by welding, for example."

(Schonenberger, Ex.1010, 8:45-51.)



Ex.1010, Fig. 10 (Annotated)

243. Thus, Schonenberger discloses "a first plurality of bearings coupled to the frame; a second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings."

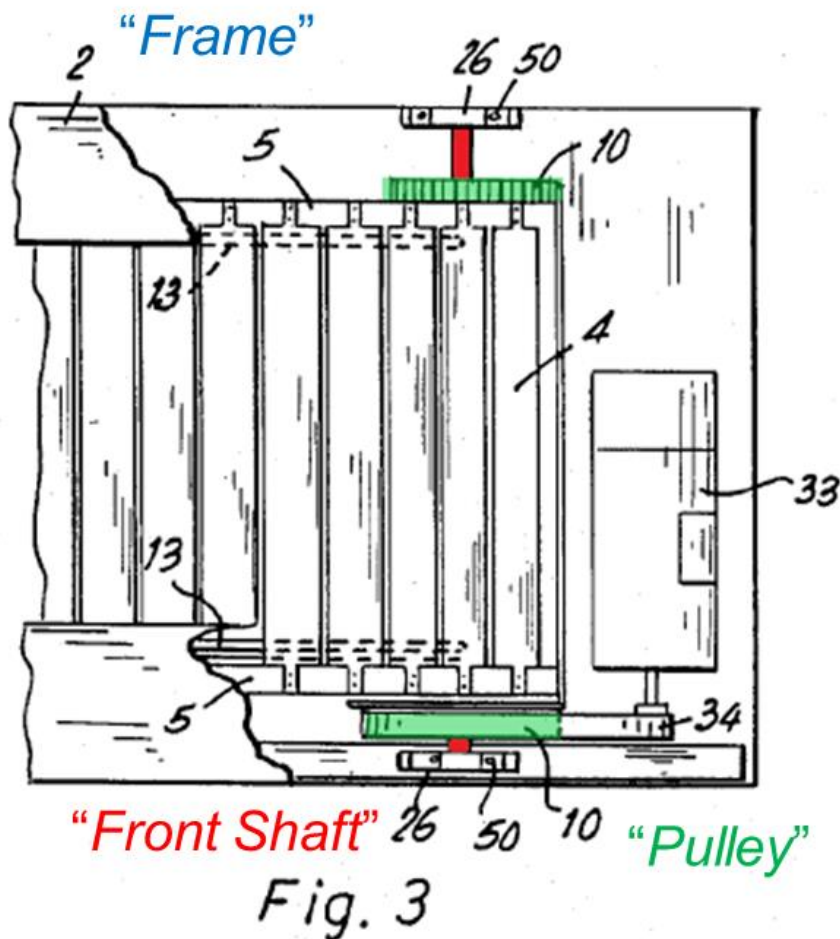
... [37.4] a front shaft assembly coupled to the frame;

244. Schonenberger discloses a "front shaft assembly" having a transverse shaft 26 ("front shaft") and a pair of "pulleys" 10 fixed thereon that are journaled

(“*coupled*”) to the housing 2 (“*frame*”):

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 **are located rotatable drums, rollers, sheaves, sprockets, or the like**, about which the surface 1, which is an endless loop, is placed. The **rotatable elements**, **preferably in the form of two operating drums or rollers 10**, are suitably journalled in the frame as seen at 50, FIG. 3. If two sheaves or pulleys are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by **a transverse shaft 26** (FIG. 8).

(Schonenberger, Ex. 1010, 4:10-23.)

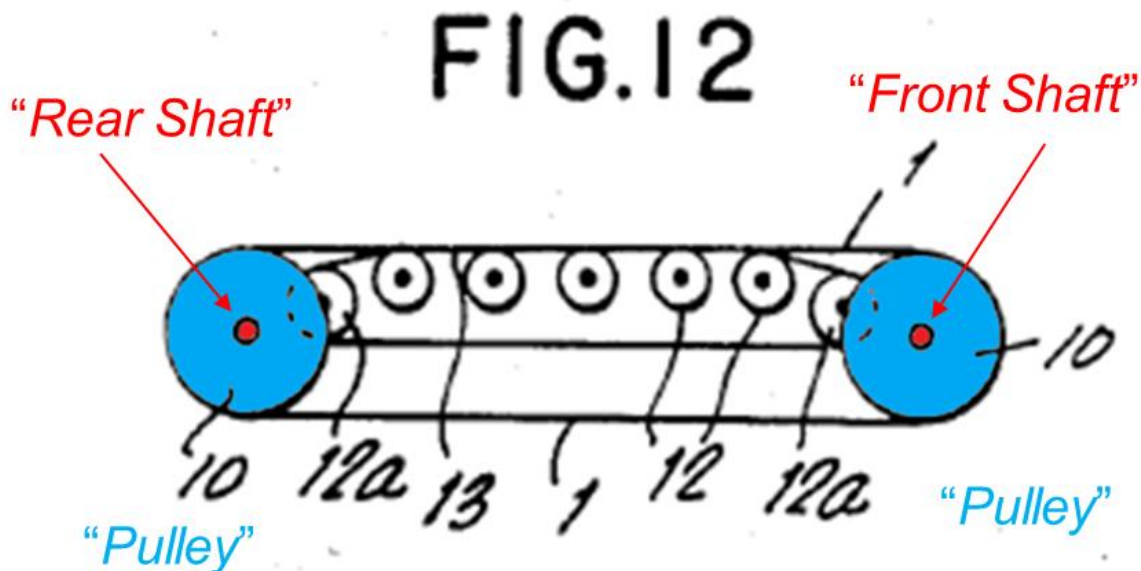


Schonenberger, Ex. 1010, Fig. 3 (Annotated)

245. Thus, Schonenberger discloses “a front shaft assembly [pulley 10 and shaft 26] coupled to the frame.”

... [37.5] a rear shaft assembly coupled to the frame;

246. Schonenberger discloses that the transverse shaft 26 and pulleys 10 are located “at either end of the apparatus.” (Schonenberger, Ex. 1010, 4:14-23.)



Schonenberger, Ex. 1010, Fig. 12 (Annotated)

247. Therefore, Schonenberger discloses *"a rear shaft assembly [having a rear shaft 26 and a pair of pulleys 10 fixed thereon] coupled to the frame [housing 2]."*

*... [37.6] a running belt at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved; and*

248. Claim limitation [37.6] is substantially similar to limitation [30.5]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 159-167.)

***... [37.7] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

249. Claim limitations [37.7] is substantially similar to limitation [30.6].

Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 180-186.)

***... [37.8] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate relative to the other of the one of the first and second rotatable elements of the safety device in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.***

250. Claim limitations [37.8] is substantially similar to limitation [30.7].

Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 199-206.)

## **7. Dependent claims 38-43 and 45-49**

... ***[38.] The manually powered treadmill of claim 37, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing.***

251. Claim 38 is largely duplicative of claim 33. To illustrate, the table below shows a side-by-side comparison of claims 33 and 38. Claim 38 is “marked up” to show the minor differences.

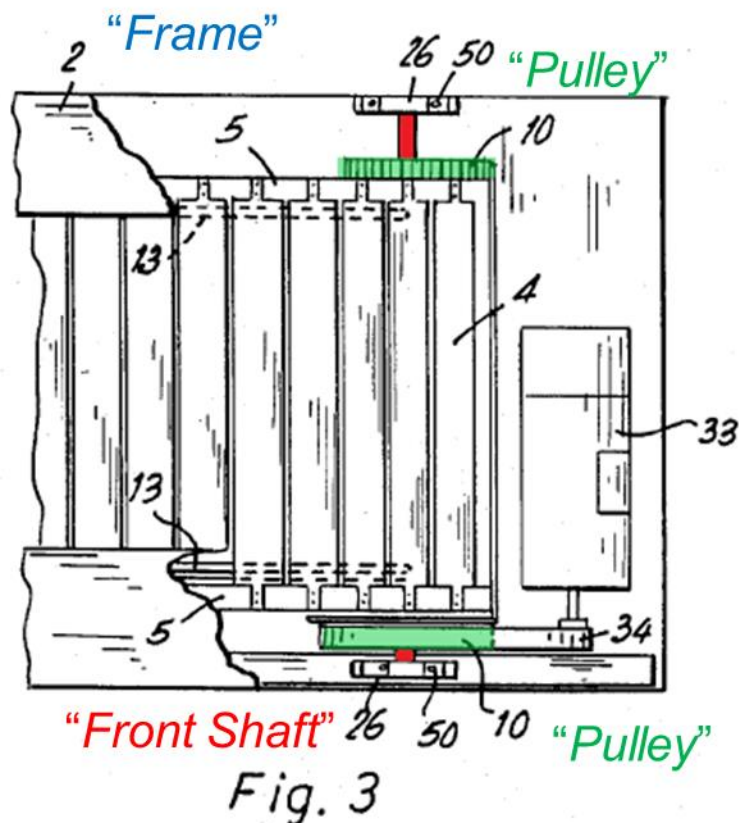
| <b>‘884 Patent Claim 33</b>                                                                                                                                    | <b>‘884 Patent Claim 38</b>                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [33.] The manually powered treadmill of claim 30, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing. | [38.] The manually powered treadmill of claim <b>37</b> , wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing. |

252. Because the additional limitations of claim 38 are identical to the additional limitations of claim 33, I refer back to my analysis of these limitations of claim 33 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 225-226.)

... ***[39.] The manually powered treadmill of claim 37, wherein the front shaft assembly comprises a front shaft coupled to frame.***

253. As discussed above in [37.4], Schonenberger discloses a “front shaft assembly” having a transverse shaft 26 (“front shaft”) and a pair of “pulleys” 10 fixed thereon that are journalled (“coupled”) to the housing 2 (“frame”).

(Schonenberger, Ex. 1010, 4:10-24.)



Schonenberger, Ex. 1010, Fig. 3 (Annotated)

254. Thus, Schonenberger discloses, “wherein the front shaft assembly comprises a front shaft [transverse shaft 26] coupled to frame.”

... [40.] *The manually powered treadmill of claim 39, wherein the front shaft assembly comprises at least one front running belt pulley coupled to the front shaft.*

255. As discussed above in claim [37.4], Schonenberger discloses a “front shaft assembly” having a transverse shaft 26 (“front shaft”) and a pair of “pulleys” 10 fixed thereon that are journaled (“coupled”) to the housing 2 (“frame”):

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 **are located rotatable drums, rollers, sheaves, sprockets, or the like**, about which the surface 1, which is an endless loop, is placed. The **rotatable elements, preferably in the form of two operating drums or rollers 10**, are suitably journalled in the frame as seen at 50, FIG. 3. If two sheaves or pulleys are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by **a transverse shaft 26** (FIG. 8).

(Schonenberger, Ex. 1010, 4:10-23.)

256. Therefore, Schonenberger discloses, “*wherein the front shaft assembly [shaft 26 and pulley 10] comprises at least one front running belt pulley [10] coupled to the front shaft [26].*”

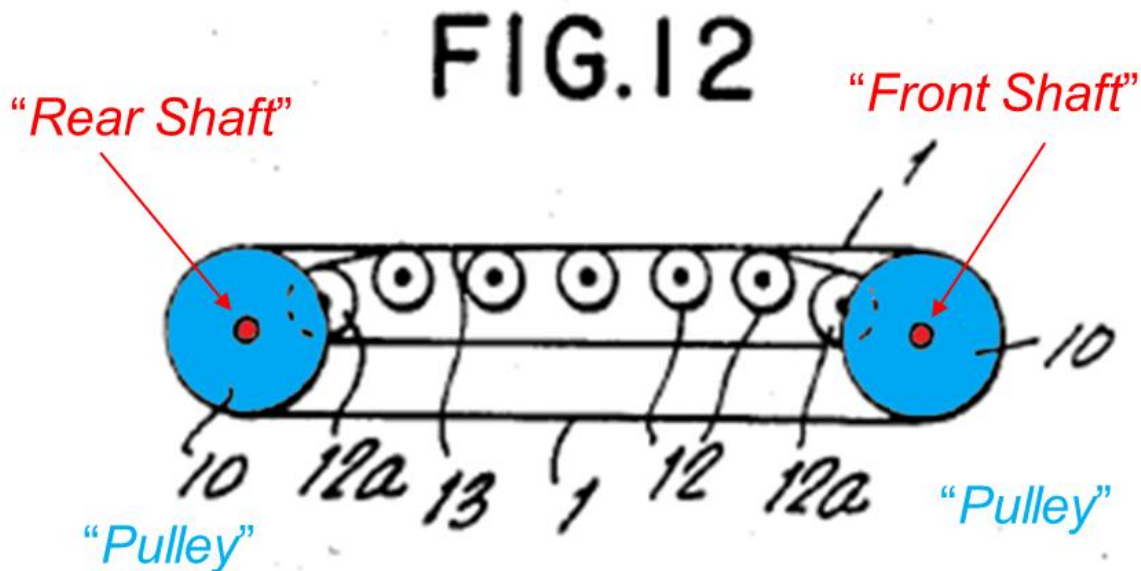
***... [41.] The manually powered treadmill of claim 37, wherein the rear shaft assembly comprises a rear shaft coupled to the frame.***

257. Schonenberger discloses a “*shaft assembly*” that includes two “*pulleys*” that are connected by a transverse “*shaft*” 26 and journalled (“*coupled*”) to the “*frame*” at “*either end of the apparatus.*”

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 are located rotatable drums, rollers, sheaves, sprockets, or the like, about which the surface 1, which is an endless loop, is placed. The rotatable elements, preferably in the form of two operating drums or rollers 10, are suitably **journalled in the frame** as seen at 50, FIG. 3. If two sheaves or **pulleys** are provided at either end of the apparatus, one

will be located at either side thereof, suitably journaled and, connected by a **transverse shaft 26** (FIG. 8).

(Schonenberger, Ex.1010, 4:10-23.)



Ex.1010, Fig.12 (Annotated)

258. Thus the combination of references teaches “*the rear shaft assembly comprises a rear shaft [transverse shaft 26] coupled to the frame.*”

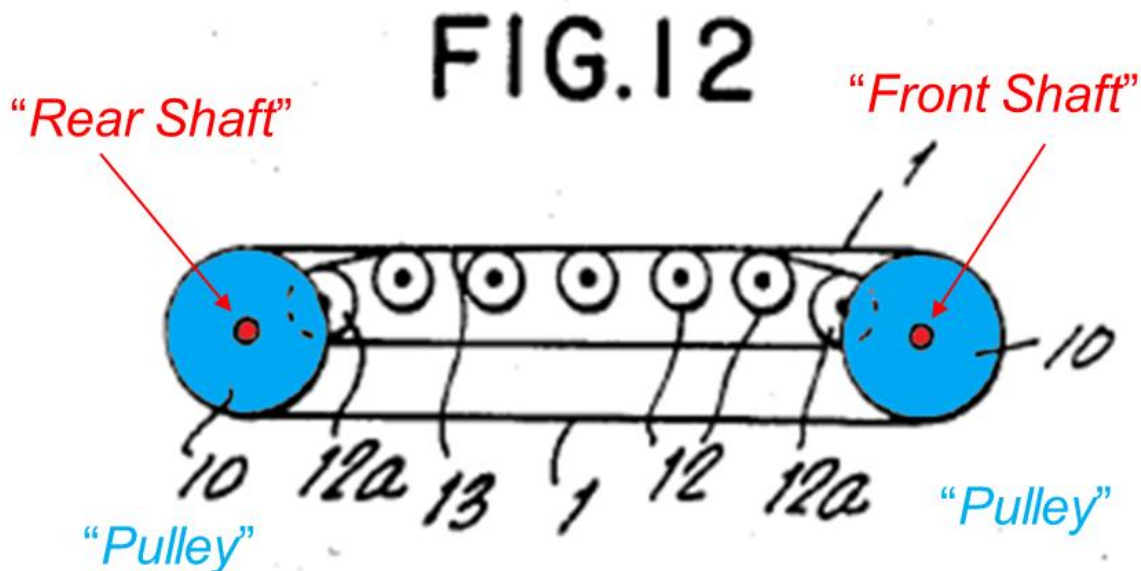
... [42.] *The manually powered treadmill of claim 41, wherein the rear shaft assembly comprises at least one rear running belt pulley coupled to the rear shaft.*

259. Schonenberger discloses a “*shaft assembly*” that includes two “*pulleys*” that are connected by a transverse “*shaft*” 26 and journaled (“*coupled*”) to the “*frame*” at “*either end of the apparatus.*”

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 are located rotatable drums, rollers, sheaves, sprockets, or the like, about which the surface 1, which is an endless loop, is placed. The

rotatable elements, preferably in the form of two operating drums or rollers 10, are suitably **journalled** in the frame as seen at 50, FIG. 3. If two sheaves or **pulleys** are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by a **transverse shaft 26** (FIG. 8).

(Schonenberger, Ex.1010, 4:10-23.)



Ex.1010, Fig.12 (Annotated)

260. Thus the combination of references teaches “*wherein the rear shaft assembly comprises at least one rear running belt pulley [10] coupled to the rear shaft [26].*”

... [43.] *The manually powered treadmill of claim 37, wherein the rear shaft assembly comprises at least one rear running belt pulley and the front shaft assembly comprises at least one front running belt pulley.*

261. As I discussed above in claim [42.], Schonenberger discloses the rear

shaft assembly comprises at least one rear running belt pulley. (See ¶¶ 259-260.) As I discussed above in claim [40.], Schonenberger discloses the front shaft assembly comprises at least one front running belt pulley. (See ¶¶ 255-256.)

262. Thus, the combination of references teaches “*wherein the rear shaft assembly comprises at least one rear running belt pulley and the front shaft assembly comprises at least one front running belt pulley.*”

*... [45.] The manually powered treadmill of claim 37, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.*

263. Claim 45 is largely duplicative of claim 34. To illustrate, the table below shows a side-by-side comparison of claims 34 and 45. Claim 45 is “marked up” to show the minor differences.

| ‘884 Patent Claim 34                                                                                                                                                                                | ‘884 Patent Claim 45                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [34.] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of | [45.] The manually powered treadmill of claim 37, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of |

|                                                                                                                                                           |                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. | the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|

264. Because the additional limitations of claim 45 are identical to the additional limitations of claim 34, I refer back to my analysis of these limitations of claim 34 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 227-234.)

*... [46.] The manually powered treadmill of claim 37, wherein the running belt is at least partially supported by the first plurality of bearings and the second plurality of bearings.*

265. Claim 46 repeats limitations already claimed in [37.6] of the independent claim. To illustrate, the table below shows a side-by-side comparison:

| <b>‘884 Patent Claim 37.6</b>                                                                                                                               | <b>‘884 Patent Claim 46</b>                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| [37.6] a running belt at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least | [46.] The manually powered treadmill of claim 37, wherein the running belt is at least partially supported by the first plurality of |

|                                                                                                                                       |                                                |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved | bearings and the second plurality of bearings. |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|

266. Because the additional limitations of claim 46 are identical to the limitations of claim [37.6], I refer back to my analysis of these limitations of claim 37 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶ 248.)

*... [47.] The manually powered treadmill of claim 46, wherein each of the first and second pluralities of bearings define a curved top profile and wherein the curved top profile substantially corresponds to at least a portion of the curved portion of the running surface.*

267. Claim 47 is largely duplicative of claim 32. To illustrate, the table below shows a side-by-side comparison of claims 32 and 47. Claim 47 is “marked up” to show the minor differences.

| <b>‘884 Patent Claim 32</b>                                            | <b>‘884 Patent Claim 47</b>                                          |
|------------------------------------------------------------------------|----------------------------------------------------------------------|
| [32.][a] The manually powered treadmill of claim 31, wherein the first | [47.][a] The manually powered treadmill of claim 46, wherein each of |

|                                                                                                                   |                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| plurality of bearings and the second plurality of bearings each at least partially define a curved top profile,   | the first and second pluralities of bearings define a curved top profile and                                                     |
| [b] wherein the curved top profile substantially corresponds to at least a portion of the curved running surface. | [b] wherein the curved top profile substantially corresponds to at least a portion of the curved portion of the running surface. |

268. Because the additional limitations of claim [47.][a] are substantially similar to the additional limitations of claim 32, I refer back to my analysis of these limitations of claim 32 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 222-223.)

*... [48.] The manually powered treadmill of claim 37, wherein the frame includes a left side member, a right side member spaced a distance from the left side member, and at least one cross-member extending between the left side member and the right side member.*

*... [49.] The manually powered treadmill of claim 48, wherein the first plurality of bearings are coupled the left side member and the second plurality of bearings are coupled to the right side member.*

269. Claims 48 and 49 combined are largely duplicative of claim 31. To

illustrate, the table below shows a side-by-side comparison of claims 31, 48 and 49.

Claims 48 and 49 are “marked up” to show the minor differences.

| ‘884 Patent Claim 31                                                                                                                                                                                                     | ‘884 Patent Claims 48 and 49                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [31.][a] The manually powered treadmill of claim 30, wherein the frame includes a left side member, a right side member, and at least one cross-member extending between the left side member and the right side member, | [48.] The manually powered treadmill of claim 37, wherein the frame includes a left side member, a right side member spaced a distance from the left side member, and at least one cross-member extending between the left side member and the right side member. |
| [31][b] wherein the plurality of bearings includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame.                            | [49.] The manually powered treadmill of claim 48, wherein the first plurality of bearings are coupled the left side member and the second plurality of bearings are coupled to the right side member.                                                             |

270. Because the additional limitations of claims 48 and 49 are substantially similar to the additional limitations of claim 31, I refer back to my analysis of these limitations of claim 31 to establish that they are met by the combination of

Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 218-221.) While not explicitly discussed in my previous analysis, the left and right sides of the housing 2 are spaced apart from each other. (Schonenberger, Ex. 1010, Figs. 1, 3, 10, and 19.)

## 8. Independent Claim 50

271. Independent claim 50 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 50. Claim 50 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 50                                                                                                                                    |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [50.0] A manually powered treadmill, comprising:                                                                                                        |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [50.1] a frame;                                                                                                                                         |
| [30.2] a front shaft coupled to the frame proximate the front end;                  | [50.2] at least one front <b>running belt pulley</b> coupled to the frame;                                                                              |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                    | [50.3] at least one rear <b>running belt pulley</b> coupled to the frame and <b>spaced a distance from the at least one front running belt pulley</b> ; |
| [30.4] a plurality of bearings coupled to                                           | [50.4] a plurality of bearings coupled to                                                                                                               |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| the frame;                                                                                                                                                                                                                                                           | the frame;                                                                                                                                                                                                                                                                                                                |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                    | [50.5] a running belt at least partially supported by the plurality of bearings and at least partially supported by at least one of the at least one front running belt pulley and the at least one rear running belt pulley, wherein the running belt includes a running surface, at least a portion of which is curved; |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; | [50.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                      |
| [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation                                                                                                               | [50.7] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate in a first direction of rotation relative to                                                                                                                                                        |

|                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| relative to the other of the first and second rotatable elements of the safety device, but                                                                                                                                                                                                                                                                              | the frame, however, in a second direction of rotation, opposite the first direction of rotation,                                                                                                                                                                               |
| interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the one of the first and second rotatable elements of the safety device and the running belt relative to the frame. |

272. As illustrated above, limitations [50.0]-[50.7] are substantially similar to corresponding limitations of claim 30. The main difference being claim 50 claims front and rear running belt pulleys, where claim 30 claims the front and rear shafts.

... [50.0] *A manually powered treadmill, comprising:*

273. Claim limitation [50.0] is identical to limitation [30.0]. Therefore, I

refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Magid, and Sclater. (See ¶¶ 143-215.)

... [50.1] ***a frame;***

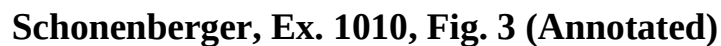
274. Because Claim limitation [50.1] is recited in limitation [30.1] of claim 30, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Magid, and Sclater. (See ¶¶ 146-148.)

... [50.2] ***at least one front running belt pulley coupled to the frame;***

275. Schonenberger discloses a “*front shaft assembly*” having a transverse shaft 26 (“*front shaft*”) and a pair of “*pulleys*” 10 fixed thereon that are journalled (“*coupled*”) to the housing 2 (“*frame*”):

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 **are located rotatable drums, rollers, sheaves, sprockets, or the like**, about which the surface 1, which is an endless loop, is placed. The **rotatable elements, preferably in the form of two operating drums or rollers 10**, are suitably journalled in the frame as seen at 50, FIG. 3. If two sheaves or pulleys are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by **a transverse shaft 26** (FIG. 8).

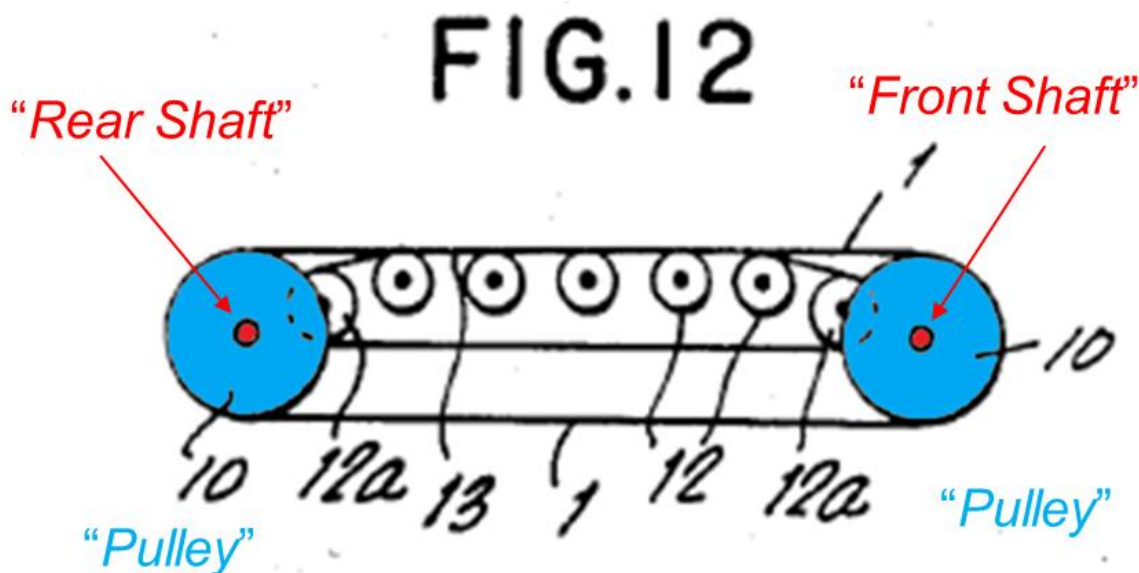
(Schronenberger, Ex. 1010, 4:10-23.)



... [50.3] at least one rear running belt pulley coupled to the frame and spaced a distance from the at least one front running belt pulley;

277. Schonenberger discloses that the transverse shaft 26 and “*pulleys*” 10 are located “at either end of the apparatus.” (Schoenberger, Ex. 1010, 4:14-23.) As illustrated in Figure 12 below, the rear “*pulley*” is “*spaced a distance from the at*

*least one front running belt pulley.”*



**Schonenberger, Ex. 1010, Fig. 12 (Annotated)**

278. Therefore, Schonenberger discloses *“at least one rear running belt pulley [10] coupled to the frame [housing 2] and spaced a distance from the at least one front running belt pulley [10].”*

*... [50.4] a plurality of bearings coupled to the frame;*

279. Because Claim limitation [50.4] is identical to limitation [30.4] of claim 30, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 154-158.)

**... [50.5] a running belt at least partially supported by the plurality of bearings and at least partially supported by at least one of the at least one front running belt pulley and the at least one rear running belt pulley, wherein the running belt includes a running surface, at least a portion of which is curved;**

280. Claim limitation [50.5] is substantially similar to limitation [30.5]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 159-167.)

**... [50.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;**

281. Because Claim limitation [50.6] is substantially similar to limitation [30.6] of claim 30, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 180-186.)

*... [50.7] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the one of the first and second rotatable elements of the safety device and the running belt relative to the frame.*

282. Claim limitations [50.7] is substantially similar to limitation [30.7]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 199-206.)

#### **9. Dependent Claims 52, 53, and 54**

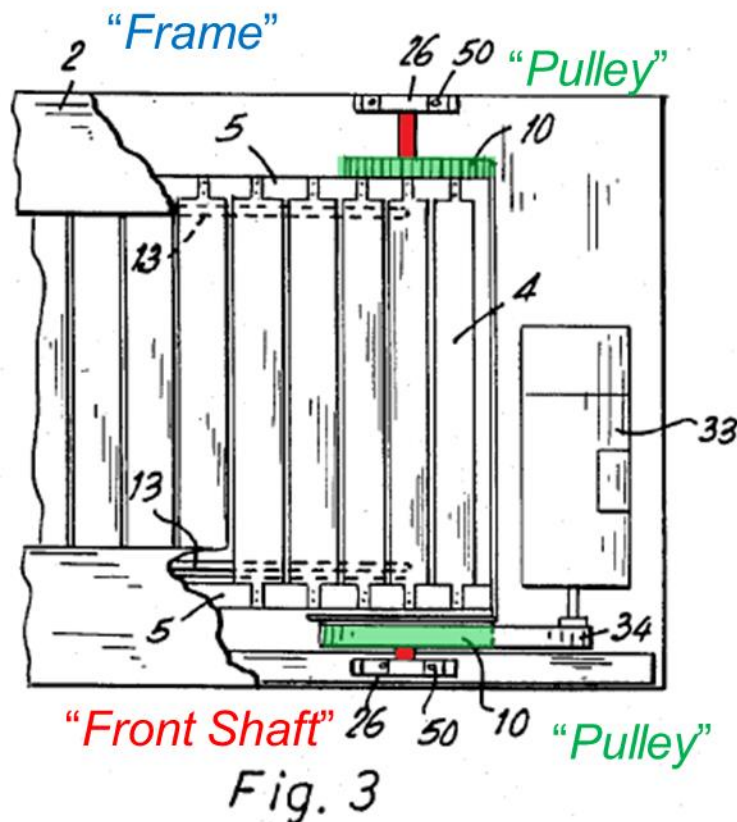
*... [52.] The manually powered treadmill of claim 50, further comprising a front shaft coupled to frame, the front shaft being adapted to support the at least one front running belt pulley.*

283. Schonenberger discloses that front “pulleys” 10 are supported by a transverse shaft 26 (“front shaft”). Schonenberger further discloses that the shaft 26 is journalled (“coupled”) to the frame 2:

At either end of the apparatus (see FIGS. 3 and 12), and within the housing 2 **are located rotatable drums, rollers, sheaves, sprockets, or the like**, about which the surface 1, which is an endless loop, is placed. The **rotatable elements, preferably in the form of two**

**operating drums or rollers 10, are suitably journalled in the frame as seen at 50, FIG. 3. If two sheaves or pulleys are provided at either end of the apparatus, one will be located at either side thereof, suitably journalled and, connected by a **transverse shaft 26** (FIG. 8).**

(Schonenberger, Ex. 1010, 4:10-23.)



**Schonenberger, Ex. 1010, Fig. 3 (Annotated)**

284. With reference to Figure 3 above, Schonenberger illustrates the pair of front pulleys 10 that are interconnected by a **transverse shaft 26** that extends between the left and right sides of the frame proximate the front end. The shaft 26 is journalled to the frame 2 by mounts 50, as shown in Figure 3. A journal or sleeve

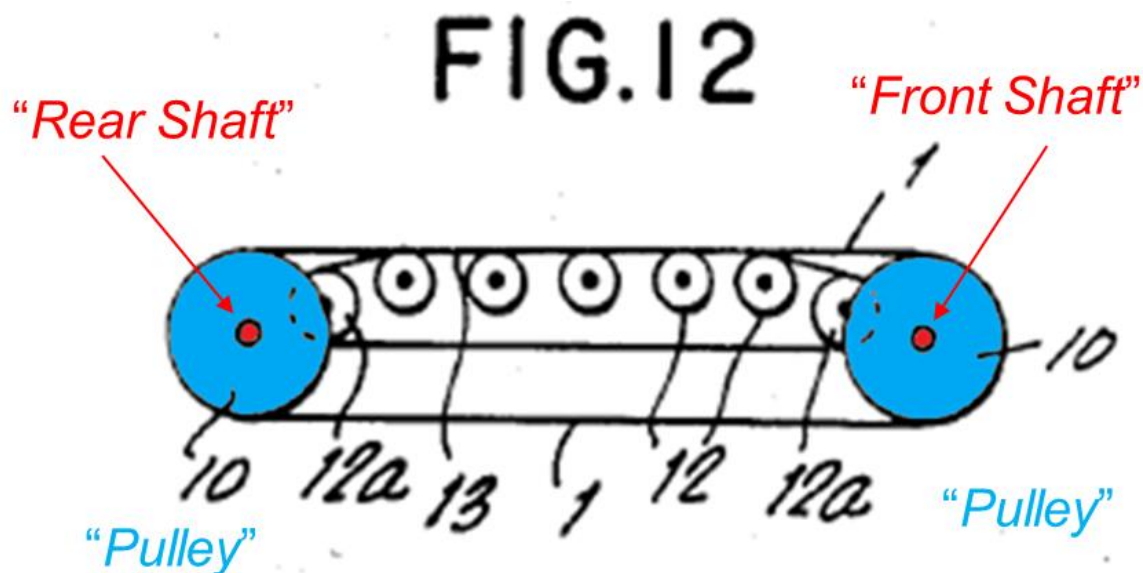
Fig. 2

“Front Shaft”

Labels in Fig. 2: 3, 4, 12, 10, 2, 13, 34, 33, 37, 36, 50, A

285. Thus, Schonenberger discloses “*a front shaft [26] coupled to frame, the front shaft being adapted to support the at least one front running belt pulley [10].*”

286. Schonenberger discloses that the transverse shaft 26 and pulleys 10 are located “at either end of the apparatus.” (Schoenberger, Ex. 1010, 4:14-23.)



**Schonenberger, Ex. 1010, Fig. 12 (Annotated)**

287. Thus, the combination of references teaches “a rear shaft [transverse shaft 26] coupled to frame [housing 2], the rear shaft being adapted to support the at least one rear running belt pulley [10].”

... [54.] *The manually powered treadmill of claim 50, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing.*

288. Claim 54 is duplicative of claim 38. To illustrate, the table below shows a side-by-side comparison of claims 38 and 54.

| ‘580 Patent Claim 38                                                                                                   | ‘580 Patent Claim 34                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| [38.] The manually powered treadmill of claim 37, wherein the first and second rotatable elements of the safety device | [54.] The manually powered treadmill of claim 50, wherein the first and second rotatable elements of the safety device |

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| at least partly form a one-way bearing. | at least partly form a one-way bearing. |
|-----------------------------------------|-----------------------------------------|

289. Because the additional limitations of claim 54 are identical to the additional limitations of claim 38, I refer back to my analysis of these limitations of claim 38 in Ground 1 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 251-252.)

#### 10. Independent Claim 57

290. Independent claim 57 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 57. Claim 57 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 57                                                                     |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [57.0] A method, comprising:<br><br>[57.1][a] providing a manually powered treadmill,    |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [57.1][a] the manually powered treadmill having a frame with a front end and a rear end; |
| [30.2] a front shaft coupled to the frame proximate the front end;                  |                                                                                          |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.3] a rear shaft coupled to the frame proximate the rear end;                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                   |
| [30.4] a plurality of bearings coupled to the frame;                                                                                                                                                                                                                 | [57.2] providing a plurality of bearings coupled to the frame, wherein the plurality of bearings define at least a portion of a curved top profile;                                                                                                                               |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                    | [57.3] disposing a running belt on the plurality of bearings such that the curved top profile of plurality of bearings define at least a portion of a curved running surface of the running belt;                                                                                 |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; | [57.4] providing a safety device coupled to the frame and to the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.</p> | <p>[57.5] permitting rotation of one of the first and second rotatable elements of the safety device and the running belt in a first direction of rotation; and</p> <p>[57.6] substantially preventing rotation in a second direction, opposite the first direction, of the running belt and the one of the first and second rotatable elements by interference between the safety device and at least one of the first rotatable element and the second rotatable element.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

... **[57. 0] A method, comprising:**

... **[57.1][a] providing a manually powered treadmill,**

291. Claim limitations [57.0]-[57.1][a] are substantially similar to limitation

[30.0]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 143-145.)

**... [57.1][b]the manually powered treadmill having a frame with a front end and a rear end;**

292. Claim limitations [57.1][a] is substantially similar to limitation [30.1]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 146-148.)

**... [57. 2] [a] providing a plurality of bearings coupled to the frame, wherein the plurality of bearings define at least a portion of a curved top profile;**

**... [57. 3] disposing a running belt on the plurality of bearings such that the curved top profile of plurality of bearings define at least a portion of a curved running surface of the running belt;**

293. Claim limitation [57.2][a] is substantially similar to claim [30.4]. Therefore, I refer back to my analysis of claim [30.4] in Ground 1 to establish that they are met by the same combination of references. (See ¶¶ 154-158.) Claim limitations [57.2][b]-[57.3] are substantially similar to claim 32. Therefore, I refer back to my analysis of claim 32 in Ground 1 to establish that they are met by the combination of Schonenberger,

Socwell, Magid, and Sclater. (See ¶¶ 222-223.)

***... [57. 4] providing a safety device coupled to the frame and to the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

294. Claim limitations [57.4] is substantially similar to limitation [30.6].

Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 1 to establish that it is met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 180-186.)

***... [57.5] permitting rotation of one of the first and second rotatable elements of the safety device and the running belt in a first direction of rotation; and***

***... [57.6] substantially preventing rotation in a second direction, opposite the first direction, of the running belt and the one of the first and second rotatable elements by interference between the safety device and at least one of the first rotatable element and the second rotatable element.***

295. Claim limitations [57.5]-[57.6] are substantially similar to limitation [30.7]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 199-206.)

## 11. Dependent Claim 59

*... [59] A method according to claim 57, further comprising providing for the adjustment of the vertical incline of at least a portion of the running surface.*

296. Claim 59 is largely duplicative of claim 34. To illustrate, the table below shows a side-by-side comparison of claims 34 and 59. Claim 59 is “marked up” to show additional limitations.

| ‘884 Patent Claim 34                                                                                                                                                                                                                                                                                                                                         | ‘884 Patent Claim 59                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [34] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. | [59.] A method according to claim 57, further comprising providing for the adjustment of the vertical incline of at least a portion of the running surface. |

297. Because Claim [59] is substantially similar to claim [34], I refer back to my analysis of claim 34 in Ground 1 to establish that it is met by the combination

of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 227-234.)

**B. Ground 2 – The Combination of Schonenberger, Socwell, Magid, Sclater, and Skowronski Teaches all of the Limitations of Claims 44 and 51**

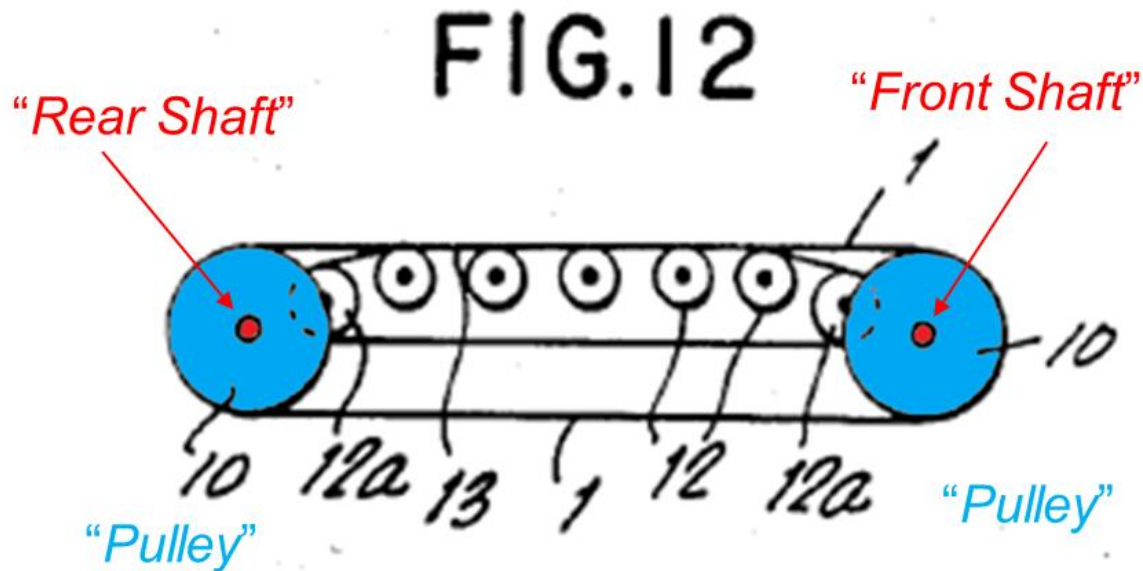
**1. Claim 44**

298. Claim 44 depends for claim 43, which depends from claim 37. I understand that claim 44 require all of the limitations of claim 43 and claim 37 in addition to its additional limitations.

299. The combination of Schonenberger, Socwell, Magid, and Sclater, disclose all of the limitations of claims 37 and 43 as described above. (See ¶¶ 237-250, 261-262.)

***... [44.] The manually powered treadmill of claim 43, wherein at least one of the at least one rear running belt pulley and the at least one front running belt pulley are formed from an electrically insulating material.***

300. Schonenberger discloses front and rear shaft assemblies that each include two “pulleys” that are connected by a transverse “shaft” 26. (Ex.1010, 4:10-23.)



Ex.1010, Fig.12 (Annotated)

301. Schonenberger does not disclose the material of the pulleys 10. However, a POSA would have understood that the pulley 10 could be made from a variety of different materials such as metal and plastic. Skowronski discloses a treadmill having plastic pulleys that support a belt.

A drive assembly for the **belt 20** is generally illustrated in the Figures, and more particularly in FIGS. 2B, 3B and 3C. A **front belt pulley 22** is rotatably mounted on a first axle 24. A Second, **rear belt pulley 28** is rotatably Supported on a second axle 30 which is in turn secured to the frame portions 26 and 26' within the frame portions 12 and 12" by fasteners 31 and 31', respectively.

(Skowronski, Ex. 1030, 6:46-52.)

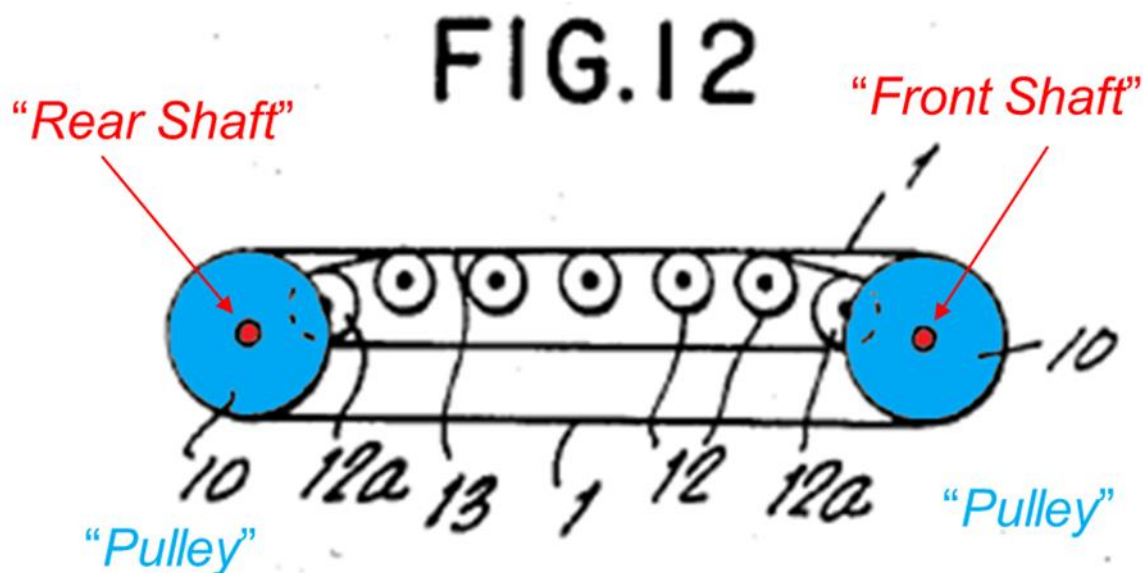
**Pulleys 22 and 28 are also preferably of a molded plastic construction.** Suitable materials from which pulleys 22 and 28 can be molded include glass-filled polypropylene, polystyrene, polycarbonate,

polyurethane and polyester. Economical manufacture of the pulleys 22 and 28 having such a relatively large diameter is facilitated through the use of this plastic material.

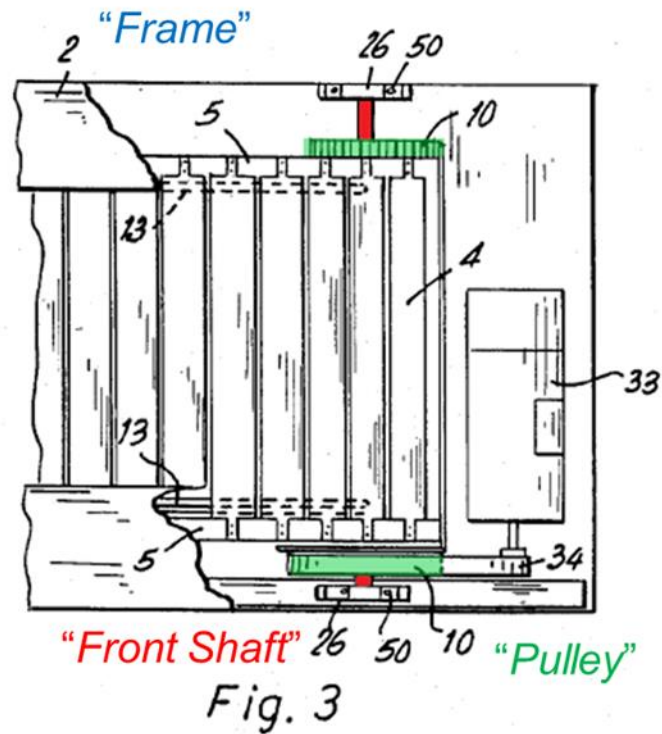
(Skowronski, Ex. 1030, 7:49-55.)

302. A POSA would have understood that plastic is electrically insulative. Therefore it would have been obvious to a POSA to form the pulleys 10 of Schonenberger from plastic as taught in Skowronski.

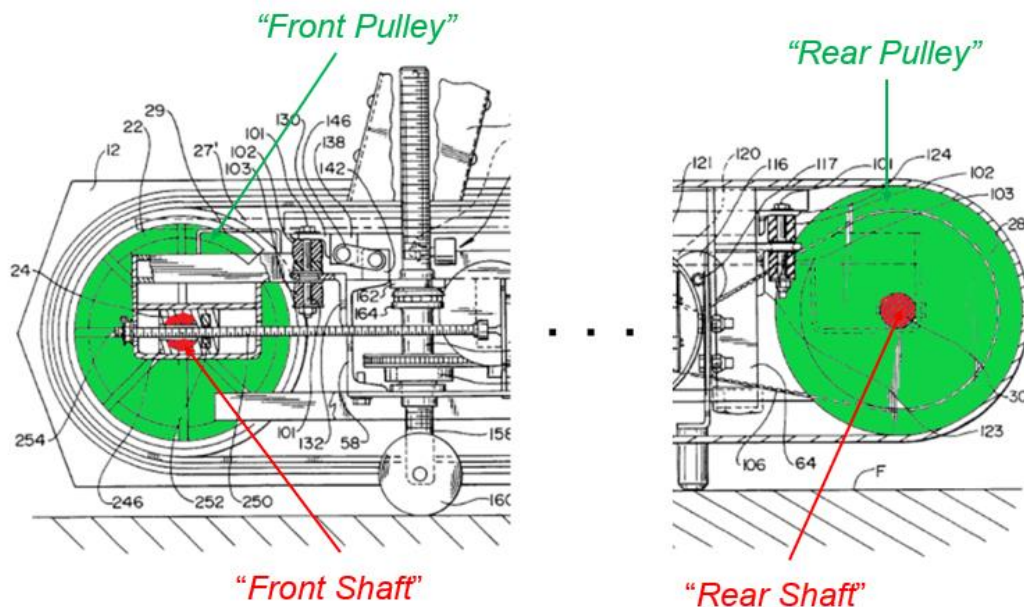
303. The structure of Schonenberger's shaft assemblies is the same as that in Skowronski—both have a shaft coupled to the frame and a pulley coupled to the shaft:



Schonenberger, Ex. 1010, Fig. 12 (Annotated)



Schonenberger, Ex. 1010, Fig. 3 (Annotated)



Skowronski, Ex. 1030, Figs. 2A and 2B (Cropped, Combined, and Annotated)

304. Therefore, forming the pulleys 10 of Schonenberger from plastic would

have been obvious in view of Skowronski.

305. Thus, the combination of Schonenberger, Magid, Sclater, and Skowronski teaches “*wherein at least one of the at least one rear running belt pulley and the at least one front running belt pulley are formed from an electrically insulating material.*”

## 2. Claim 51

***... [51.] The manually powered treadmill of claim 50, wherein at least one of the at least one rear running belt pulley and the at least one front running belt pulley are formed from an electrically insulating material.***

306. Claim 51 depends for claim 50, which I understand means that claim 51 require all of the limitations of claim 50 in addition to its additional limitations.

307. The combination of Schonenberger, Socwell, Magid, and Sclater disclose all of the limitations of claim 50 as described above. (See ¶¶ 273-282.)

308. Claim 51 is largely duplicative of claim 44. To illustrate, the table below shows a side-by-side comparison of claims 44 and 51. Claim 45 is “marked up” to show the minor differences.

| <b>‘884 Patent Claim 44</b>                                                   | <b>‘884 Patent Claim 51</b>                                                   |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| [44.] The manually powered treadmill of claim 43, wherein at least one of the | [51.] The manually powered treadmill of claim 50, wherein at least one of the |

|                                                                                                                                          |                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| at least one rear running belt pulley and the at least one front running belt pulley are formed from an electrically insulating material | at least one rear running belt pulley and the at least one front running belt pulley are formed from an electrically insulating material. |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|

309. Because the additional limitations of claim 51 are identical to the additional limitations of claim 44, I refer back to my analysis of these limitations of claim 44 to establish that they are met by the combination of Schonenberger, Socwell, Magid, and Sclater. (See ¶¶ 300-301.)

### **3. Rationale to combine Schonenberger, Socwell, Magid, Sclater, and Skowronski**

310. It would have been obvious to a POSA to form the front and rear pulleys 10 of Schonenberger from plastic as taught by Skowronski.

311. A POSA would have understood that the pulleys 10 could be made from a variety of different materials such as metal and plastic. For example, the PT Handbook describes flat belt pulleys as made of “cast iron (the most common material), steel, wood, plastic and fiber.” (Ex 1016 at 3-7.)

312. Schonenberger and Skowronski are from the same field –treadmills for exercise. (Schronenberger, Ex. 1010, 1:63-68; Skowronski; Ex. 1030, Abstract.) Both Schonenberger and Skowronski disclose treadmills with a belt supported by front

and rear shafts and pulleys. (Schonenberger, Ex. 1010, 4:14-23, 6:16-18, Figs. 3 and 12; Skowronski, Ex. 1030, 6:46-60, Fig. 2A-2B.)

313. Skowronski explains several benefits associated with plastic pulleys. One benefit from using plastic is that the size of the pulleys can be increased, which in turn, allows for a thicker and heavier belt:

Preferably, the **pulleys 22 and 28 are of the same relatively large diameter** and in the range of seven to ten inches. The preferred pulleys have a twenty inch longitudinal surface and include a six inch long crowned center portion having a diameter of 9.14 inches which includes a rise of 0.07 inches from the ends of the pulley that have a diameter of 9.00 inches. **The relatively large diameter of pulleys 22 and 28 provides significant performance advantages. One advantage is that the large diameter pulleys permit the use of a relatively thicker belt 20**, which can provide more shock absorbency than most currently used belts The thickness of the preferred belt 20 is about 0.20 inches or more.

(Skowronski, Ex. 1030, 7:20-31.)

314. Another benefit of larger pulleys is enhanced gripping between the pulleys and the belt due to increased contact area:

A second significant performance advantage of large diameter pulleys stems from the large drive pulley to belt contact area. **This large contact area provides enhanced “gripping” of the belt by the pulley, which in turn permits the use of lower belt tension than is required by treadmills having smaller diameter pulleys.** This, in

turn, reduces or eliminates tension-related belt failure known to occur in treadmills having smaller diameter pulleys.

(Skowronski, Ex. 1030, 7:32-39.)

315. Skowronski further explains that plastic pulleys are lighter and less expensive than metal pulleys.

Pulleys used in current exercise treadmills **typically are made of steel or aluminum and as such are relatively expensive to make and are relatively heavy**. Therefore, because of tooling, manufacturing and material costs, the diameter of the pulleys are normally no larger than three to four inches.

(Skowronski, Ex. 1030, 2:10-15.)

316. A POSA would have recognized that the large diameter pulleys 10 of Schonenberger would benefit from the lighter weight and lower inertia provided by plastic given the similarities with the pulleys of Skowronski. Lower inertia pulleys allow greater latitude in optimizing the running surface weight and thickness.

**C. Ground 3 – The Combination of Schonenberger, Socwell, Magid, and Sclater Teaches all of the Limitations of Claims 30-34, 37-54, 57, 59**

317. In Ground 3, I consider certain claim constructions that I did not consider in Grounds 1 and 2.

**1. Independent Claim 30**

318. I have given each of the limitations of claim 1 a unique numerical identifier, as shown in the chart below:

| <b>U.S. Patent No. 10,561,884</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>[30.0]</b>                     | A manually powered treadmill, comprising:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>[30.1]</b>                     | a frame having a front end and a rear end positioned opposite the front end;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>[30.2]</b>                     | a front shaft coupled to the frame proximate the front end;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>[30.3]</b>                     | a rear shaft coupled to the frame proximate the rear end;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>[30.4]</b>                     | a plurality of bearings coupled to the frame;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>[30.5]</b>                     | a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>[30.6]</b>                     | a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                                                                                                                                                                                                                                                            |
| <b>[30.7]</b>                     | wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable |

elements.

... [30.0] *A manually powered treadmill, comprising:*

... [30.1] *a frame having a front end and a rear end positioned opposite the front end;*

319. Because limitations [30.0]-[30.1] do not include any claim constructions, I refer back to my analysis of these limitations in Ground 1 to establish that they are met by the combination of references. (See ¶¶ 143-148.)

... [30.2] *a front shaft coupled to the frame proximate the front end;*

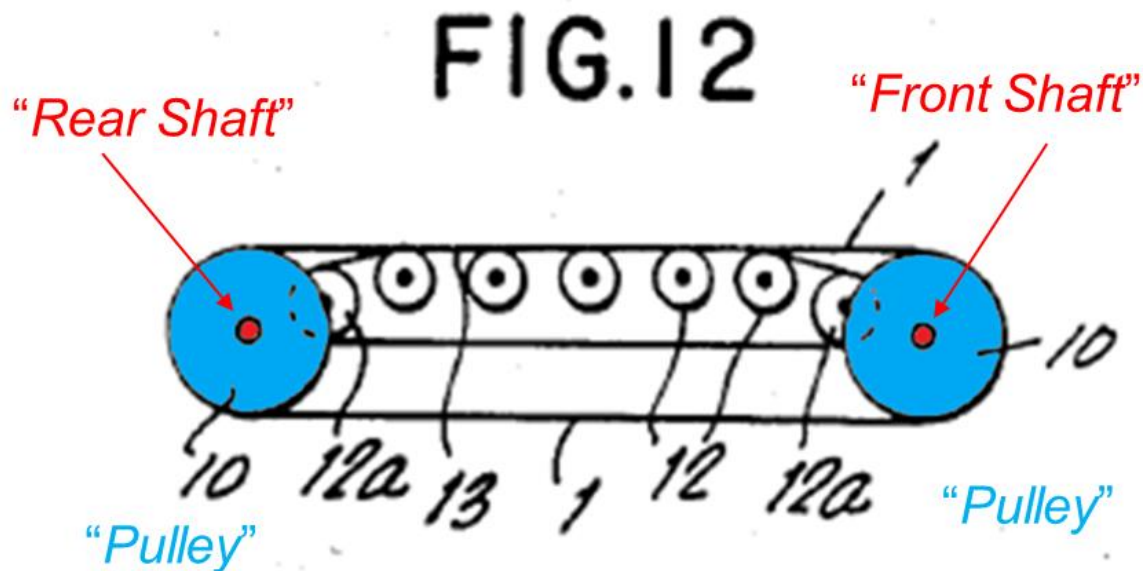
320. I understand that the proposed construction of the term “*shaft*” is “a rotating element used to transmit power from one part to another.”

321. It is therefore my understanding that claim limitation [30.2] should be interpreted as “*a front [rotating element used to transmit power from one part to another] coupled to the frame proximate the front end.*”

322. Regarding the original claim limitations, I refer back to my analysis of claim limitation [30.2] in Ground 1. (See ¶¶ 149-151.)

323. Regarding the claim limitation as construed, Schonenberger discloses that the front shaft assembly (pulley 10 and shaft 26) is coupled to the rear shaft assembly (pulley 10 and shaft 26) by the movable surface 1. (Schoenenberger, Ex. 1010, 4:10-24, Fig. 3.) The front shaft assembly receives power from the user

through the movable surface 1. As a user walks/runs on the movable surface 1, the resultant force on the surface 1 is transferred to the front shaft assembly. The front shaft assembly then transfers this power to the rear shaft assembly through the movable surface 1.



Schonenberger, Ex. 1010, Fig. 12 (Annotated)

324. Thus, Schonenberger discloses *"a front [rotating element (transverse shaft 26) used to transmit power from one part to another] coupled to the frame proximate the front end."*

*... [30.3] a rear shaft coupled to the frame proximate the rear end;*

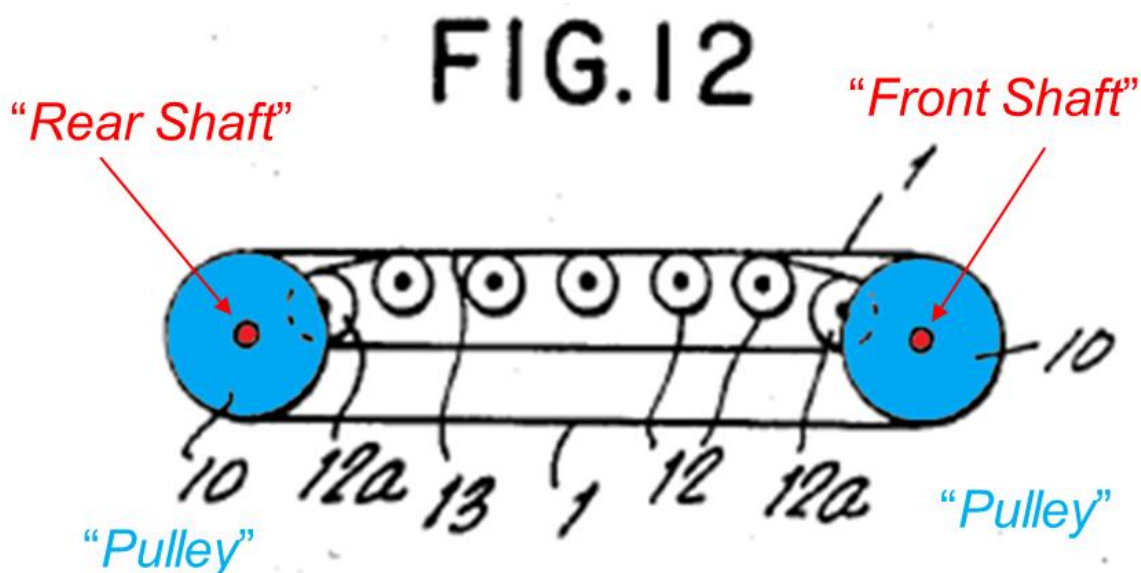
325. I understand that the proposed construction of the term *"shaft"* is *"a rotating element used to transmit power from one part to another."*

326. It is therefore my understanding that claim limitation [30.3] should be interpreted as *"a rear [rotating element used to transmit power from one part to*

another] *coupled to the frame proximate the rear end.*”

327. Regarding the original claim limitations, I refer back to my analysis of claim limitation [30.3] in Ground 1. (See ¶¶ 152-153.)

328. Regarding the claim limitation as construed, Schonenberger discloses that the front shaft assembly (pulley 10 and shaft 26) is coupled to the rear shaft assembly (pulley 10 and shaft 26) by the movable surface 1. (Schenkenberger, Ex. 1010, 4:10-24, Fig. 3.) The rear shaft assembly receives power from the user through the movable surface 1. As a user walks/runs on the movable surface 1, the resultant force on the surface 1 is transferred to the rear shaft assembly. The rear shaft assembly then transfers this power to the front shaft assembly through the movable surface 1.



Schenkenberger, Ex. 1010, Fig. 12 (Annotated)

329. Thus, Schonenberger discloses “a rear [rotating element (transverse

shaft 26) used to transmit power from one part to another] *coupled to the frame proximate the rear end.*”

... ***[30.4] a plurality of bearings coupled to the frame;***

... ***[30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and***

330. Because limitations [30.4]-[30.5] do not include any claim constructions, I refer back to my analysis of these limitations in Ground 1 to establish that they are met by the same combination of references. (See ¶¶ 157-167.)

... ***[30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

331. I understand that the proposed construction of the term “*safety device*” is a “device having two ring-shaped components.”

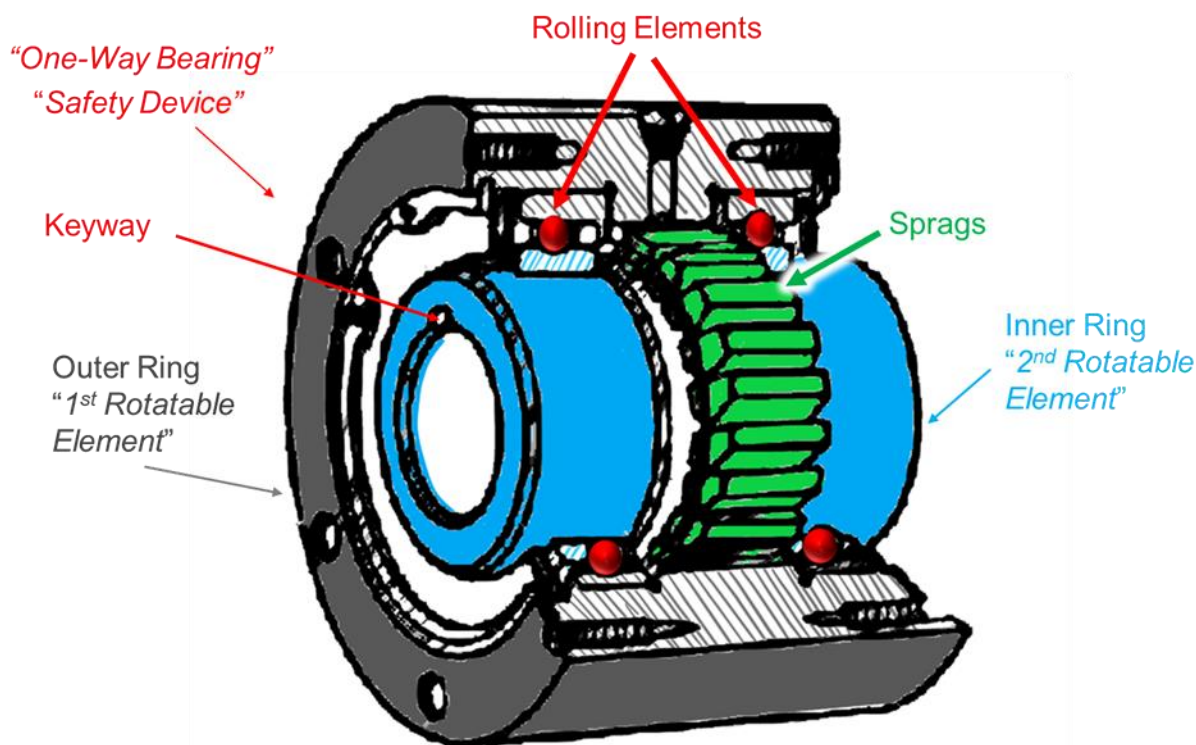
332. It is therefore my understanding that claim limitation [30.6] should be interpreted as “a [device having two ring-shaped components] *coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame.*”

333. Regarding the original claim limitations, I refer back to my analysis of

claim limitation [30.6] in Ground 1. (See ¶¶ 180-186.)

334. Sclater discloses sprag-type one-way bearing assemblies. “Sprags 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.” (Sclater, Ex. 1017 at 312.)

335. As illustrated in the image below, Sclater discloses that the sprag-type one-way bearing assembly includes an inner ring, an outer ring, and a plurality of sprags disposed between the inner ring and the outer ring. The inner ring and the outer ring are “*two ring-shaped components.*”



Sclater, Ex. 1017 at 318 (Annotated)

336. Thus, the combination of references teaches “a [device having two ring-shaped components] *coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame.*”

***... [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.***

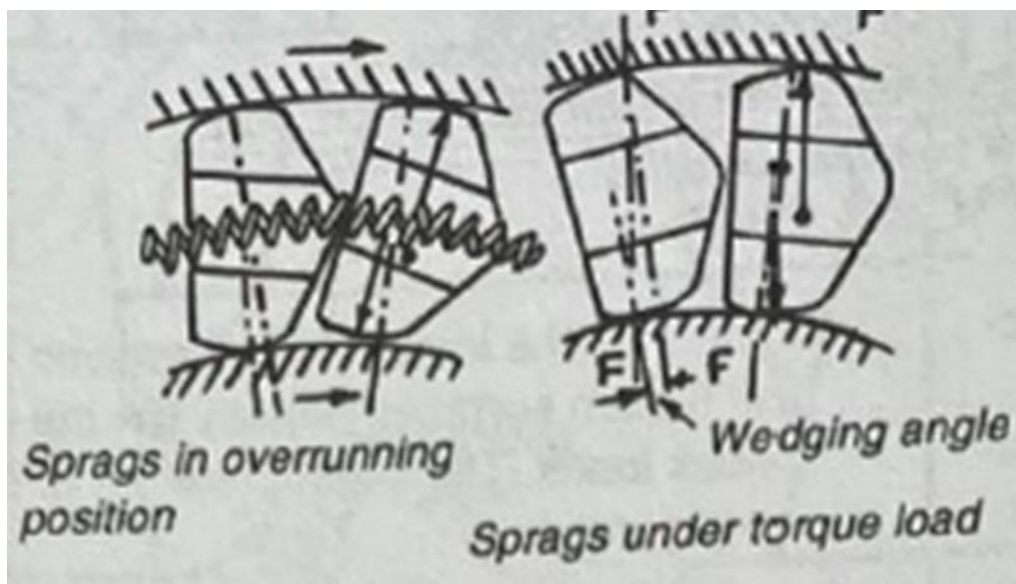
337. I understand that the proposed construction of the term “*substantially prevent rotation*” is “prevent any movement after allowing no or minimal movement.”

338. It is therefore my understanding that claim limitation [30.7] should be interpreted as “*wherein the running belt and one of the first and second rotatable elements of the [device having two ring-shaped components] freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of*

*the first and second rotatable elements [prevent any movement after allowing no or minimal movement] rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.”*

339. Regarding the original claim limitations and the “*safety device*” construction, I refer back to my analysis of claim limitation [30.7] in Ground 1. (See ¶¶ 199-206.)

340. Regarding the proposed construction for “*substantially prevent rotation*,” a sprag-type one-way bearing allows minimal movement before the sprags rotate into a locked position. 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.



**Sclater, Ex. 1017 at 318**

341. Thus, the combination of references teaches “*wherein the running belt and one of the first and second rotatable elements of the [device having two ring-shaped components] freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements [prevent any movement after allowing no or minimal movement] rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.*”

## **2. Dependent Claims 31, 32, 33, 34**

342. Although some claims include construed terms, the proposed constructions do not impact the additional claim limitations, therefore I refer back

to my analysis of 31, 32, 33, 34 in Ground 1 to establish that they are met by the same combination of references. (See ¶¶ 218-234.)

### 3. Independent Claim 37

343. Independent claim 37 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 37. Claim 37 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 37                                                                                                                                |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [37.0] A manually powered treadmill, comprising:                                                                                                    |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [37.1] a frame;                                                                                                                                     |
| [30.2] a front shaft coupled to the frame proximate the front end;                  | [37.4] a front shaft <b>assembly</b> coupled to the frame;                                                                                          |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                    | [37.5] a rear shaft <b>assembly</b> coupled to the frame;                                                                                           |
| [30.4] a plurality of bearings coupled to the frame;                                | [37.2] a <b>first</b> plurality of bearings coupled to the frame;<br>[37.3] a <b>second plurality of bearings coupled to the frame and spaced a</b> |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                      | distance from the first plurality of bearings;                                                                                                                                                                                                                                                         |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                    | [37.6] a running belt at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved; and |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; | [37.7] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                   |
| [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely                                                                                                                                                       | [37.8] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate                                                                                                                                                                                  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | relative to the other of the one of the first and second rotatable elements of the safety device in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

344. As illustrated above, limitations [37.0]-[37.8] are substantially similar to corresponding limitations of claim 30. The main difference being claim 37 claims front and rear shaft assemblies, where claim 30 claims the front and rear shafts. Accordingly, I refer back to my analysis of claim 30 in Ground 3 to establish that these claims are met by the same combination of references. (See ¶¶ 319-341.)

#### 4. Dependent claims 38-43 and 45-49

345. Although some claims include construed terms, the proposed constructions do not impact the additional claim limitations, therefore I refer back to my analysis of 38-43 and 45-49 in Ground 1 to establish that they are met by the same combination of references. (See ¶¶ 251-252, 263-269.)

#### 5. Independent Claim 50

346. Independent claim 50 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 50. Claim 50 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 50                                                                                                              |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [50.0] A manually powered treadmill, comprising:                                                                                  |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [50.1] a frame;                                                                                                                   |
| [30.2] a front shaft coupled to the frame proximate the front end;                  | [50.2] at least one front <b>running belt pulley</b> coupled to the frame;                                                        |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                    | [50.3] at least one rear <b>running belt pulley</b> coupled to the frame and <b>spaced a distance from the at least one front</b> |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                      | running belt pulley;                                                                                                                                                                                                                                                                                                      |
| [30.4] a plurality of bearings coupled to the frame;                                                                                                                                                                                                                 | [50.4] a plurality of bearings coupled to the frame;                                                                                                                                                                                                                                                                      |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                    | [50.5] a running belt at least partially supported by the plurality of bearings and at least partially supported by at least one of the at least one front running belt pulley and the at least one rear running belt pulley, wherein the running belt includes a running surface, at least a portion of which is curved; |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; | [50.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                      |
| [30.7] wherein the running belt and one of the first and second rotatable                                                                                                                                                                                            | [50.7] wherein one of the first and second rotatable elements of the safety                                                                                                                                                                                                                                               |

|                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but                                                                                                                                                                                                 | device and the running belt freely rotate in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation,                                                                                        |
| interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the one of the first and second rotatable elements of the safety device and the running belt relative to the frame. |

347. As illustrated above, limitations [50.0]-[50.7] are substantially similar to corresponding limitations of claim 30. The main difference being claim 50 claims front and rear running belt pulleys, where claim 30 claims the front and rear shafts.

Accordingly, I refer back to my analysis of claim 30 in Ground 3 to establish that these claims are met by the same combination of references. (See ¶¶ 319-341.)

#### 6. Dependent Claims 52, 53, and 54

348. Although some claims include construed terms, the proposed constructions do not impact the additional claim limitations, therefore I refer back to my analysis of 52, 53, and 54 in Ground 1 to establish that they are met by the same combination of references. (See ¶¶ 283-289.)

#### 7. Independent Claim 57

349. Independent claim 57 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 57. Claim 57 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 57                                                                            |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [57.0] <b>A method, comprising:</b><br>[57.1][a] <b>providing</b> a manually powered treadmill, |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [57.1][a] the manually powered treadmill having a frame with a front end and a rear end;        |
| [30.2] a front shaft coupled to the frame proximate the front end;                  |                                                                                                 |

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.3] a rear shaft coupled to the frame proximate the rear end;                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                   |
| [30.4] a plurality of bearings coupled to the frame;                                                                                                                                                                                                                 | [57.2] providing a plurality of bearings coupled to the frame, wherein the plurality of bearings define at least a portion of a curved top profile;                                                                                                                               |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and                                                                                                                    | [57.3] disposing a running belt on the plurality of bearings such that the curved top profile of plurality of bearings define at least a portion of a curved running surface of the running belt;                                                                                 |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; | [57.4] providing a safety device coupled to the frame and to the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame; |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.</p> | <p>[57.5] permitting rotation of one of the first and second rotatable elements of the safety device and the running belt in a first direction of rotation; and</p> <p>[57.6] substantially preventing rotation in a second direction, opposite the first direction, of the running belt and the one of the first and second rotatable elements by interference between the safety device and at least one of the first rotatable element and the second rotatable element.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

350. As illustrated above, limitations [57.0]-[57.6] are substantially similar to corresponding limitations of claim 30. Accordingly, I refer back to my analysis of claim 30 in Ground 3 to establish that these claims are met by the same combination

of references. (See ¶¶ 319-336.)

## **8. Dependent Claim 59**

351. Because claim 59 does not include any claim constructions, I refer back to my analysis of this claim in Ground 1 to establish that it is met by the same combination of references. (See ¶¶ 296-297.)

## **9. Rationale to Combine Schonenberger, Socwell, Magid, and Sclater**

352. The rationales to combine Schonenberger, Socwell, Magid, and Sclater is the same as the rationales explained in Ground 1. Accordingly, I refer back to my rationales to combine references in Ground 1. (See ¶¶ 168-179.)

## **D. Ground 4 – The Combination of Chickering, Magid, and Sclater Teaches all of the Limitations of Claims 30-34, 37-39, 41, 45-49, 57, 59**

### **1. Independent Claim 30**

353. I have given each of the limitations of claim 1 a unique numerical identifier, as shown in the chart below:

| <b>U.S. Patent No. 10,561,884</b>                                                          |
|--------------------------------------------------------------------------------------------|
| <b>[30.0]</b> A manually powered treadmill, comprising:                                    |
| <b>[30.1]</b> a frame having a front end and a rear end positioned opposite the front end; |
| <b>[30.2]</b> a front shaft coupled to the frame proximate the front end;                  |
| <b>[30.3]</b> a rear shaft coupled to the frame proximate the rear end;                    |

**[30.4]** a plurality of bearings coupled to the frame;

**[30.5]** a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and

**[30.6]** a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;

**[30.7]** wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.

... ***[30.0] A manually powered treadmill, comprising:***

354. Chickering discloses “a new type of treadmill exercising device . . . on which the user can simulate the acts of walking, jogging and running without relying on handles, belts or other external supports for maintaining his balance.”

355. Chickering does not refer to its treadmill as a manual treadmill, nor does it disclose a motor for propelling the belt. However, Chickering discloses that a user can adjust their running pace by adjusting the angle of the tread surface:

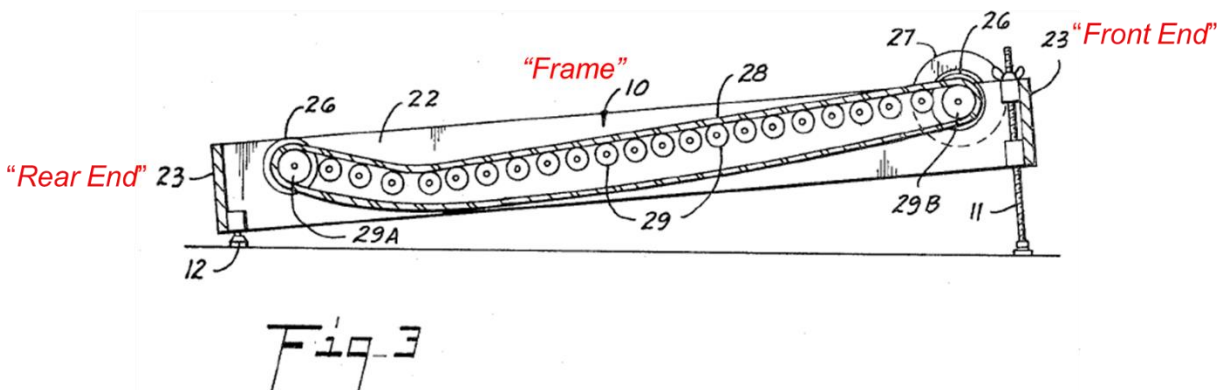
(Chickering, Ex. 1013, 2:44-49.)

## LIFECORE EX. 1003

357. Thus, Chickering discloses “A manually powered treadmill.”

... [30.1] a frame having a front end and a rear end positioned opposite the front end;

358. Chickering discloses that the treadmill has a base 10 (“frame”). “[T]he exercising device . . . has a base 10 which comprises an inclined rectangular frame having two sidewalls 22 and two end walls 23.” (Chickering, Ex. 1013, 1:65-68.) As shown in Figure 3 below, the end walls 23 are positioned opposite each other, one at the front end of the frame 10 and one at the rear end of the frame 10.



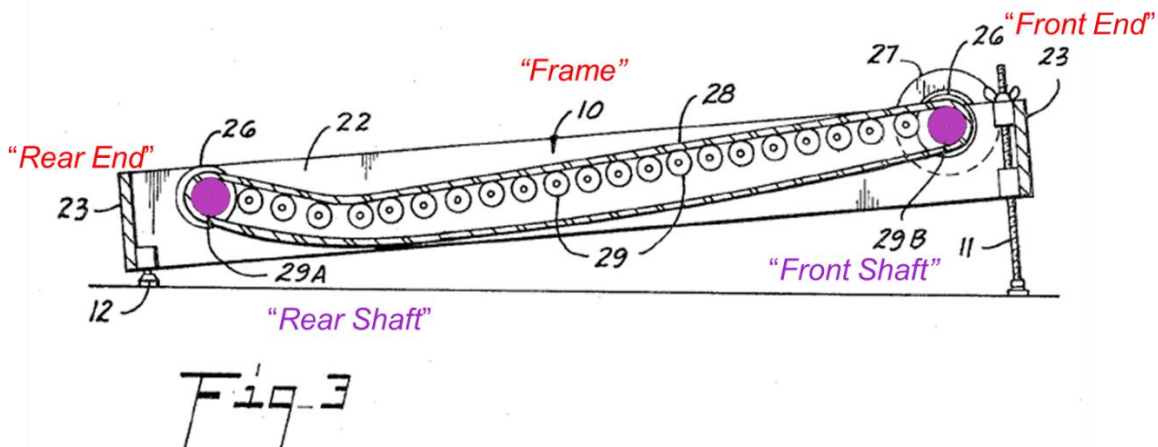
Chickering, Ex. 1013, Fig. 3 (Annotated)

359. Thus, Chickering discloses “a frame having a front end and a rear end positioned opposite the front end.”

... [30.2] a front shaft coupled to the frame proximate the front end;

360. Chickering discloses an end roller 29b coupled to a front end of the frame:

(Chickering, Ex. 1013, 3:11-16.)



### Chickering, Ex. 1013, Fig. 3 (Annotated)

361. Chickering discloses that the “rollers 29 are provided journaled in the sidewalls 22 of base 10.” (Chickering, Ex. 1013, 2:75-3:2.) The roller 29 is coupled to the frame by the journals, i.e., a type of plain bearing.

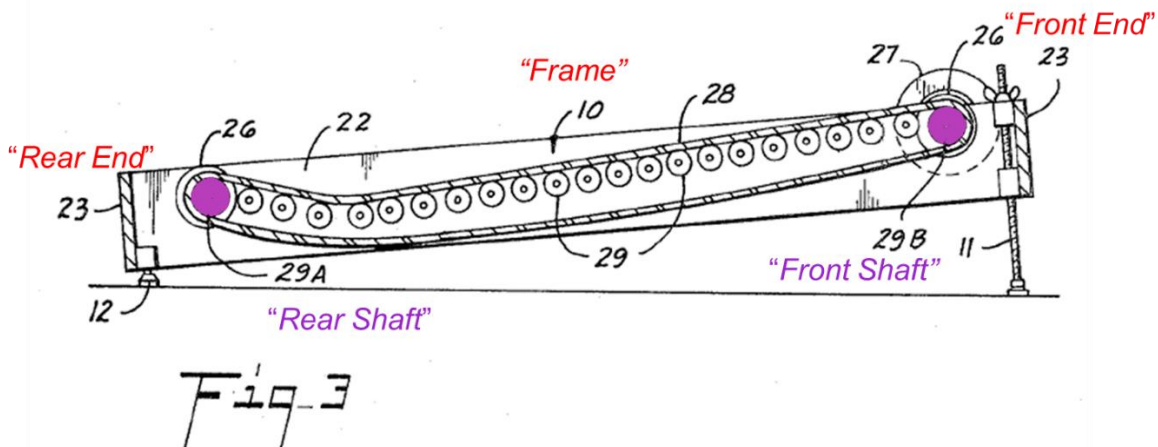
362. Thus, Chickering discloses “a *front shaft [roller 29b] coupled to the frame proximate the front end.*”

... [30.3] a rear shaft coupled to the frame proximate the rear end;

363. Chickering discloses an end roller 29a coupled to a front end of the frame:

When a single belt is used, it may be necessary to use heavier belting material so that the belt will lie flat upon the rollers without being under tension. When such heavier belting material 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.

(Chickering, Ex. 1013, 3:11-16.)



**Chickering, Ex. 1013, Fig. 3 (Annotated)**

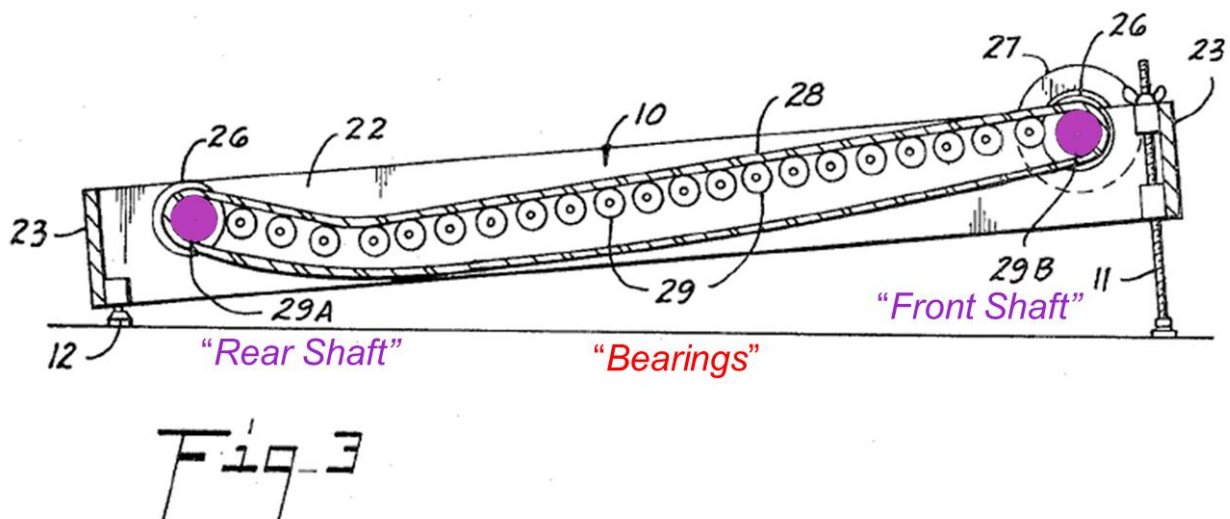
364. Chickering discloses that the “rollers 29 are provided journaled in the sidewalls 22 of base 10.” The roller 29a is also coupled to the frame by the journals. (Chickering, Ex. 1013, 2:75-3:2.)

365. Thus, Chickering discloses “a rear shaft [roller 29a] coupled to the frame proximate the rear end.”

... [30.4] a plurality of bearings coupled to the frame;

366. Chickering discloses a plurality of rollers 29 (“bearings”) that extend between the left and right sidewalls 22 of the base 10 (“frame”). “In the device

shown in FIG. 3, a single series of rollers 29 are provided journaled in the sidewalls 22 of base 10.” (Chickering, Ex. 1013, 2:75-3:2.) A POSA would have understood that Chickering’s rollers 29 are at least plain/journal bearings, as I explained above in ¶ 67.



Chickering, Ex. 1013, Fig. 3 (Annotated)

367. Thus, Chickering discloses a “a plurality of bearing [rollers 29] coupled to the frame [base 10].”

... [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and

368. Chickering discloses a single endless running belt 28 that is supported by the plurality of rollers 29 (“bearings”) and follows their curved contour.

An alternate form of the exercising device of the present invention is shown in FIG. 3, wherein a **single endless belt 28** forms both the

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

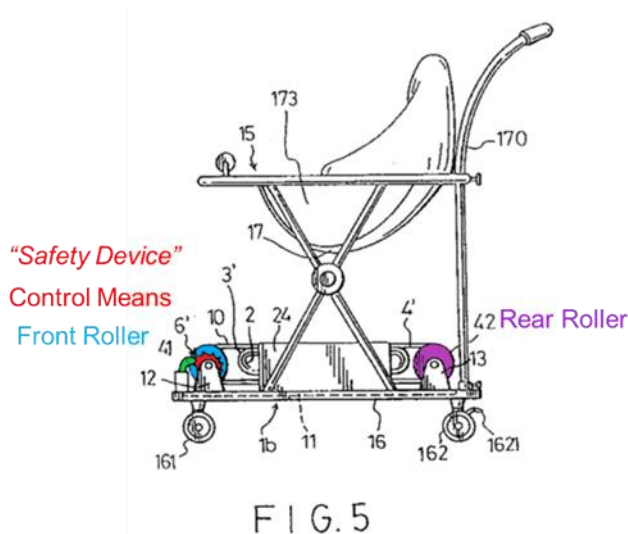
### Chickering, Ex. 1013. Fig. 3 (Annotated)

## LIFECORE EX. 1003

*comprises a curved running surface.”*

***... [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

371. Magid discloses a walker apparatus with adjacent left and right foot belts (4, 4'). (Magid, Ex. 1012, Figs. 5,6.) Magid further discloses “A unidirectional control means 6, 6' is installed to permit only unidirectional movement of the left and right foot belts 4, 4'.” (Magid, Ex. 1012, 4:46-48.)



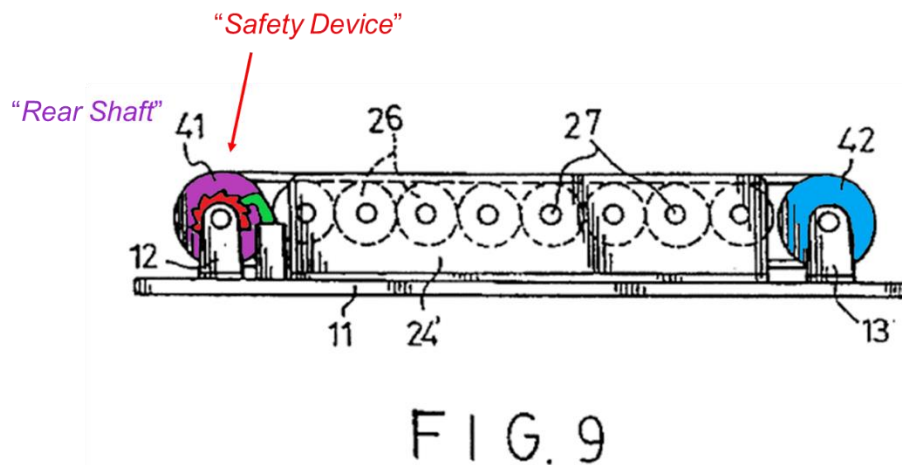
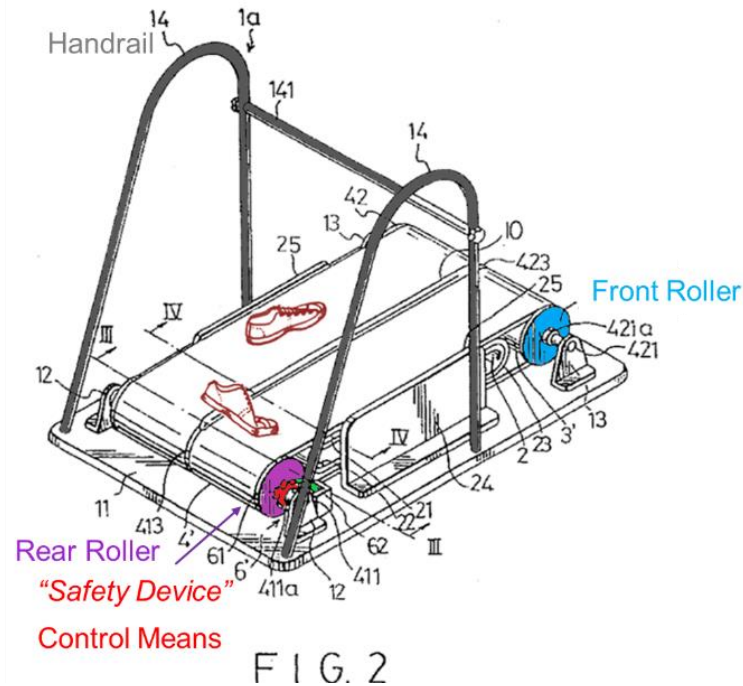
**Magid, Ex. 1012, Fig. 5 (Annotated)**

372. As shown in Figure 5 above, Magid discloses that the control means 6, 6' are a pair of control means that are attached to opposing ends of the front rollers 41. Magid also discloses that the control means 6, 6' may be attached to the rear rollers 42 and that each control means 6, 6' includes a ratchet gear 61 and a pawl 62:

A unidirectional control means 6, 6' is installed to permit only unidirectional movement of the left and right foot belts 4, 4'. In this embodiment, 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 to permit only unidirectional rotation of the front rollers 41, thereby preventing bidirectional movement of the foot belts 4, 4'. A releasable means (not shown) may be provided to release selectively the pawls 62 from the ratchet gears 61 in a known manner to permit reciprocating movement of the foot belts 4, 4' when desired. Of course, the ratchet gears may be attached to the rear rollers 42 to achieve the same result.

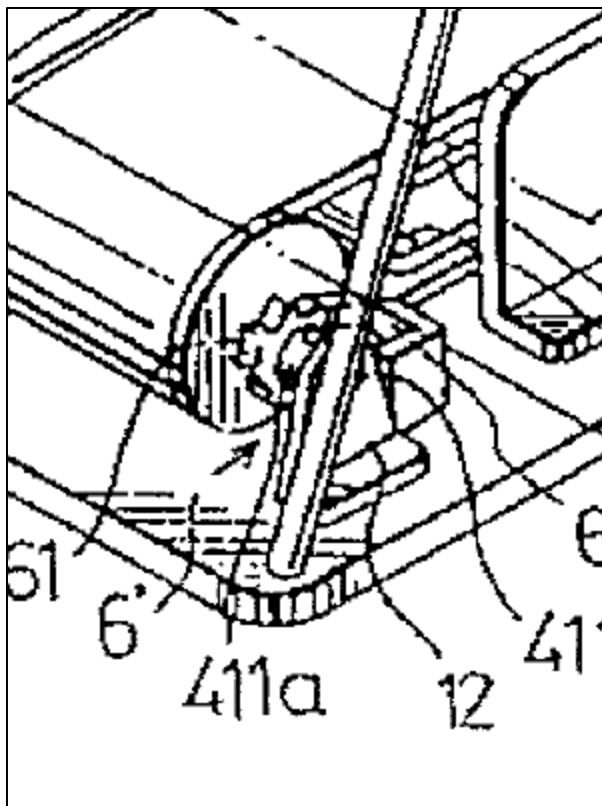
(Magid, Ex. 1012, 4:46-59.)

373. Magid illustrates the control means 6, 6' coupled to the rear rollers in Figures 2 and 9 below. Although Magid mislabels the front roller and the rear roller with the wrong reference numeral in these figures, a POSA would have understood, from the orientation of the handrail 14, and the ratchet gear 61, that the control means 6, 6' are mounted to the rear roller. Figure 2 of Magid is annotated to include a user's feet to further illustrate front and rear rollers of the treadmill.



**Magid, Ex. 1012, Figs. 2 and 9 (Annotated)**

374. Additionally, the gear profile of the ratchet and orientation of the pawl in Figure 2 would prevent the rear roller from rotating in one direction, which corresponds to the belt being blocked from moving to the right on the page, or forward.



**Magid, Ex. 1012, Fig. 2 (Enlarged)**

375. It would have been obvious to a POSA to combine Chickering's treadmill with Magid's control means to permit only unidirectional movement of the running belt to reduce the risk of a user stepping onto the running belt of the treadmill and losing their balance when the belt moves in the forward direction. Magid's control means 6, 6' provide a "safety device" that prevents the left and right foot belts 4, 4' from moving forward.

376. Thus, the combination of references teaches "*a safety device [Magid's control means 6, 6'] coupled to the frame [base 10] and the running belt [28], the safety device having a first rotatable element [ratchet gear] and a second rotatable*

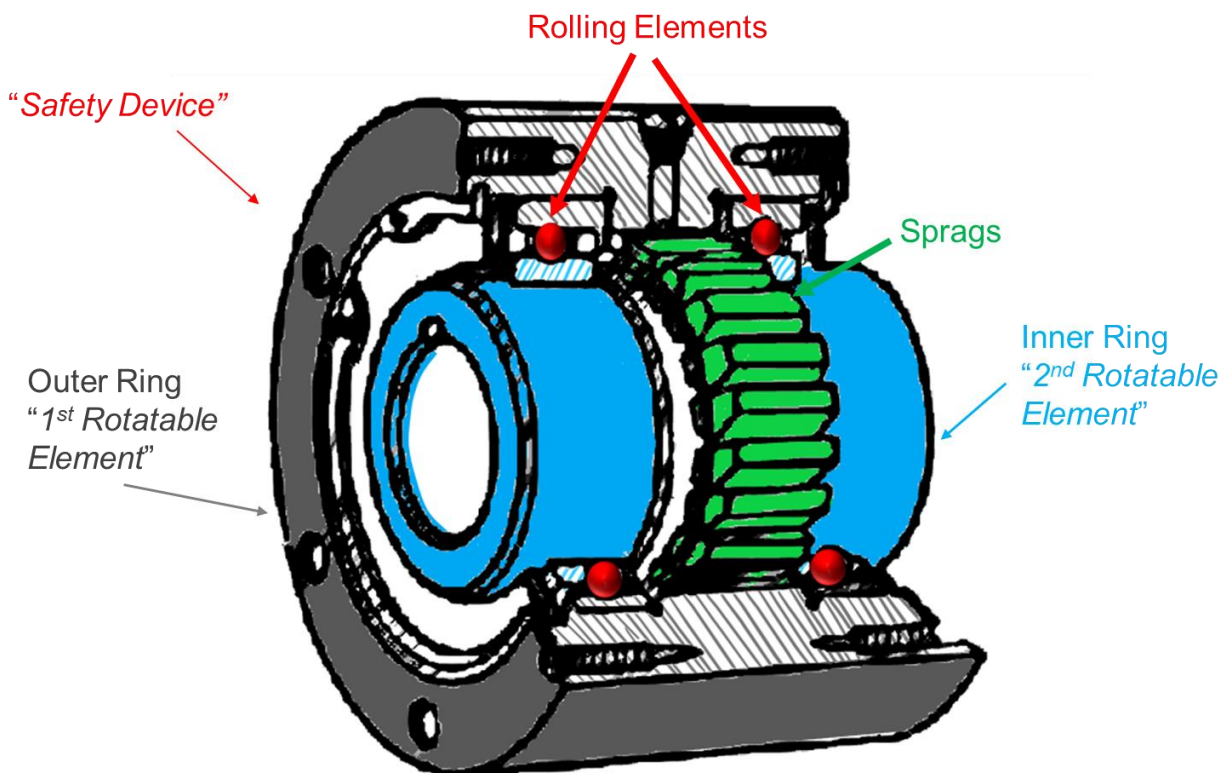
*element [pawl], wherein at least one of the first and second rotatable elements [ratchet gear] are adapted for rotation relative to the frame.”*

***... [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.***

377. Magid does not expressly disclose that the control means (“safety device”) includes a third element to create “interference” with the ratchet gear 61 (“first rotatable element”) or the pawl 62 (“second rotatable element”).

378. Sclater discloses sprag-type one-way bearing assemblies that include sprags combined with rolling elements, such as cylindrical rollers or balls. “Sprags 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.” (Sclater, Ex. 1017 at 312.)

379. As illustrated in the image below, Sclater discloses that the sprag-type one-way bearing assembly includes an inner ring, an outer ring, and a plurality of sprags and rolling elements disposed between the inner ring and the outer ring.



**Sclater, Ex. 1017 at 318 (Annotated)**

380. Sclater discloses that the inner ring defines a center hole that is sized to receive a shaft and defines a keyway on the inner diameter. The keyway provides means for rotatably coupling the inner ring to a shaft via a key. The inner ring and/or the outer ring of a one-way bearing assembly rotate about a central axis; therefore both rings are “*rotatable elements*.” Sclater discloses that the outer ring includes holes that can be used to mount the bearing assembly to a support structure, such as a frame or bracket.

381. Sclater further discloses that this sprag-type bearing assembly functions as a one-way bearing by providing “one-direction only torque transmission in an

overrunning clutch.” (Ex. 1017 at 312.)

382. A POSA would have known that ratchet clutch is noisy and not ideal for high-speed applications. Accordingly, as explained in ¶¶ 443-451, a POSA would have been motivated to substitute a sprag-type one way bearing, such as that disclosed by Sclater, for Magid’s ratchet clutch, to reduce noise and improve durability. A POSA would have known how to mount Sclater’s one-way bearing assembly to provide one-direction only torque transmission, *e.g.*, by attaching the outer ring (“*first rotatable element*”) to the frame, and mounting the inner ring (“*second rotatable element*”) to the “*front shaft*” or the “*rear shaft*.” Therefore the inner ring (“*second rotatable element*”) is adapted to rotate with the shaft and relative to the frame.

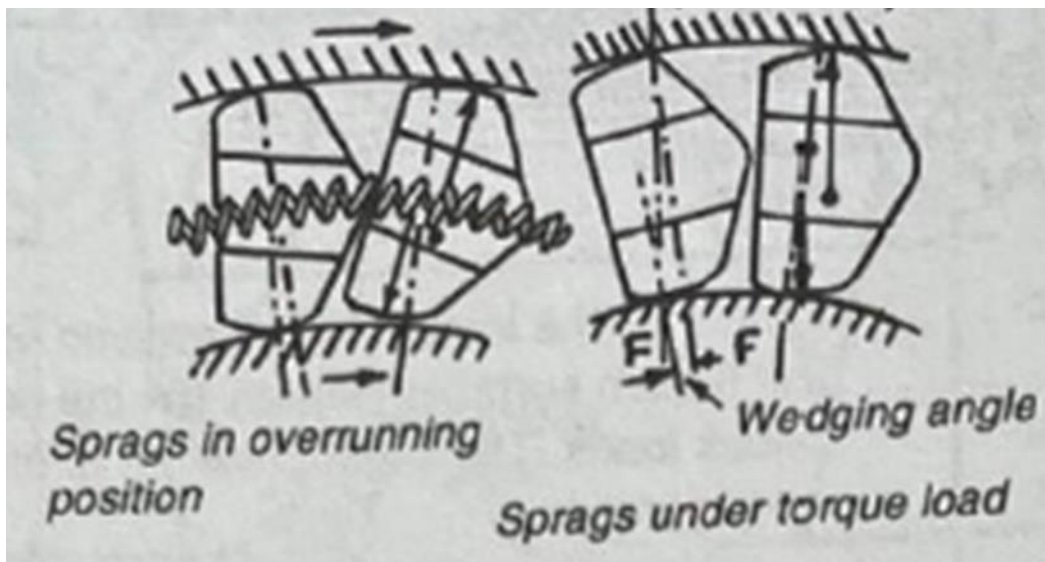
383. Sclater discloses that the sprags have a “sprag profile, which is composed of two nonconcentric curves of different radius” that provide “a locking ramp.” (Sclater, Ex.1017 at 312.) Sclater further discloses that the:

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.

(Sclater, Ex.1017 at 318.)

384. The movable surface 1 (“*running belt*”) is coupled to the inner ring (“*second rotatable element*”) through the front shaft assembly or the rear shaft

assembly. As illustrated in the figure below on the left, the movable surface 1 (“*running belt*”) and the inner ring (“*second rotatable element*”) rotate in a first direction relative to the outer ring (“*first rotatable element*”) to overrun. However, as illustrated in the figure below on the right, wedging or “*interference*” between the sprags and the inner and outer rings prevents rotation of the inner ring in an opposite direction, which prevents the movable surface 1 (“*running belt*”) from moving forward.



**Sclater, Ex. 1017 at 318**

385. Thus the combination of references teaches “*wherein the running belt [movable surface 1] and one of the first and second rotatable elements of the safety device [inner ring] freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device [outer ring], but interference between the safety device [sprags] and at least one of the first and*

*second rotatable elements [inner and outer rings] substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.”*

## **2. Dependent Claims 31, 32, 33, 34**

386. Claims 31, 32, 33, and 34 depend directly or indirectly from claim 30, which I understand means that claims 31, 32, 33, and 34 require all of the limitations of claim 30 and the limitations of any intervening claims in addition to their additional limitations.

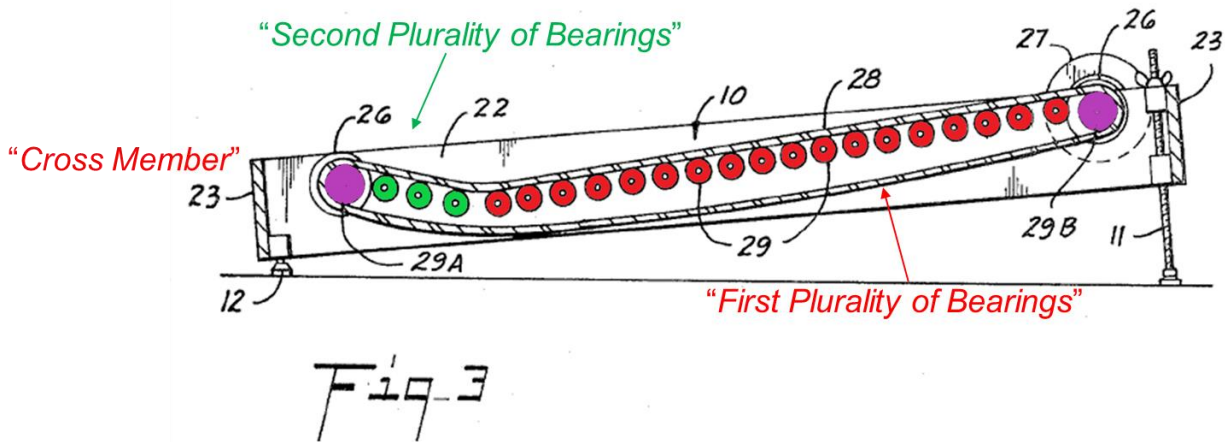
387. The combination of references disclose all of the limitations of claim 30 as described above. (See ¶¶ 354-385.)

*... [31.] The manually powered treadmill of claim 30, wherein the frame includes a left side member, a right side member, and at least one cross-member extending between the left side member and the right side member, wherein the plurality of bearings includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame.*

388. Chickering discloses a base 10 having left and right sidewalls 22 and front and rear end walls 23 extending between the left and right sidewalls 22. The end walls 23 extend transversely and would have been considered “cross members” by a POSA.

[A] base 10 which comprises an inclined rectangular frame having two sidewalls 22 and two end walls 23. The base may be of any suitable material such as wood or metal.

(Chickering, Ex. 1013, 1:66-69; Figs. 1 and 3.)



**Chickering, Ex. 1013, Fig. 3 (Annotated)**

389. As discussed above in [30.4], Chickering discloses a plurality of rollers 29 (“bearings”) that support the belt 28. Chickering discloses that the “rollers 29 are provided journaled in the sidewalls 22 of base 10.” (Chickering, Ex. 1013, 2:75-3:2.) A POSA would have understood that Chickering’s rollers are at least plain/journal bearings, as I explained above in ¶ 67. The rollers 29 include a first group of bearings (red) coupled to the left sidewall and a second group of bearings (green) coupled to the right sidewall.

390. Thus, Chickering discloses “*wherein the frame [base 10] includes a left side member, a right side member, and at least one cross-member [end walls 23]*”

*extending between the left side member and the right side member, wherein the plurality of bearings [rollers 29] includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame.”*

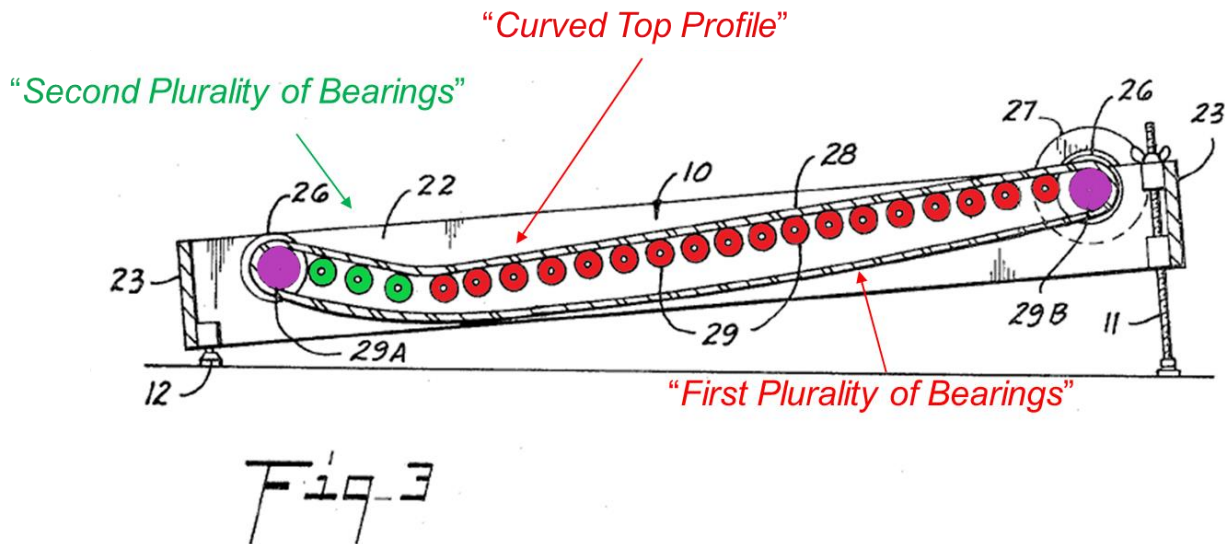
***... [32.] The manually powered treadmill of claim 31, wherein the first plurality of bearings and the second plurality of bearings each at least partially define a curved top profile, wherein the curved top profile substantially corresponds to at least a portion of the curved running surface.***

391. Chickering discloses that the endless belt 28 (“*running belt*”) is placed about the rollers 29 (“*bearings*”) and follows 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.

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

392. As illustrated below, the upper surfaces of the rollers 29 define a “*top profile*” that engages the belt 28 to form the “*curved running surface*.” The first rollers (red) form a first portion of the “*top profile*” and the second rollers (green) form a second portion of the “*top profile*.”

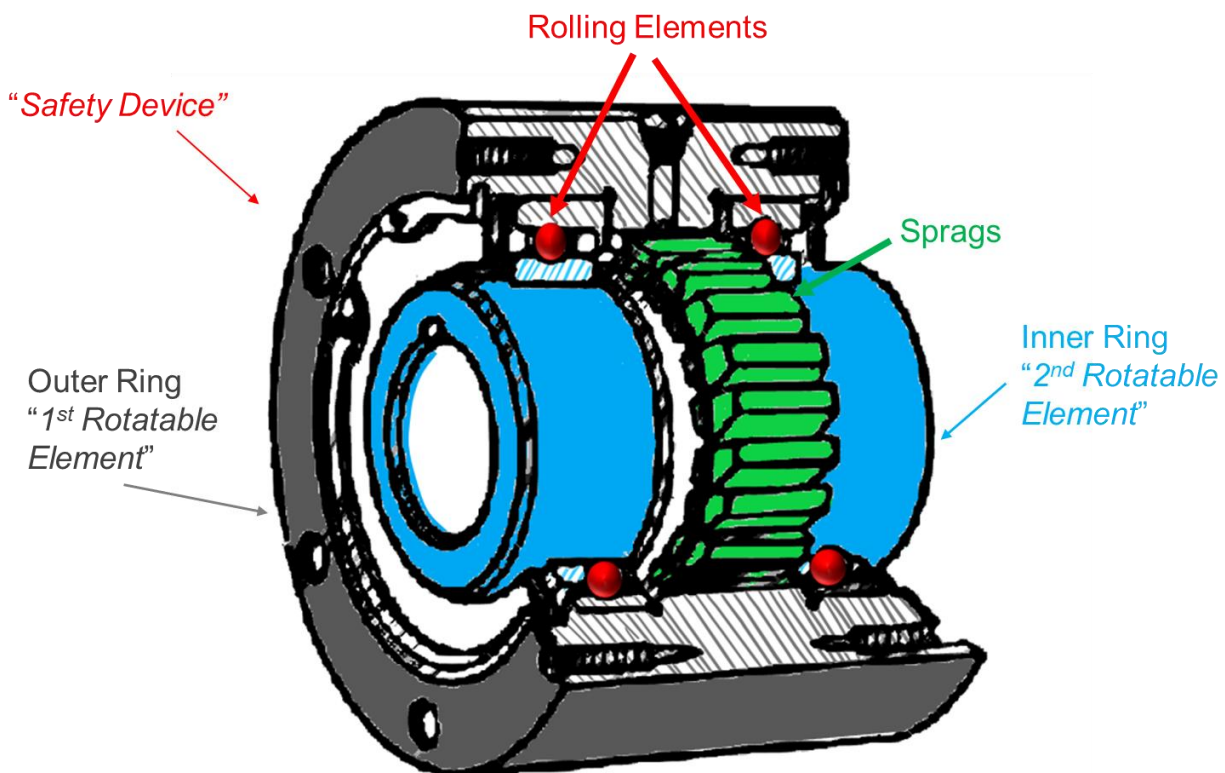


Chickering, Ex. 1013, Fig. 3 (Annotated)

... [33.] *The manually powered treadmill of claim 30, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing.*

393. Sclater discloses sprag-type one-way bearing assemblies that include sprags combined with rolling elements, such as cylindrical rollers or balls. “Sprags 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.” (Sclater, Ex. 1017 at 312.)

394. As illustrated in the image below, Sclater discloses that the sprag-type one-way bearing assembly includes an outer ring (“*first rotatable element*”), an inner ring (“*second rotatable element*”), and a plurality of sprags and rolling elements disposed between the inner ring and the outer ring.



**Sclater, Ex. 1017 at 318 (Annotated)**

395. Sclater discloses that the inner ring defines a center hole that is sized to receive a shaft and defines a keyway on the inner diameter. The keyway provides means for rotatably coupling the inner ring to a shaft via a key. The inner ring and/or the outer ring of a one-way bearing assembly rotate about a central axis; therefore both rings are "*rotatable elements*." Sclater discloses that the outer ring includes holes that can be used to mount the bearing assembly to a support structure, such as a frame or bracket.

396. Intentionally left blank

397. Thus, Sclater discloses "first and second rotatable elements [inner and

outer rings] of the safety device at least partly form a one-way bearing [inner ring, outer ring, ball bearings].”

*... [34.] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.*

398. The treadmill of Chickering includes jackscrews 11 for adjusting vertical inclination of the belt 28 relative to the ground or floor. The jackscrews 11 are coupled to base 10.

Jackscrews 11 are provided at the forward corners of the base 11 for adjusting its angle of inclination. Leveling buttons 12 may be used on the rear corners to keep the base steady.

(Chickering, Ex. 1013, 1:69-71.)

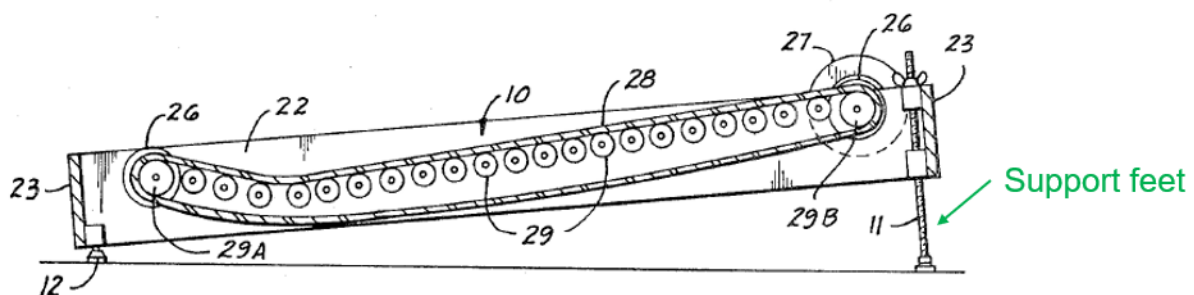


Fig. 3

Chickering, Ex. 1013, Fig. 3 (Annotated)

399. At the bottom of each jackscrew 11 is a leveling button 12 (“*support foot*.”) The jackscrews 11 are threaded (and shown with cooperating wingnuts) allowing them to be lengthen or shortened relative to the bottom of the frame to increase and decrease the inclination of the belt 28.

400. Thus, Chickering discloses “*at least one support foot [jackscrew 11] coupled to the frame [base 10], wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.*”

### 3. Independent Claim 37

401. Independent claim 37 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 37. Claim 37 is “marked up” to show the minor differences.

| ‘884 Patent Claim 30                                                                | ‘884 Patent Claim 37                                       |
|-------------------------------------------------------------------------------------|------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                    | [37.0] A manually powered treadmill, comprising:           |
| [30.1] a frame having a front end and a rear end positioned opposite the front end; | [37.1] a frame;                                            |
| [30.2] a front shaft coupled to the frame                                           | [37.4] a front shaft <b>assembly</b> coupled to the frame; |

|                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| proximate the front end;                                                                                                                          |                                                                                                                                                                                                                                                                                                                             |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                                                                                  | [37.5] a rear shaft <b>assembly</b> coupled to the frame;                                                                                                                                                                                                                                                                   |
| [30.4] a plurality of bearings coupled to the frame;                                                                                              | [37.2] a <b>first</b> plurality of bearings coupled to the frame;<br>[37.3] a <b>second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings;</b>                                                                                                                          |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a curved running surface; and | [37.6] a running belt at least partially supported by the <b>first</b> plurality of bearings <b>and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies,</b> and comprising a running surface, at least <b>a portion</b> of which is curved; and |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element                              | [37.7] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element                                                                                                                                                                                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | [37.8] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate relative to the other of the one of the first and second rotatable elements of the safety device in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first |

|  |                                |
|--|--------------------------------|
|  | and second rotatable elements. |
|--|--------------------------------|

... ***[37.0] A manually powered treadmill, comprising:***

402. Claim limitation [37.0] is identical to limitation [30.0]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 4 to establish that it is met by the same combination of references. (See ¶¶ 354-357.)

... ***[37.1] a frame;***

403. Claim limitation [37.1] is recited in limitation [30.1]. Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 4 to establish that it is met by the same combination of references. (See ¶¶ 358-359.)

... ***[37.2] a first plurality of bearings coupled to the frame;***

... ***[37.3] a second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings;***

404. As I discussed in claim [31.], Chickering discloses a first plurality of bearings coupled to the frame and a second plurality of bearings coupled to the frame and spaced a distance from the first plurality of bearings. The first bearings are longitudinally spaced from the second bearings.

... ***[37.4] a front shaft assembly coupled to the frame;***

... ***[37.5] a rear shaft assembly coupled to the frame;***

405. As I discussed above for [30.2]-[30.3], Chickering discloses a front

shaft (roller 29b) and a rear shaft (roller 29a). The rollers 29 each have ends that are journaled to the sidewalls 22. (Chickering, Ex 1013 3:1-2.). These journals are bearings that allow the rollers 29 to rotate relative to the base 10. A POSA would consider each roller 29 and their associated journal bearings to be a “shaft assembly.” (See ¶¶ 360-365.)

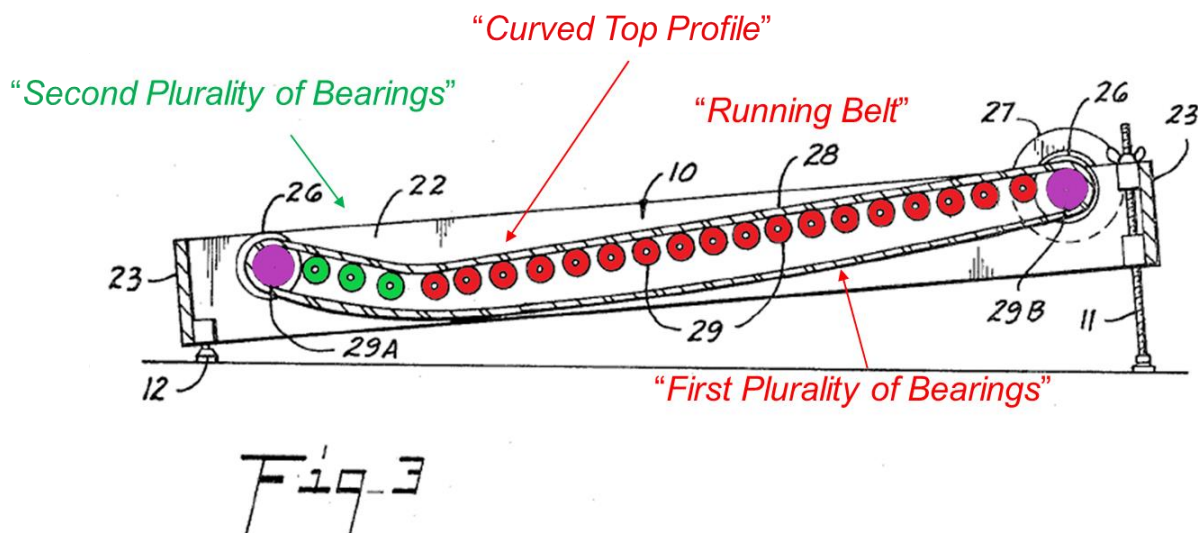
*... [37.6] a running belt at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved; and*

406. Chickering discloses “a single endless belt 28” that is disposed about the rollers 29, including the front roller 29b and the rear roller 29a and forming a running surface:

An alternate form of the exercising device of the present invention is shown in FIG. 3, wherein **a single endless belt 28** forms both the accelerating and decelerating areas. In the device shown in FIG. 3, a single series of rollers 29 are provided journaled in the sidewalls 22 of base 10. However, the rollers are so disposed that **the forward rollers lie approximately in a plane slanting downwardly from the front of the base, while the rear rollers lie approximately in a plane slanting upward toward the rear of the base 10.** 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.

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



**Chickering, Ex. 1013, Fig. 3 (Annotated)**

407. As shown in Figure 3 above, the belt 28 is supported by the “first and second bearings” or rollers 29, which are arranged to curve at least a portion of the belt.

408. Thus, Chickering discloses “a running belt [belt 28] at least partially supported by the first plurality of bearings [red rollers 29] and the second plurality of bearings [green rollers 29], the running belt being at least partially disposed about the front and rear shaft assemblies [rollers 29a and 29b], and comprising a running surface, at least a portion of which is curved.”

***... [37.7] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

409. Claim limitations [37.7] is substantially similar to limitation [30.6].

Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 4 to establish that they are met by the combination of references. (See ¶¶371-373.)

***... [37.8] wherein one of the first and second rotatable elements of the safety device and the running belt freely rotate relative to the other of the one of the first and second rotatable elements of the safety device in a first direction of rotation relative to the frame, however, in a second direction of rotation, opposite the first direction of rotation, interference between the safety device and at least one of the first rotatable element and the second rotatable element substantially prevents rotation of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements.***

410. Claim limitations [37.8] is substantially similar to limitation [30.7].

Therefore, I refer back to my analysis of this limitation of claim 30 in Ground 4 to establish that they are met by the same combination of references. (See ¶¶377-385.)

***... [38.] The manually powered treadmill of claim 37, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing.***

411. Claim 38 is largely duplicative of claim 33. To illustrate, the table

below shows a side-by-side comparison of claims 33 and 38. Claim 38 is “marked up” to show the minor differences.

| ‘884 Patent Claim 33                                                                                                                                           | ‘884 Patent Claim 38                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [33.] The manually powered treadmill of claim 30, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing. | [38.] The manually powered treadmill of claim 37, wherein the first and second rotatable elements of the safety device at least partly form a one-way bearing. |

412. Because the additional limitations of claim 38 are identical to the additional limitations of claim 33, I refer back to my analysis of these limitations of claim 33 in Ground 4 to establish that they are met by the same combination of references. (See ¶¶ 393-397.)

... ***[39.] The manually powered treadmill of claim 37, wherein the front shaft assembly comprises a front shaft coupled to frame.***

413. As discussed above, in claim limitation [37.4] Chickering discloses, “*wherein the front shaft assembly comprises a front shaft [shaft 29B] coupled to frame [base 10].*”

... ***[41.] The manually powered treadmill of claim 37, wherein the rear shaft assembly comprises a rear shaft coupled to the frame.***

414. As discussed above, in claim limitation [37.5] Chickering discloses, “*wherein the rear shaft assembly comprises a rear shaft [shaft 29A] coupled to*

*frame [base 10].”*

***... [45.] The manually powered treadmill of claim 37, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill.***

415. Claim 45 is largely duplicative of claim 34. To illustrate, the table below shows a side-by-side comparison of claims 34 and 45. Claim 45 is “marked up” to show the minor differences.

| <b>‘884 Patent Claim 34</b>                                                                                                                                                                                                                                                                                                                                   | <b>‘884 Patent Claim 45</b>                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [34.] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. | [45.] The manually powered treadmill of claim 37, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. |

416. Because the additional limitations of claim 45 are identical to the additional limitations of claim 34, I refer back to my analysis of these limitations of claim 34 in Ground 4 to establish that they are met by the same combination of references. (See ¶¶ 398-400.)

***... [46.] The manually powered treadmill of claim 37, wherein the running belt is at least partially supported by the first plurality of bearings and the second plurality of bearings.***

417. Claim 46 repeats limitations already claimed in [37.6] of the independent claim. To illustrate, the table below shows a side-by-side comparison:

| ‘884 Patent Claim 37.6                                                                                                                                                                                                                                                                            | ‘884 Patent Claim 46                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [37.6] a running belt at least partially supported by the first plurality of bearings and the second plurality of bearings, the running belt being at least partially disposed about the front and rear shaft assemblies, and comprising a running surface, at least a portion of which is curved | [46.] The manually powered treadmill of claim 37, wherein the running belt is at least partially supported by the first plurality of bearings and the second plurality of bearings. |

418. Because the additional limitations of claim 46 are identical to the limitations of claim [37.6], I refer back to my analysis of these limitations of claim 37 to establish that they are met by the combination references. (See ¶¶ 406-408.)

*... [47.] The manually powered treadmill of claim 46, wherein each of the first and second pluralities of bearings define a curved top profile and wherein the curved top profile substantially corresponds to at least a portion of the curved portion of the running surface.*

419. Claim 47 is largely duplicative of claim 32. To illustrate, the table below shows a side-by-side comparison of claims 32 and 47. Claim 47 is “marked up” to show the minor differences.

| <b>‘884 Patent Claim 32</b>                                                                                                                                                            | <b>‘884 Patent Claim 47</b>                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| [32.][a] The manually powered treadmill of claim 31, wherein the first plurality of bearings and the second plurality of bearings each at least partially define a curved top profile, | [47.][a] The manually powered treadmill of claim 46, wherein each of the first and second pluralities of bearings define a curved top profile and |
| [b] wherein the curved top profile substantially corresponds to at least a portion of the curved running surface.                                                                      | [b] wherein the curved top profile substantially corresponds to at least a portion of the curved portion of the                                   |

|  |                  |
|--|------------------|
|  | running surface. |
|--|------------------|

420. Because the additional limitations of claim 47 are identical to the additional limitations of claim 32, I refer back to my analysis of these limitations of claim 32 in Ground 4 to establish that they are met by the same combination of references. (See ¶¶ 391-392.)

*... [48.] The manually powered treadmill of claim 37, wherein the frame includes a left side member, a right side member spaced a distance from the left side member, and at least one cross-member extending between the left side member and the right side member.*

*... [49.] The manually powered treadmill of claim 48, wherein the first plurality of bearings are coupled the left side member and the second plurality of bearings are coupled to the right side member.*

421. Claims 48 and 49 combined are largely duplicative of claim 31. To illustrate, the table below shows a side-by-side comparison of claims 31, 48 and 49. Claims 48 and 49 are “marked up” to show the minor differences.

| <b>‘884 Patent Claim 31</b>                                                                                                                            | <b>‘884 Patent Claims 48 and 49</b>                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| [31.][a] The manually powered treadmill of claim 30, wherein the frame includes a left side member, a right side member, and at least one cross-member | [48.] The manually powered treadmill of claim 37, wherein the frame includes a left side member, a right side member spaced a distance from the left side |

|                                                                                                                                                                                               |                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| extending between the left side member and the right side member,                                                                                                                             | <b>member</b> , and at least one cross-member extending between the left side member and the right side member.                                                                                       |
| [31][b] wherein the plurality of bearings includes a first plurality of bearings coupled to a left-side of the frame and a second plurality of bearings coupled to a right-side of the frame. | [49.] The manually powered treadmill of claim 48, wherein the first plurality of bearings are coupled the left side member and the second plurality of bearings are coupled to the right side member. |

422. Because the additional limitations of claims 48 and 49 are identical to the additional limitations of claim 31, I refer back to my analysis of these limitations of claim 31 to establish that they are met by the combination of references. (See ¶¶ 388-390.) While not explicitly discussed in my previous analysis, the left and right sides 22 of the base 11 are spaced apart from each other. (Chickering, Ex. 1013, 1:66-69, Fig. 1.)

#### **4. Independent Claim 57**

423. Independent claim 57 is largely duplicative of independent claim 30. To illustrate, the table below shows a side-by-side comparison of claims 30 and 57. Claim 57 is “marked up” to show the minor differences.

| '884 Patent Claim 30                                                                                                  | '884 Patent Claim 57                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| [30.0] A manually powered treadmill, comprising:                                                                      | [57.0] A method, comprising:<br><br>[57.1][a] providing a manually powered treadmill,                                                               |
| [30.1] a frame having a front end and a rear end positioned opposite the front end;                                   | [57.1][a] the manually powered treadmill having a frame with a front end and a rear end;                                                            |
| [30.2] a front shaft coupled to the frame proximate the front end;                                                    |                                                                                                                                                     |
| [30.3] a rear shaft coupled to the frame proximate the rear end;                                                      |                                                                                                                                                     |
| [30.4] a plurality of bearings coupled to the frame;                                                                  | [57.2] providing a plurality of bearings coupled to the frame, wherein the plurality of bearings define at least a portion of a curved top profile; |
| [30.5] a running belt at least partially supported by the plurality of bearings, wherein the running belt comprises a | [57.3] disposing a running belt on the plurality of bearings such that the curved top profile of plurality of                                       |

|                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| curved running surface; and                                                                                                                                                                                                                                                                                                                                                               | bearings define at least a portion of a curved running surface of the running belt;                                                                                                                                                                                                                                                                                      |
| [30.6] a safety device coupled to the frame and the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                                                      | [57.4] providing a safety device coupled to the frame and to the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;                                                                                        |
| [30.7] wherein the running belt and one of the first and second rotatable elements of the safety device freely rotate in a first direction of rotation relative to the other of the first and second rotatable elements of the safety device, but interference between the safety device and at least one of the first and second rotatable elements substantially prevents rotation in a | [57.5] permitting rotation of one of the first and second rotatable elements of the safety device and the running belt in a first direction of rotation; and<br><br>[57.6] substantially preventing rotation in a second direction, opposite the first direction, of the running belt and the one of the first and second rotatable elements by interference between the |

|                                                                                                                                                                                                                                 |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| second direction of rotation, opposite the first direction of rotation, of the running belt and the one of the first and second rotatable elements relative to the other of the one of the first and second rotatable elements. | safety device and at least one of the first rotatable element and the second rotatable element. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|

... ***[57. 0] A method, comprising:***

... ***[57.1][a] providing a manually powered treadmill,***

424. Claim limitations [57.0]-[57.1][a] is substantially similar to limitation [30.0]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Chickering, Magid, and Sclater. (See ¶¶ 354-357.)

... ***[57.1][b]the manually powered treadmill having a frame with a front end and a rear end;***

425. Claim limitations [57.1][b] is substantially similar to limitation [30.1]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Chickering, Magid, and Sclater. (See ¶¶ 358-359.)

***... [57. 2] providing a plurality of bearings coupled to the frame, wherein the plurality of bearings define at least a portion of a curved top profile;***

426. As I discuss in claim [30.4], Chickering discloses “a plurality of bearings coupled to the frame.” As I further discussed in claim [32.], Chickering discloses, “wherein the plurality of bearings define at least a portion of a curved top profile.” (See ¶¶ 366-367, 391-392.)

***... [57.3] disposing a running belt on the plurality of bearings such that the curved top profile of plurality of bearings define at least a portion of a curved running surface of the running belt;***

427. As I discussed in claim limitation [32.], the running surface of Chickering is disposed on rollers 29. The belt 28 is heavy and is not under tension: “When a single belt is used, it may be necessary to use heavier belting material so that the belt will lie flat upon the rollers without being under tension.” (Chickering, Ex. 1013, 3:11-13.) As such, the belt 28 would conform to the shape of the rollers 29, which has a curved top profile. Therefore, “the curved top profile of plurality of bearings define at least a portion of a curved running surface of the running belt.” (See ¶¶ 391-392.)

***... [57.4] providing a safety device coupled to the frame and to the running belt, the safety device having a first rotatable element and a second rotatable element, wherein at least one of the first and second rotatable elements are adapted for rotation relative to the frame;***

428. Claim limitations [57.4] is substantially similar to limitations [30.6]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Chickering, Magid, and Sclater. (See ¶¶ 373-373.)

***... [57.5] permitting rotation of one of the first and second rotatable elements of the safety device and the running belt in a first direction of rotation; and***

***... [57.6] substantially preventing rotation in a second direction, opposite the first direction, of the running belt and the one of the first and second rotatable elements by interference between the safety device and at least one of the first rotatable element and the second rotatable element.***

429. Claim limitations [57.5]-[57.6] are substantially similar to limitation [30.7]. Therefore, I refer back to my analysis of this limitation of claim 30 to establish that they are met by the combination of Chickering, Magid, and Sclater. (See ¶¶ 377-385.)

*... [59] A method according to claim 57, further comprising providing for the adjustment of the vertical incline of at least a portion of the running surface.*

430. Claim 59 is largely duplicative of claim 34. To illustrate, the table below shows a side-by-side comparison of claims 34 and 59. Claim 59 is “marked up” to show the minor differences.

| <b>‘884 Patent Claim 34</b>                                                                                                                                                                                                                                                                                                                                   | <b>‘884 Patent Claim 59</b>                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [34.] The manually powered treadmill of claim 30, further comprising at least one support foot coupled to the frame, wherein the at least one support foot is adjustable to enable an adjustment of the relative vertical incline of at least a portion of the manually powered treadmill in relation to a surface supporting the manually powered treadmill. | [59.] A method according to claim 57, further comprising providing for the adjustment of the vertical incline of at least a portion of the running surface. |

431. Because the additional limitations of claim 59 are similar to the additional limitations of claim 34, I refer back to my analysis of these limitations of claim 34 to establish that they are met by the combination of references. (See ¶¶ 398-

400.)

## **5. Rationale to Combine Chickering and Magid**

432. It would have been obvious to a POSA to combine the manual treadmill topology with a curved running surface disclosed in Chickering with the known technique of a one-way clutch to prevent treadmill belt motion in a forward direction as disclosed in Magid.

433. Chickering and Magid are from the same field – Exercise Equipment, more specifically treadmills for home exercise use. (Chickering, Ex. 1013, 1:1-7; Magid, Ex. 1012, 1:53-58; 3:23-28.) Both Chickering and Magid disclose treadmills with a running belt that is supported by rollers. (Chickering, Ex. 1013, 2:73-3:6, Fig. 3; Magid, Ex. 1012, 6:46-53, Fig. 8.) Chickering discloses that the “rollers 29 are provided journaled in the sidewalls 22 of base 10.” The roller 29a is also coupled to the frame by the journals. (Chickering, Ex. 1013, 2:75-3:2.) The rollers support the running belt 28 and collectively form a curved running surface. (Chickering, Ex. 1013, 2:13-21, Fig. 3.)

434. It has long been recognized that users may be injured by falling off of a treadmill while mounting or dismounting it, or while using it. This may be due to the treadmill belt moving in an unexpected direction or in such a way that the user cannot regain their equilibrium. It could also be due to the incline of the surface causing the position of user to drift rearwards, and off, over time. (See ¶¶ 71-72.)

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, 1:30-36.)

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, 1:33-36.)

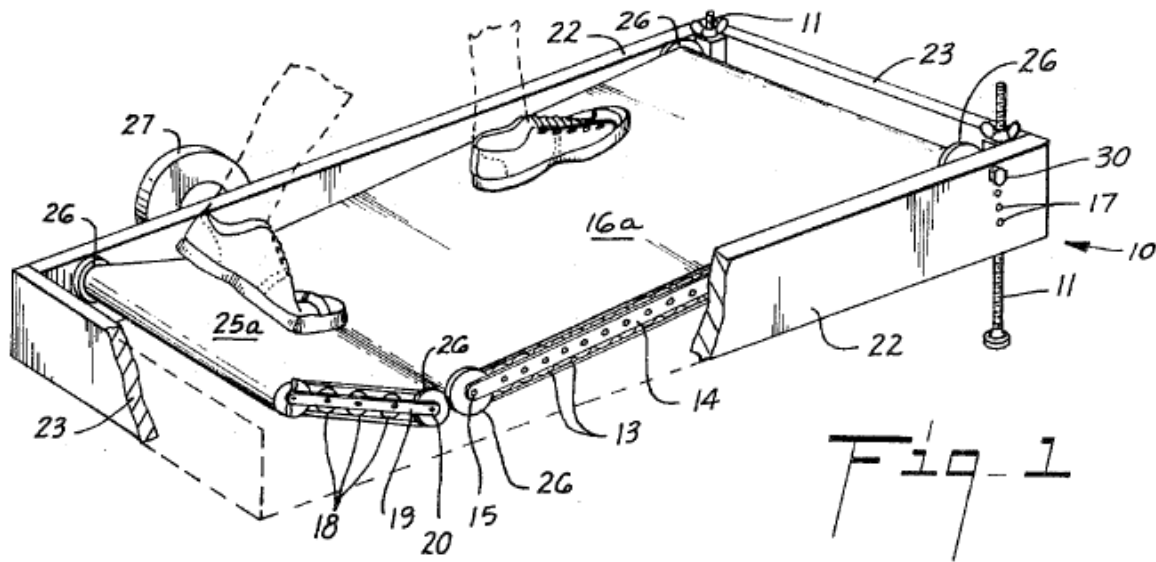
Another meaningful disadvantage of exercise treadmills of the prior art is the inherent danger associated with users tending to fall off the back end of the treadmill and become injured.

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

435. Several professional organizations have produced standards to provide guidance to manufacturers regarding both exercise equipment safety in general and other standards specifically for treadmill safety. *See* ASTM Standard, Ex. 1019; ISO Standard, Ex. 1020; and ACCC Product Safety Supplier Guide, Ex. 1007. These standards establish requirements for foot rails and handrails on treadmills to address stability. (ASTM Standard, Ex. 1019 at 3-4; ISO Standard, Ex. 1020 at 8.)

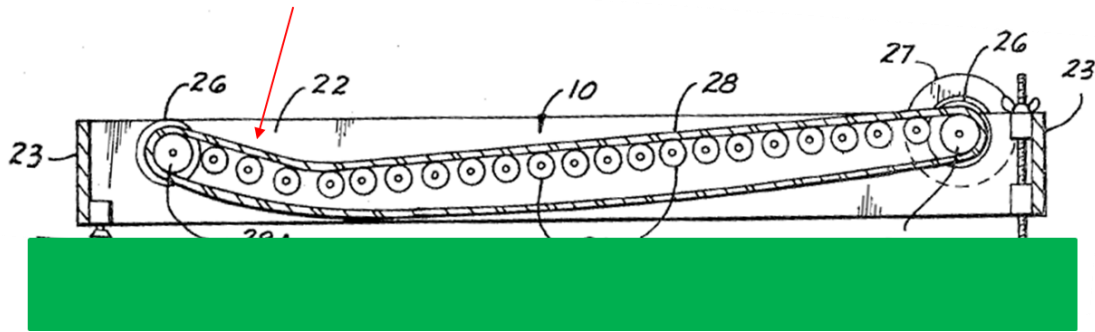
436. Chickering proposes a treadmill with a curved running surface to

address this problem: “The upwardly sloping decelerating area [at the rearward end of the treadmill] offers enough resistance to the user’s foot to enable him to maintain his balance and position on the exercising device.” (Chickering, Ex. 1013, 2:37-39.)



**Chickering, Ex. 1013, Fig. 1**

437. However, Chickering’s curved running surface does not fully address the safety issue of the running belt moving in a forward direction unexpectedly when a user steps onto the treadmill. For example, with a curved running surface, such as that disclosed in Chickering, such forward motion is likely to occur if a user were to step onto the rearward end of the running surface (indicated by the red arrow), causing the foot to unexpectedly move towards the lowest portion of the treadmill. In the condition where the user adjusts the frame to a generally horizontal position using the front jack screw, as depicted in the image below, this unexpected motion would be exacerbated.



**Chickering, Ex. 1013, Fig. 3 (Annotated)**

438. Magid discloses a one-way clutch (unidirectional control means 6, 6') that is coupled to a front shaft (Fig. 5) or a rear shaft (Fig. 2) to permit only unidirectional movement of the belt. (Magid, Ex. 1012, Fig. 5, 4:46-59.)

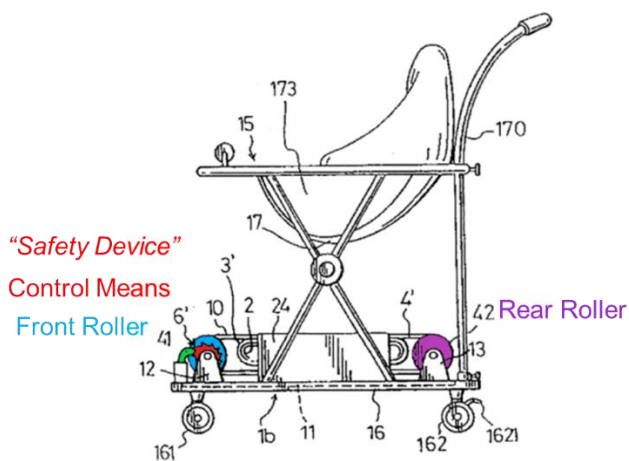


**FIG. 5**

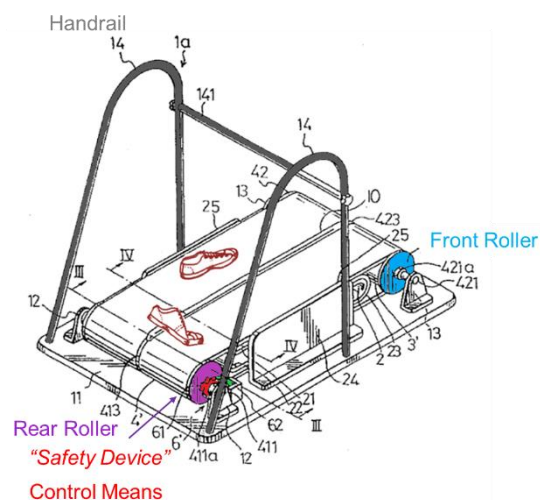
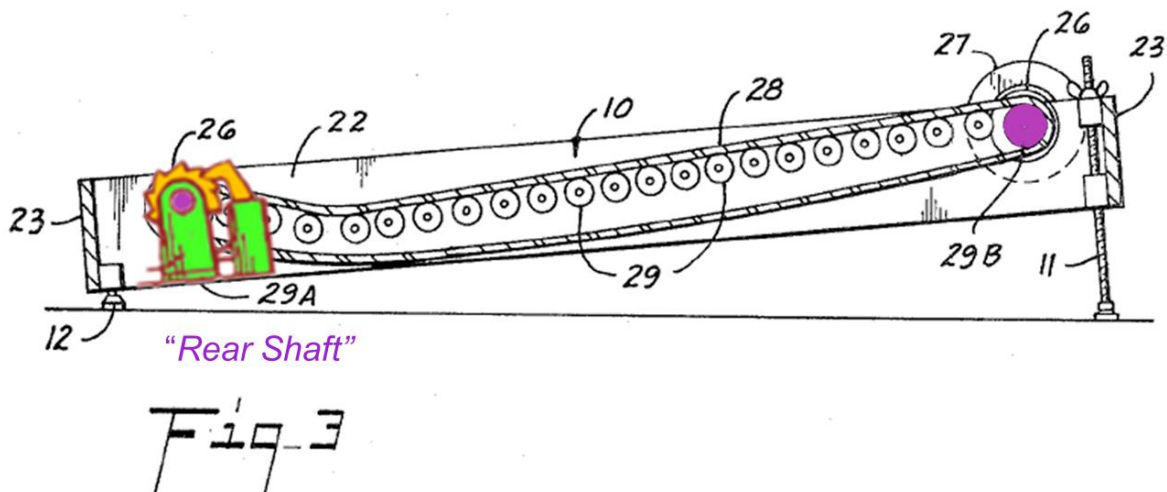


**FIG. 2**

**Magid, Ex. 1012, Figs. 5 and 2 (Annotated)**

439. It would have been obvious to a POSA to combine Chickering's treadmill with Magid's control means to permit only unidirectional movement of the running belt to reduce the risk of a user stepping onto the running belt of the treadmill and losing their balance when the belt moves in the forward direction.

440. Accordingly, a POSA would have been motivated to modify Chickering to include Magid's control means mounted to the front roller or rear roller. The modification would include mounting at least one one-way ratchet clutch to the front roller or the rear roller. The ratchet gear is mounted coaxially with the roller and the pawl is mounted adjacent to the ratchet gear, as taught by Magid. (Magid, Ex. 1012, Fig. 2.)



Chickering, Ex.1013, Fig.3 (Annotated)

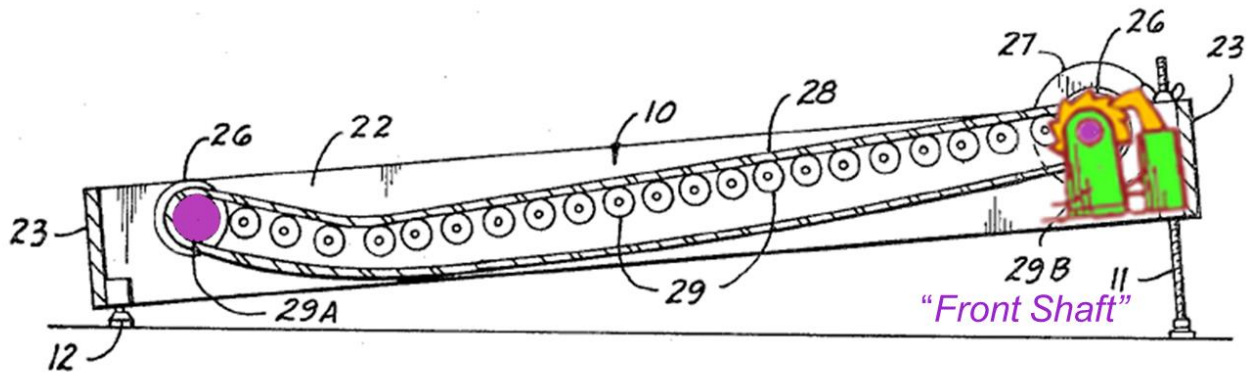


Fig. 3

Chickering, Ex.1013, Fig.3 (Annotated)

441. This modification would have been a straightforward and well understood combination of known elements in the prior art: Chickering's manual treadmill with a curved running surface and Magid's one-way ratchet clutch. The pawl is arranged forward of the ratchet gear and biased to engage the teeth. The profile of the ratchet gear teeth is swept forward to yield well understood and 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. (See ¶¶ 71, 82-83, 89-91.)

442. 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. (See ¶¶

88-90; Magid, Ex. 1012 at 4:48-54.)

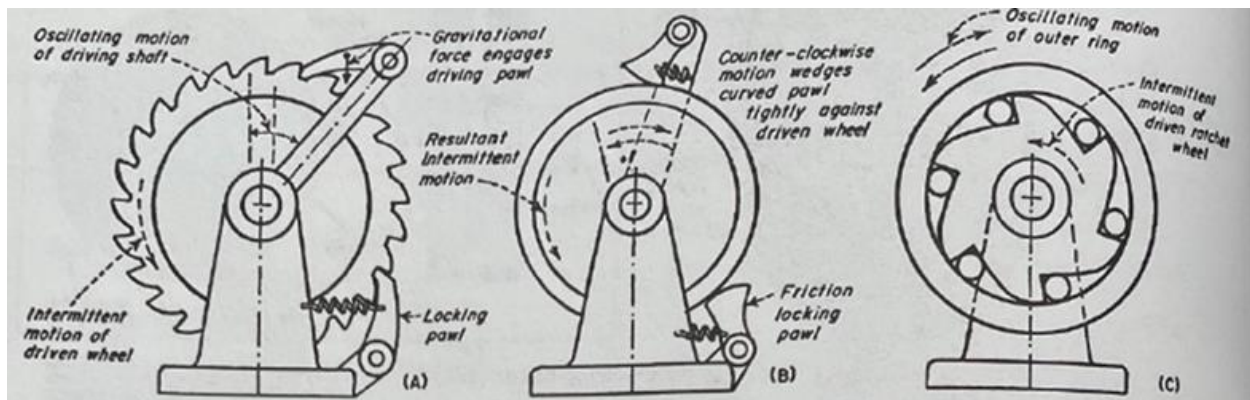
## 6. Rationale to Combine Chickering, Magid, and Sclater

443. A POSA would have been motivated to substitute Sclater's one-way sprag type bearing assembly for Magid's ratchet-and-pawl one-way clutch mechanism to obtain predictable results, e.g., reduced noise and improved durability.

444. Ratchet and pawl clutch mechanisms make noise during operation. The pawl is spring-loaded to engage each gear tooth of the ratchet and it makes an audible "click" when colliding with the gear tooth root after overrunning or passing over each tooth. For example, a POSA would have been aware of this noise from other common ratchet clutches, such as those included in a ratchet wrench and an automotive parking brake. Sclater acknowledges that a "friction-type clutch" is quieter than a ratchet type clutch:

Fig. 1 Elementary overriding clutches: (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.

(Sclater, Ex. 1017 at 316.)



**Sclater, Ex. 1017 at 316**

445. Sclater further discloses that roller clutches are better suited for high speed freewheeling than pawl-and-ratchet clutches. 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.

Fig. 9 Cam and Roller Clutch: This over-running clutch is better suited for higher-speed free-wheeling than a pawl-and-ratchet clutch. The inner driving member has cam surfaces on its outer rim that hold light springs that force the rollers to wedge between the cam surfaces and the inner cylindrical face of the driven member. While driving, friction rather than springs force the rollers to wedge tightly between the members to provide positive clockwise drive. The springs ensure fast clutching action. If the driven member should begin to run ahead of the driver, friction will force the rollers out of their tightly wedged positions and the clutch will slip.

(Sclater, Ex. 1017 at 303.)

Overrunning sprag clutches transmit torque in one direction and reduce speed, rest, hold, or free-wheel in the reverse direction. Applications include overrunning, back stopping and indexing. Their selection – similar to other mechanical devices – requires a review of the torque to be transmitted, overrunning speed, type of lubrication, mounting characteristics, environmental conditions, and shock conditions that might be encountered.

(Sclater, Ex. 1017 at 320.)

446. Sclater further describes a backstopping mode of operation for a conveyor:

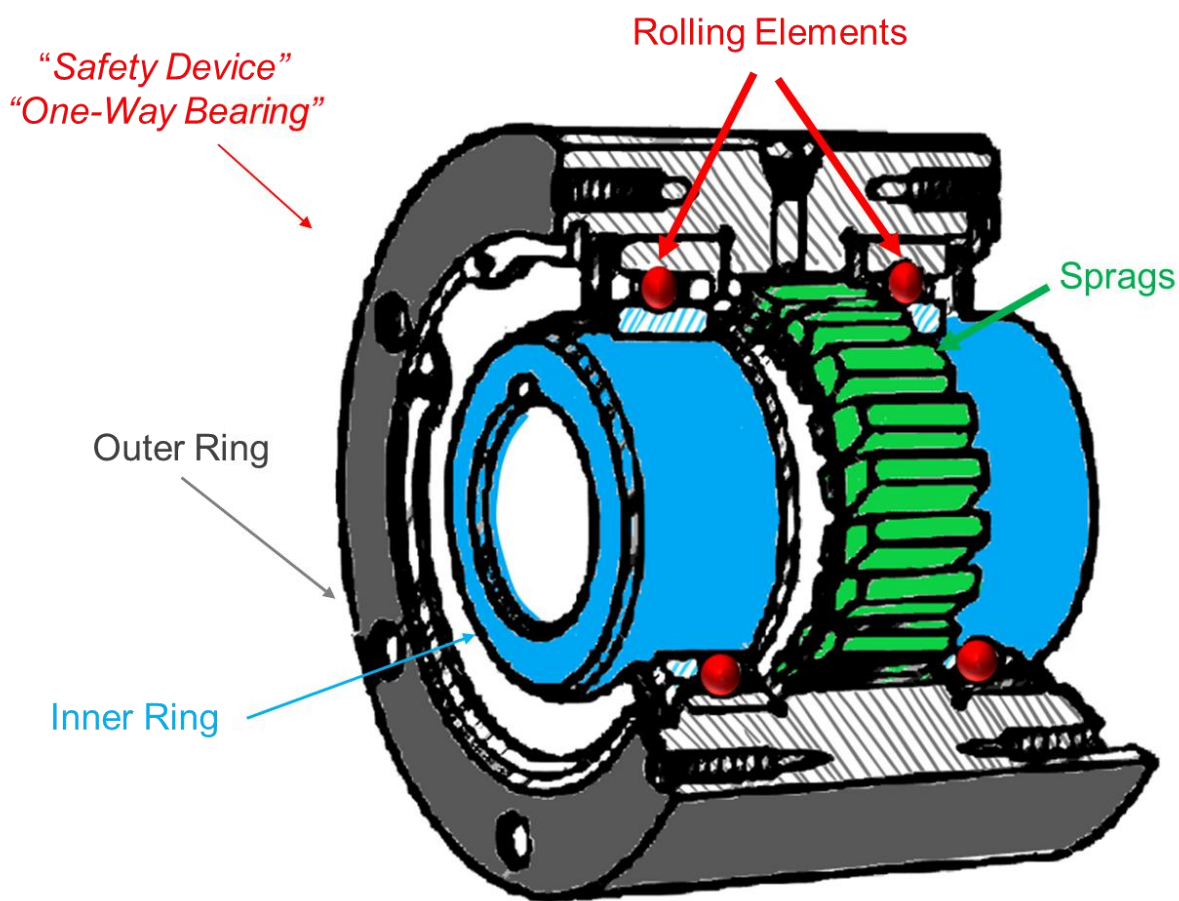
An example is a clutch mounted on the headshaft of a conveyor. The outer race is restrained by torque-arming the stationary frame of the conveyor.

(Sclater, Ex. 1017 at 320.)

447. A POSA would have considered a sprag-type one-way clutch bearing for an exercise equipment application, such as a treadmill. Emerson is a bearing catalog from 2001 that describes its NSS Series sprag type one-way clutch as an option for multiple “Field Applications,” including “Exercise equipment,” “Food processing equipment,” “Printing presses,” and “Roll conveyors.” (Ex. 1018 at 52-53; Ex. 1003, ¶¶ 90.)

448. 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

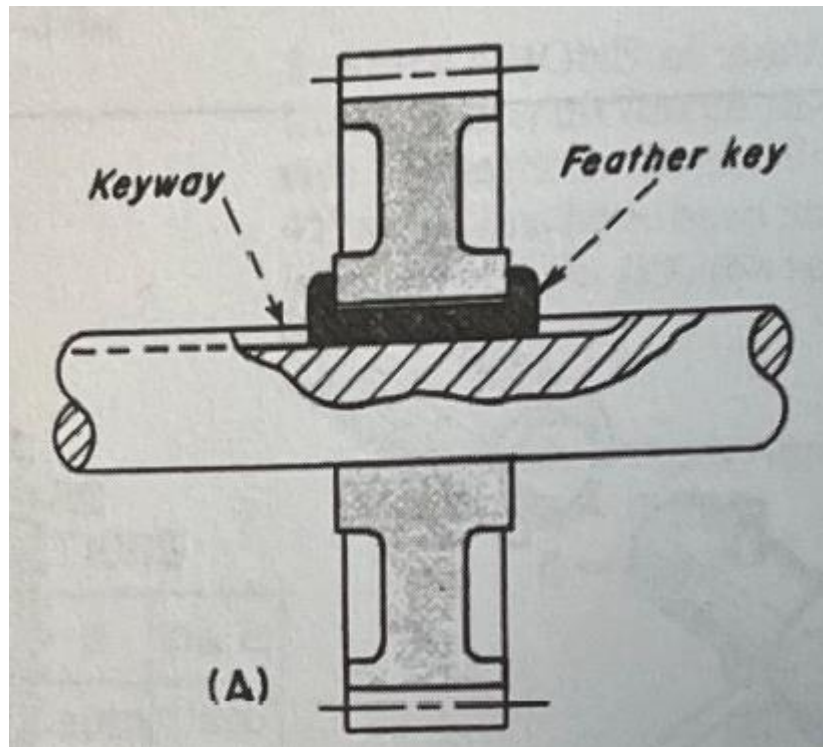
to the frame either directly or through one or more intermediaries, e.g., a bracket, or support structure. For example, Sclater illustrates below that the outer ring includes tapped holes for receiving fasteners for mounting the one-way bearing to a bracket, and Emerson marketed their commercially available brackets or torque arms. (See Ex. 1018 at 38-43.)



**Sclater, Ex. 1017 at 318 (Annotated)**

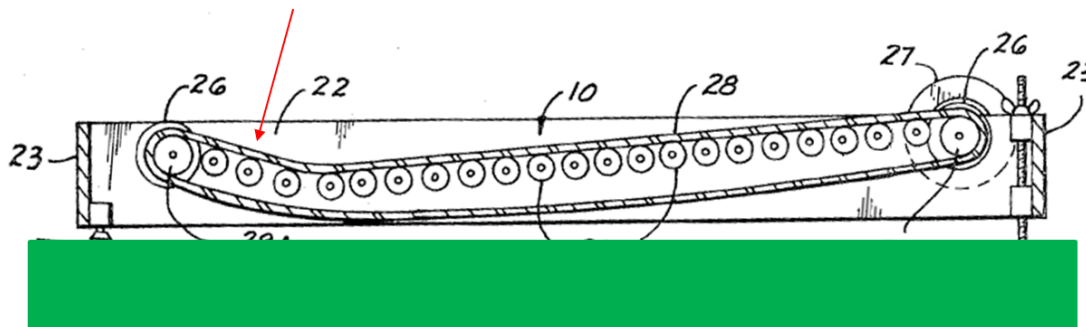
449. The inner ring of the one-way bearing would be secured to the axle of the front roller or rear roller, e.g., with a key/keyway interface, such as that disclosed

by Sclater, above and below:

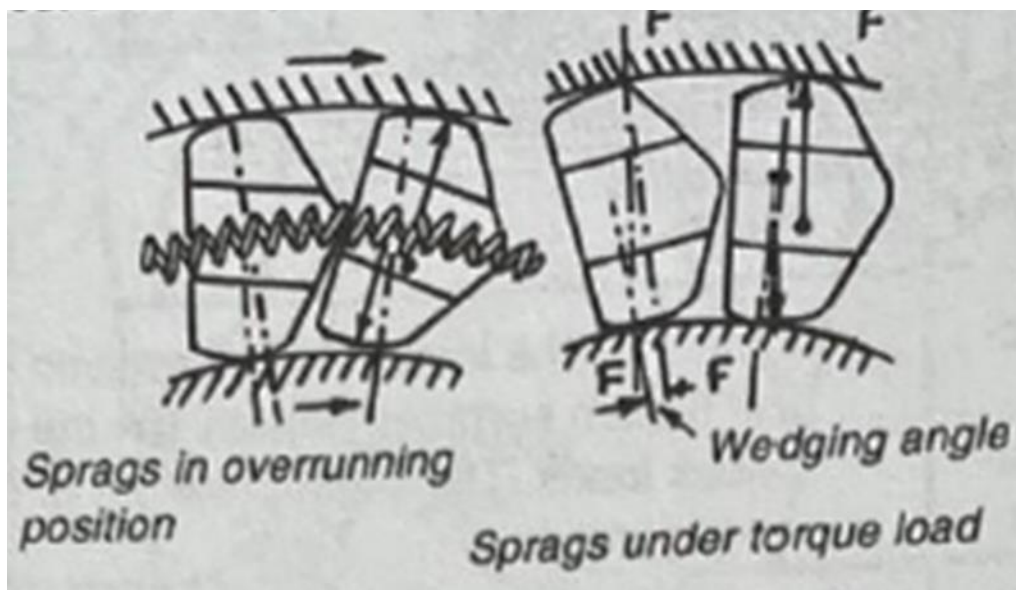


**Sclater, Ex. 1017 at 420**

450. With this arrangement, rearward motion of the endless 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. However, forward motion of the endless belt 28 would rotate the inner ring the opposite direction and wedge the sprags into the locked position to backstop and prevent forward motion of the belt.



Chickering, Ex. 1013, Fig. 3 (Annotated)



Sclater, Ex. 1017 at 318

451. 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.

#### X. Objective Indicia Does Not Support Patentability

452. Considering the information that I have reviewed, my general knowledge of the field of exercise equipment, including manual treadmills with curved running surfaces, and publications within that and related fields, I am not

aware of any objective evidence that might support the patentability of the claims of the '884 Patent. Further, from my review of the file history (Ex. 1002) of the '884 Patent, I did not see that the applicant raised any secondary indicia of nonobviousness during prosecution. I am not otherwise aware of any publicly available evidence of secondary indicia of nonobviousness. Should any alleged secondary indicia of nonobviousness be presented, I reserve the right to provide an opinion thereon.

## **XI. Conclusion**

453. In my opinion, all the elements of the challenged claim limitations are disclosed by the references discussed above and that the claims are unpatentable in view of these prior art references.

454. I reserve the right to supplement my opinions to address any information obtained, or positions taken, based on any new information that comes to light throughout this proceeding.

I declare under penalty of perjury that the foregoing is true and accurate to the best of my ability.

Executed on: April 12, 2023

  
\_\_\_\_\_  
Robert Giachetti, Ph.D.