

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MILLERKNOLL, INC.,
Petitioner,

v.

AARON DEJULE,
Patent Owner.

Patent No. 10,893,753
Filing Date: May 10, 2019
Issue Date: January 19, 2021

Title: APPARATUS WITH WEIGHT RESPONSIVE
CHANGEABLE ADJUSTING CHARACTERISTICS

Inter Partes Review No.: IPR2023-01427

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.***

TABLE OF CONTENTS

	Page
I. MANDATORY NOTICES	1
A. Real Parties in Interest & Related Matters	1
B. Lead & Back-Up Counsel, Service Information	2
II. GROUNDS FOR STANDING & FEE PAYMENT	2
III. OVERVIEW OF THE '753 PATENT	3
A. Brief Description	3
B. Prosecution History of the '498 and '753 Patents.....	6
C. Claim 16 Is Not Entitled to the Provisional's Filing Date	8
IV. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED	11
A. Claims Challenged and Grounds for Challenge.....	11
B. Level of Skill in the Art and How the Claims Are to Be Construed.....	12
1. Level of Skill in the Art.....	12
2. How the Claims Are to Be Construed	13
(i) "adjusting assembly"	13
(ii) "a seat mounted on the frame"	17
V. OVERVIEW OF PRIOR ART	19
A. Schmitz '637.....	19
B. Takamatsu	21
C. Schmitz '738.....	24
VI. SPECIFIC GROUNDS FOR UNPATENTABILITY	28

A.	Ground I: Claims 1-6, 8-14, and 18-22 Are Anticipated by Schmitz '637.....	28
1.	Independent Claim 1.....	28
[1]	A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:	28
[1.a]	a frame;.....	29
[1.b]	a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat; and.....	30
[1.c]	a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame.....	33
[1.d]	the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;.....	36
[1.e]	and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position, ...	36
[1.f]	whereby as an incident of a user sitting on the seat a leaning force greater than the first	

	leaning force is required to change the angular position of the back rest from the starting angular position.	44
2.	Dependent Claim 2	45
3.	Dependent Claim 3	46
4.	Dependent Claim 4	48
5.	Dependent Claim 5	50
6.	Dependent Claim 6	52
7.	Dependent Claim 8	54
8.	Dependent Claim 9	54
9.	Dependent Claim 10	55
10.	Dependent Claim 11	58
11.	Dependent Claim 12	59
12.	Dependent Claim 13	59
13.	Dependent Claim 14	60
14.	Dependent Claim 18	61
15.	Dependent Claim 19	63
16.	Dependent Claim 20	64
17.	Dependent Claim 21	65
18.	Dependent Claim 22	67
B.	Ground II: Claims 1-3, 7, 15, and 17 Are Anticipated by Takamatsu	69
1.	Independent Claim 1	69
[1]	A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:	69

[1.a]	a frame,.....	69
[1.b]	a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat,.....	70
[1.c]	a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame,.....	76
[1.d]	the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;.....	78
[1.e]	and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position, ...	80
[1.f]	whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.	86
2.	Dependent Claim 2	86
3.	Dependent Claim 3	87

4.	Dependent Claim 7	88
5.	Dependent Claim 15	89
6.	Dependent Claim 17	90
C.	Ground III: Claim 16 Is Anticipated by Schmitz '738.....	91
1.	Independent Claim 1	91
[1]	A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:	91
[1.a]	a frame	92
[1.b]	a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat;.....	92
[1.c]	a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame,.....	95
[1.d]	the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;.....	98
[1.e]	and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular	

orientation of the back rest from the starting angular position, ...	99
[1.f] whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.	106
2. Dependent Claim 15	106
3. Dependent Claim 16	107
VII. CONCLUSION.....	108
CERTIFICATION UNDER 37 C.F.R. § 42.24(d)	110
CERTIFICATE OF SERVICE	111
CLAIM LISTING APPENDIX	112

EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,893,753 (“the ’753 Patent”)
1002	U.S. Patent No. 10,292,498 (“the ’498 Patent”)
1003	U.S. Provisional App. No. 62/114,706 (“the Provisional”)
1004	File History for U.S. Patent App. No. 15/040,735
1005	File History for U.S. Patent App. No. 16/408,650
1006	U.S. Patent App. Publication No. 2009/0261637 A1 (“Schmitz ’637”)
1007	U.S. Patent No. 5,348,372 (“Takamatsu”)
1008	U.S. Patent No. 10,531,738 (“Schmitz ’738”)
1009	Excerpts from File History for U.S. Patent App. No. 15/565,495
1010	German Application DE 10 2015 003 156 (“DE’156”)
1011	Certified English Translation of German Application DE 10 2015 003 156
1012	Declaration of Marcus C. Koepke
1013	Marcus C. Koepke CV
1014	Declaration of Alexander J. Bruening
1015	U.S. Patent No. 7,992,936 (“Schmitz ’936”)

Pursuant to 35 U.S.C. §§ 311 *et seq.* and 37 C.F.R. § 42.100 *et seq.*, MillerKnoll, Inc. (“Petitioner”) hereby petitions for *inter partes* review (“IPR”) and cancellation of Claims 1-22 of U.S. Patent No. 10,893,753 (the “’753 Patent,” Ex. 1001), titled “Apparatus with Weight Responsive Changeable Adjusting Characteristics.”

I. MANDATORY NOTICES

A. Real Parties in Interest & Related Matters

MillerKnoll, Inc. is the real party-in-interest. No unnamed entity is funding, controlling, or directing the IPR of the ’753 Patent, or otherwise has an opportunity to control or direct this Petition or Petitioner’s participation in any resulting IPR.

The ’753 Patent issued from U.S. Patent Application No. 16/408,650 (“the ’650 Application”), filed on May 10, 2019. Ex. 1001, 1. The ’650 Application is a continuation of U.S. Patent Application No. 15/040,735 (“the ’735 Application”), filed February 10, 2016, which issued as U.S. Patent No. 10,292,498 (“the ’498 Patent”). *Id.* Concurrent to the filing of this Petition, MillerKnoll is petitioning for IPR of claims 1-10, 14-15, and 18-22 of the ’498 Patent in IPR2023-01428.

Petitioner further identifies that the ’753 Patent is currently asserted in *DeJule v. Miller Knoll, Inc.*, Case No. 1:23-cv-00969-RJJ-SJB (W.D. Mich., filed Sept. 13, 2023).

B. Lead & Back-Up Counsel, Service Information

Petitioner designates counsel listed below and consents to electronic service.

A power of attorney for counsel is being filed with this Petition.

Lead Counsel	Back-Up Counsel
Erik Maurer (Reg. No. 48,648) emaurer@bannerwitcoff.com	Audra Eidem Heinze (Reg. No. 61,267) aheinze@bannerwitcoff.com
Banner & Witcoff, Ltd. 71 S. Wacker Dr. Ste. 3600 Chicago, IL 60606 Tel: (312) 463-5000 Fax: (312) 463-5001	Alexander Bruening (Reg. No. 76,293) abruening@bannerwitcoff.com
	Banner & Witcoff, Ltd. 71 S. Wacker Dr. Ste. 3600 Chicago, IL 60606 Tel: (312) 463-5000 Fax: (312) 463-5001

Please address all correspondence to counsel at this address shown above.

Petitioner consents to electronic service by email at the following address and the above emails: MillerKnoll_IPRservice@bannerwitcoff.com.

II. GROUNDS FOR STANDING & FEE PAYMENT

Petitioner certifies that the '753 Patent is available for IPR and that Petitioner is not barred or estopped from requesting an IPR challenging claims 1-22 on the grounds identified below.

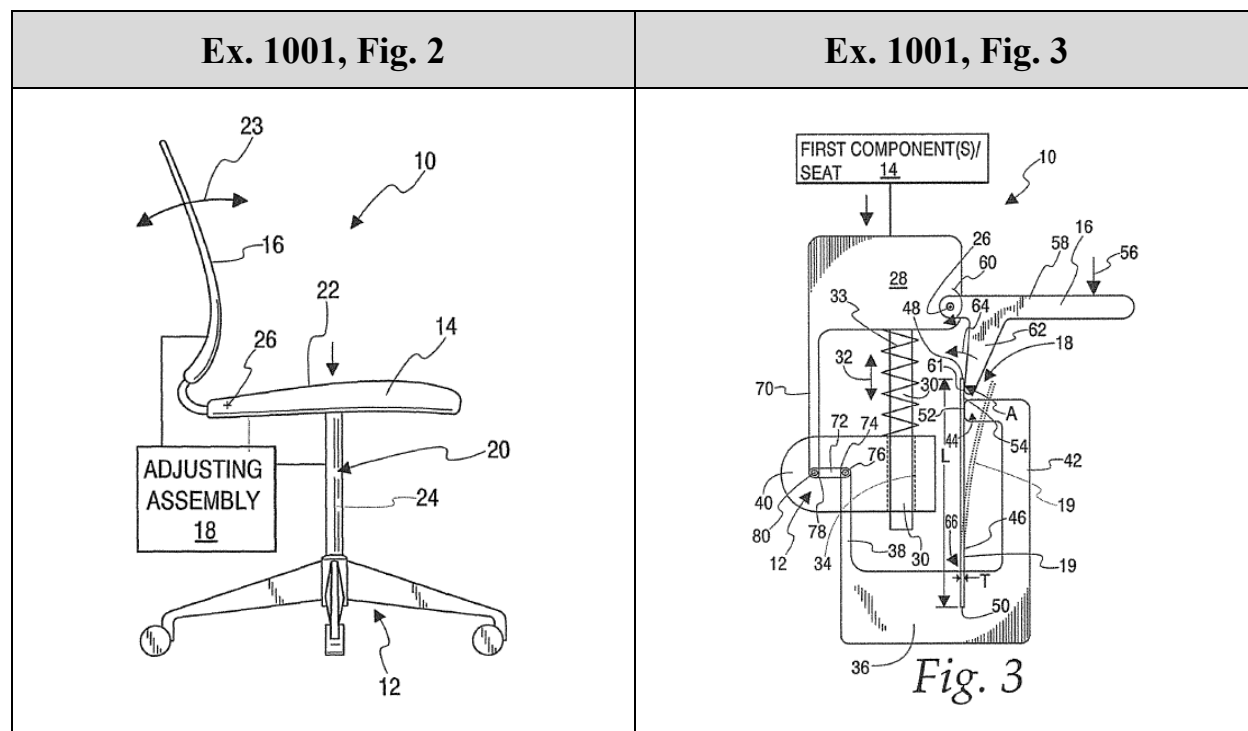
The undersigned authorizes charges of necessary fees to Deposit Account No. 19-0733.

III. OVERVIEW OF THE '753 PATENT

A. Brief Description

The '753 Patent, titled “Apparatus with Weight Responsive Changeable Adjusting Characteristics,” was filed May 10, 2019, and issued January 19, 2021. Ex. 1001, 1.

The '753 Patent is directed to mechanisms for chairs, such as office chairs. Ex. 1001, 5:9-11; Ex. 1012, ¶22. The '753 Patent discloses a mechanism that purports to automatically adjust resistance to tilting a backrest based on a user's weight. Ex. 1012, ¶22. Figure 2 shows a chair 10 incorporating an “adjusting assembly 18” for providing this functionality, and Figure 3 shows one specific assembly. Ex. 1001, Figs. 2, 3; *id.*, 4:15-21; Ex. 1012, ¶¶30-31.



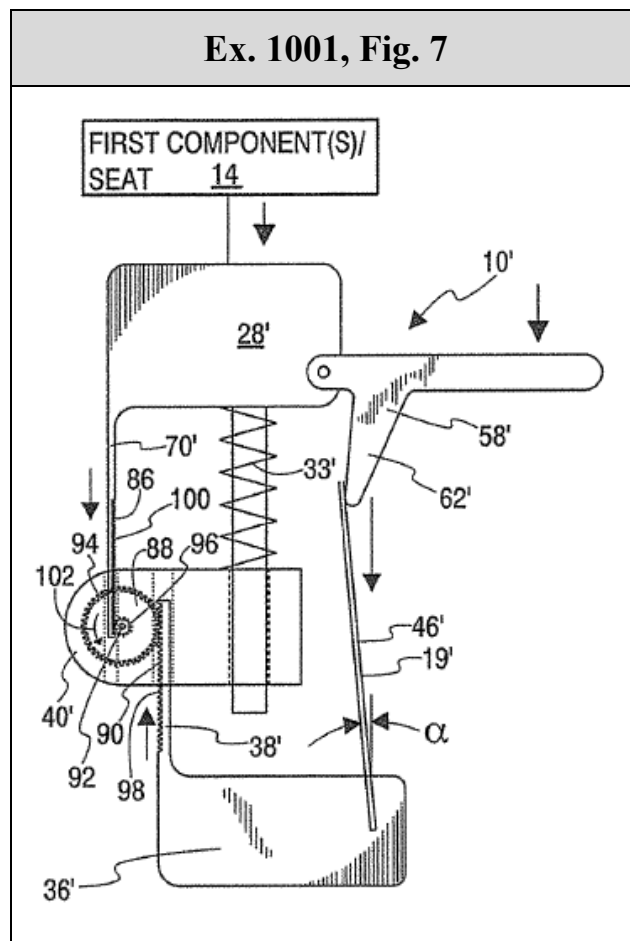
The assembly includes leaf spring 19 that resists tilting of the chair's backrest 16, and when a user sits, the effective length of the leaf spring is reduced in proportion to the user's weight. Ex. 1012, ¶¶31-34. Thus, the heavier the user, the shorter the leaf spring's effective length and the more force required to tilt the backrest. *Id.*

To this end, referring to Figure 3, seat 14 is attached to support 28 that is mounted on frame component 12 via descending post 30. Ex. 1012, ¶31; Ex. 1001, 6:9-13. Coil spring 33 between frame 12 and support 28 biases support 28 upwardly against a user's weight. Ex. 1012, ¶31; Ex. 1001, 6:14-16. Also mounted on support 28 is backrest component 58, which pivots about axis 26 when a user leans back. Ex. 1012, ¶32; Ex. 1001, 6:39-46. The assembly also includes "U-shaped member 36" that includes leg 38 mounted on frame 12. Ex. 1012, ¶33; Ex. 1001, 6:17-19. Leaf spring 19 is anchored in U-shaped member 36 and extends up to resist tilting of backrest component 58. Ex. 1012, ¶33; Ex. 1001, 6:29-30, 6:47-56.

When a user sits on seat 14, coil spring 33 compresses in proportion to the user's weight, and seat 14, support 28, and backrest component 58 move down relative to frame 12 and thus leaf spring 19. Ex. 1012, ¶34; Ex. 1001, 6:65-7:1. Accordingly, the location A at which backrest component 58 bears against leaf spring 19 also moves down, such that the effective length of leaf spring 19 decreases

and more force is required to pivot backrest component 58 about axis 26. Ex. 1012, ¶34; Ex. 1001, 7:1-7.

In an embodiment shown in Figure 7, the mechanism includes rack-and-pinion gears that convert downward movement of the seat into upward movement of the leaf spring, thereby further decreasing the effective length of the leaf spring in response to a user sitting. Ex. 1001, 8:3-15; *id.*, Fig. 7; Ex. 1012, ¶¶36-37.



B. Prosecution History of the '498 and '753 Patents

The '650 Application, which issued as the '753 Patent, was a continuation of the '735 Application, which issued as the '498 Patent. Ex. 1001, 1.

Original claim 1 of the '735 Application recited a “frame,” a “first component” (e.g., a seat), a “second component” (e.g., a backrest), and an “adjusting assembly” configured so that, when the force on the “first component” changes (e.g., a user sitting), the “force being applied in the second manner required to reconfigure the apparatus” (e.g., the force required to tilt the backrest) also changes. Ex. 1004, 30.

The examiner rejected all pending claims over Schmitz '637 (Ex. 1006), observing that it discloses multiple seating mechanisms that alter the force required to tilt a backrest based on the user's weight. Ex. 1004, 84-87; Ex. 1012, ¶26.

Applicants narrowed the claims, amending claim 1 to specify that the “adjusting assembly” changes the force required to “move the second component *relative to the first component*” (e.g., tilt the backrest relative to the seat). Ex. 1004, 104; Ex. 1012, ¶26.¹ Applicants argued this amendment distinguished Schmitz '637 because the backrest of Schmitz '637 “pivot[s]...as a unit” with its seat—not

¹ All emphases throughout this Petition are added.

independently. Ex. 1004, 112; Ex. 1012, ¶26. The examiner agreed, Ex. 1004, 139, and the '498 Patent issued. Ex. 1002.

The '650 Application, which issued as the '753 Patent, was filed soon thereafter. Ex. 1001, 1. Original claim 1 resembled claim 1 of the '498 Patent, reciting a “frame,” a “seat,” a “back rest,” and an “adjusting assembly.” Ex. 1005, 13. But claim 1 omitted the limitation applicants relied on to distinguish Schmitz '637: the “adjusting assembly” no longer adjusted the force required to tilt the “back rest” relative to the “seat”; it only changed the force required to tilt the backrest from its “starting angular position.” *Id.*; Ex. 1012, ¶27. And while claim 1 added one limitation—that the “adjusting assembly” include “a plurality of gears,” Ex. 1005, 13—the examiner previously recognized that Schmitz '637 discloses this limitation. Ex. 1004, 86 (“Schmitz ['637] discloses...cooperating toothed elements.”); *see also* Ex. 1012, ¶¶27-28, 111-116; Ex. 1006, Fig. 7d. Nonetheless, the examiner allowed the claims without rejection, *see* Ex. 1005, and the '753 Patent issued. Ex. 1001, 1.

The file history reveals the examiner’s mistake. As shown in the “reasons for allowance,” the examiner erroneously believed that claim 1 *did* include the limitation applicants relied on to distinguish Schmitz '637 during prosecution of the '498 Patent. Specifically, when analyzing two other prior art references (US 4,962,962 and 7,600,814) and applying them to claim 1, the examiner noted that each reference “teaches a *backrest tiltable relative to the seat part.*” Ex. 1005, 170.

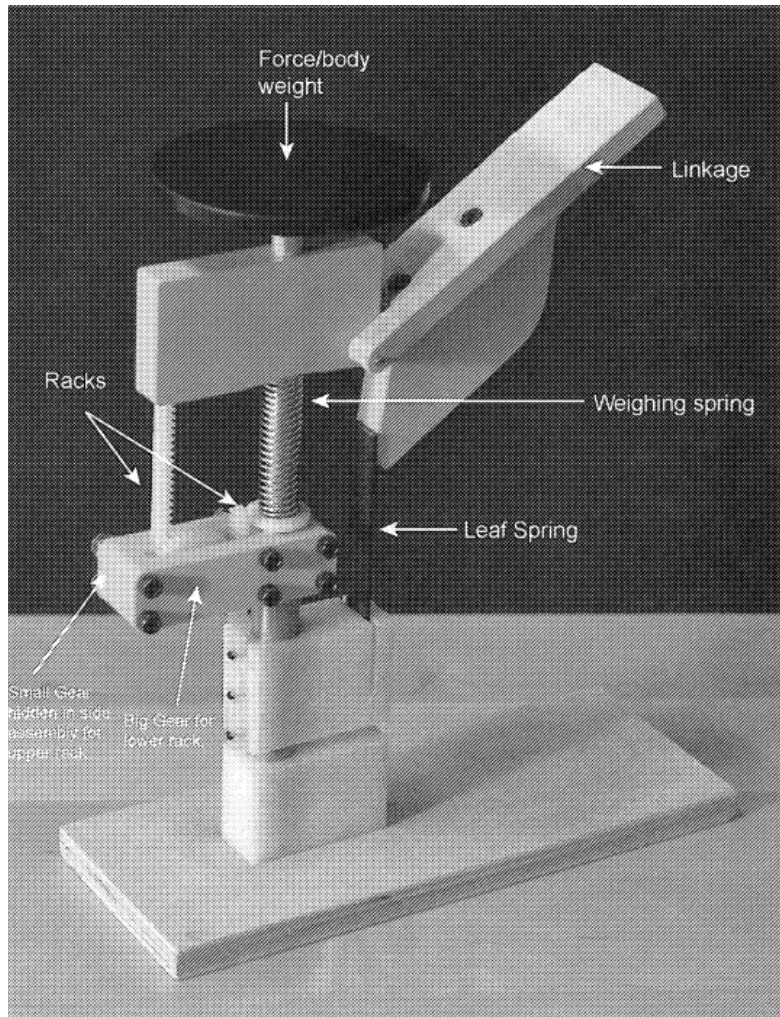
That is, the examiner erroneously believed claim 1 required a backrest tiltable *relative to a seat part* (as with the '498 Patent) when, in fact, claim 1 only required a backrest tiltable relative to its “starting angular position.” Ex. 1005, 13; Ex. 1001, 12:24-50.

C. Claim 16 Is Not Entitled to the Provisional’s Filing Date

Claim 16 of the '753 Patent is not entitled to the filing date of Provisional Application No. 62/114,706 (Ex. 1003, the “Provisional”). To be entitled to an earlier priority date, a claim must be described in an earlier-filed application. *Los Angeles Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049, 1057 (Fed. Cir. 2017).

The Provisional does not describe claim 16’s requirement of “first and second gears turn[ing] around *different axes*.” Ex. 1012, ¶¶42-49; Ex. 1001, 14:1-3. The two-page specification of the Provisional discloses a mechanism that resembles that of Figure 7 of the '753 Patent. Ex. 1003, 4; *see* Ex. 1001, Fig. 7; Ex. 1012, ¶¶43-45.

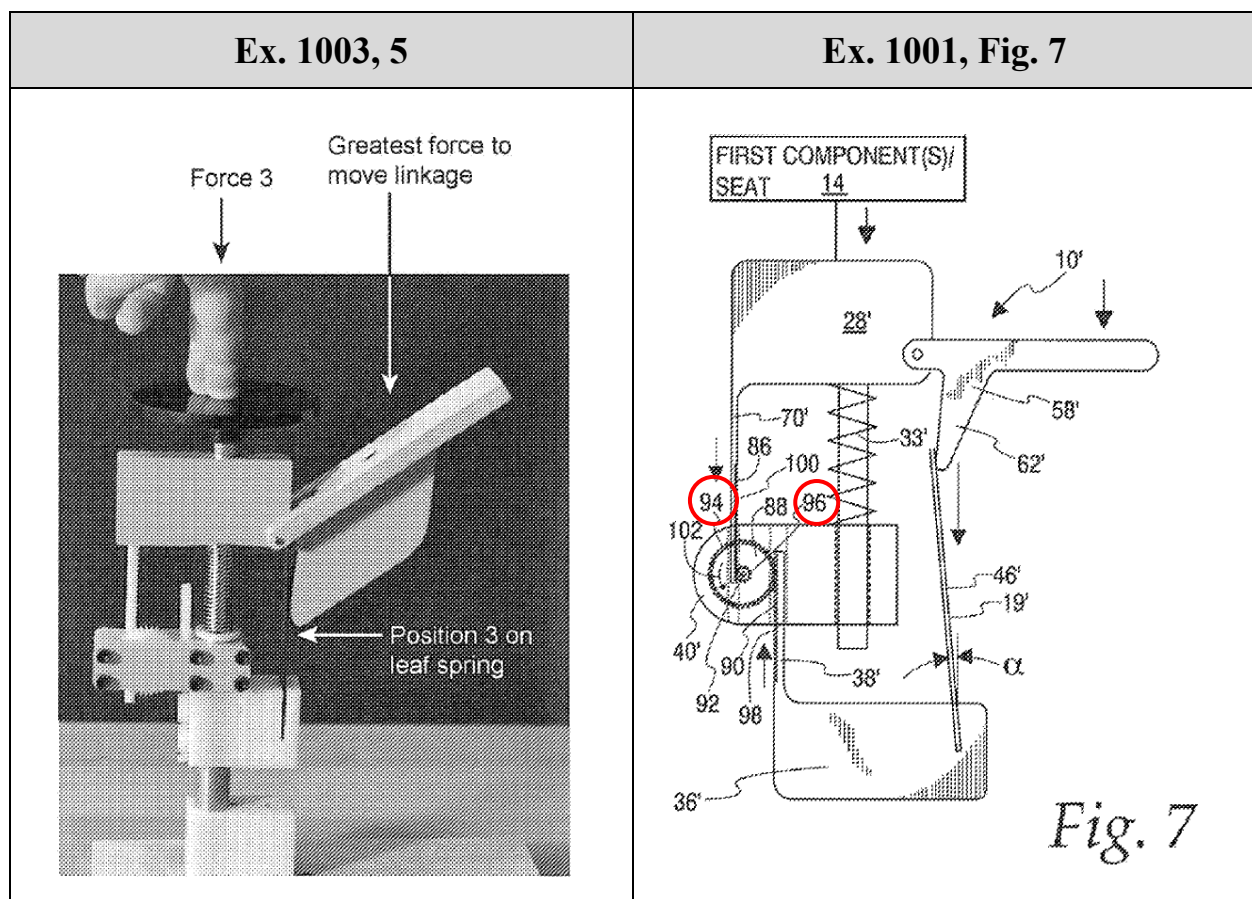
Provisional (Ex. 1003, 4)



A seat component (black disc) is mounted on a rectangular member supported by a “Weighing spring.” Ex. 1003, 4-5; Ex. 1012, ¶44. A “Linkage” is mounted on the rectangular member and pivots against the resistance of a “Leaf Spring.” Ex. 1003, 4-5. When a user sits, the rectangular member and the Linkage move down against the “Weighing spring.” *Id.* In addition, a “Rack[]” extending down from the rectangular member drives a “Small Gear hidden in side assembly for upper rack,”

which turns with a “Big Gear for lower rack” that, in turn, drives a “Rack[]” extending up from a rectangular member in which the “Leaf Spring” is anchored. *Id.*; see Ex. 1012, ¶45.

As with small gear 96 and large gear 94 in Figure 7 of the ’753 Patent, the “Small Gear” and “Big Gear” of the Provisional turn on the same axis—not on different axes. Ex. 1012, ¶47-48. The comparison below bears this out.



The Provisional therefore does not support “first and second gears turn[ing] around different axes,” and claim 16 is not entitled to the Provisional filing date. Ex. 1012, ¶¶47-49.

IV. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED

A. Claims Challenged and Grounds for Challenge

Petitioner requests review on the following Grounds:

Ground	Claims	Basis	Prior Art
I	1-6, 8-14, 18-22	102(a)(1)	Schmitz '637
II	1-3, 7, 15, 17	102(a)(1)	Takamatsu
III	16	102(a)(2)	Schmitz '738

Schmitz '637 was before the examiner of the '753 Patent. However, the examiner erred in failing to reject the claims over Schmitz '637.

As discussed above, the applicants for the '753 Patent omitted from the claims the element they had relied on to distinguish Schmitz '637 during prosecution of the '498 Patent—that the “adjusting assembly” change the amount of force required to “move the second component *relative to the first component*.” Compare Ex. 1004, 104 with Ex. 1005, 13; Ex. 1012, ¶¶26-27. And the only new element, a “plurality of gears,” is disclosed in Schmitz '637, as the examiner previously found. Ex. 1004, 86; Ex. 1012, ¶28. Still, the examiner failed to reject claim 1 because he erroneously believed it did, in fact, require a backrest pivotable relative to its seat. Compare Ex. 1005, 170 with Ex. 1005, 13; Ex. 1001, 12:24-50.

Thus, reliance herein on Schmitz '637 does not weigh against institution. *Medacta USA, Inc. v. RSB Spine, LLC*, IPR2020-00264, Paper 24, 10-18 (PTAB

May 22, 2020) (instituting IPR involving reference examiner erroneously overlooked).

In addition, neither Takamatsu nor Schmitz '738 were of record during prosecution of the '753 Patent (Ex. 1001, 1; Ex. 1005; Ex. 1012, ¶29), which further supports institution. *E.g. Sony Interactive Entertainment LLC v. Bot M8, LLC*, IPR2020-00726, Paper 13, 9-14 (PTAB Oct. 6, 2020).

Finally, Petitioner submits the Declaration of Marcus Koepke in support of Grounds I-III, which includes testimony on how a person of ordinary skill in the art ("PHOSITA") would understand the claims of the '753 Patent and the disclosures of the prior art. Ex. 1012. This testimony was not of record during prosecution and further supports institution. *Halliburton Energy Servs., Inc. v. Schlumberger Tech. Corp.*, IPR2017-02070, Paper 13, 5-6 (PTAB Apr. 13, 2018).

B. Level of Skill in the Art and How the Claims Are to Be Construed

1. Level of Skill in the Art

The '753 Patent is directed to seating mechanisms and, more particularly, to mechanisms that automatically adjust resistance to tilting a backrest based on a user's weight. Ex. 1012, ¶22. As of the presumptive priority date of February 11, 2015, a PHOSITA would have had a bachelor's degree in industrial design, mechanical engineering, and/or a related field, and at least 2-3 years of experience designing furniture. *Id.*, ¶23.

2. How the Claims Are to Be Construed

No claim terms require construction except those below, which warrant construction under the standard used in civil actions under § 282(b). 37 C.F.R. § 42.100(b).

(i) “adjusting assembly”

“Adjusting assembly,” recited in claim 1, is not a recognized term of art in the field of the ’753 Patent. Ex. 1012, ¶53. As used in the ’753 Patent, it should be construed as a means-plus-function (“MPF”) element under § 112(f). *Id.*

Claim elements that do not recite “means” are presumed to not be MPF, but that presumption is overcome where the claim recites function without reciting sufficient structure for performing that function. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015).

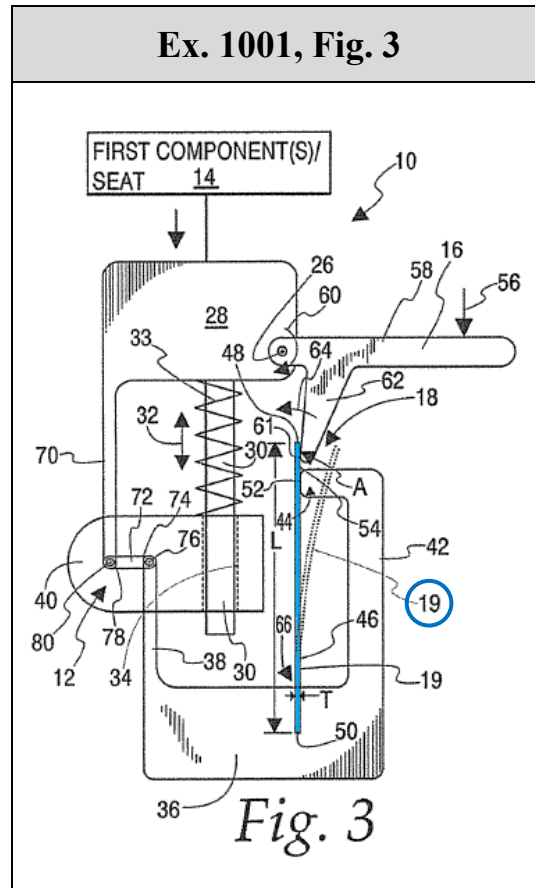
Claim 1 recites function. Ex. 1012, ¶57. It reads: “an adjusting assembly comprising a plurality of gears” configured to “increase a resistance to changing of the angular orientation of the back rest from the starting angular position” when the seat moves from a “first position into [a] loaded position.” Ex. 1001, 12:41-46.

But claim 1 does not recite sufficient structure for performing that function. For starters, a PHOSITA would not consider “adjusting assembly” to refer to any specific structure. Ex. 1012, ¶58. Nor does the ’753 Patent define “adjusting assembly” as specific structure; it merely describes example adjusting assemblies.

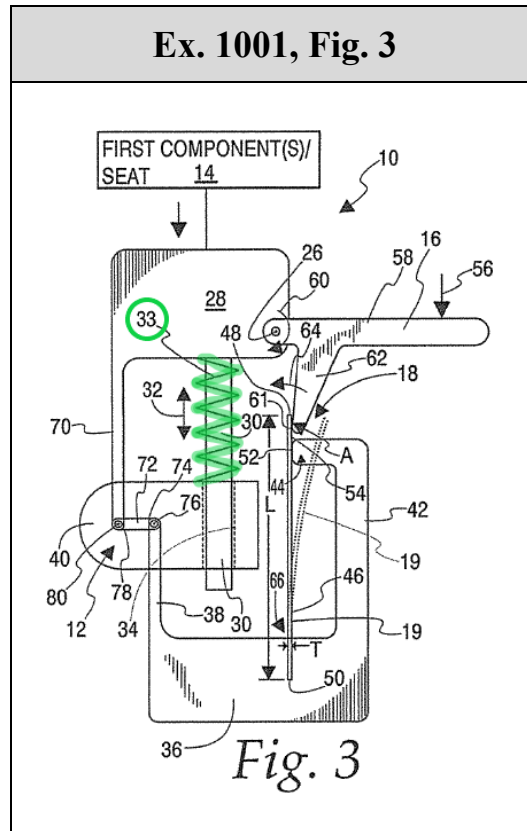
Id., ¶59; Ex. 1001, 5:66-6:3. Rather, “adjusting assembly” is used as a “nonce” term that operates as a substitute for “means” to claim a function. *See MTD Prods. Inc. v. Iancu*, 933 F.3d 1336, 1341-45 (Fed. Cir. 2019).

Nor do the claims otherwise recite sufficient structure for providing the claimed function. Ex. 1012, ¶¶60-65. To avoid application of § 112(f), a claim must recite “sufficient structure to perform the entire claimed function.” *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1305 (Fed. Cir. 1999). Claim 1 recites a “plurality of gears,” Ex. 1001, 12:41-46, but this structure is not sufficient to perform the claimed function. Ex. 1012, ¶60. Rather, two other structures are necessary, neither of which is recited in claim 1.

First, the claimed function requires a spring structure that variably resists the tilting of the backrest—i.e., a tilting spring. Ex. 1012, ¶61. Otherwise, there can be no “resistance to changing of the angular orientation of the back rest,” much less an “increase” in resistance. *Id.* An example tilting spring in the ’753 Patent is leaf spring 19 (blue below). *Id.*; Ex. 1001, Fig. 3.



Second, the claimed function requires a spring structure that allows the seat to move down a distance proportionate to a user's weight when the user sits—i.e., a weighing spring. Ex. 1012, ¶63. This weight-adjusted movement reduces the effective length of the tilting spring, thereby increasing the backrest tilting resistance—the claimed function. *Id.* An example weighing spring in the '753 Patent is coil spring 33 (green below). *Id.*; Ex. 1001, Fig. 3.



None of the claims recite both these structures. Ex. 1001, 12:24-14:41; Ex. 1012, ¶65. Thus, “adjusting assembly” is properly construed as MPF. *Egenera, Inc. v. Cisco Sys., Inc.*, 972 F.3d 1367, 1374 (Fed. Cir. 2020) (“The question is not whether a claim term recites *any* structure but whether it recites *sufficient* structure.”).

There are two steps to construing “adjusting assembly”: (1) identify the claimed function, and (2) identify the corresponding structure(s) disclosed in the specification. *Williamson*, 792 F.3d at 1351.

First, the claimed function is “increas[ing] a resistance to changing of the angular orientation of the back rest from the starting angular position,” which is

recited in the claim itself. Ex. 1012, ¶¶66; Ex. 1001, 12:41-46; *see Generation II Orthotics Inc. v. Medical Tech. Inc.*, 263 F.3d 1356, 1364-65 (Fed. Cir. 2001).

Second, the corresponding structure is limited to that which is “necessary to perform the claimed function.” *Micro Chemical, Inc. v. Great Plains Chemical Co., Inc.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999).

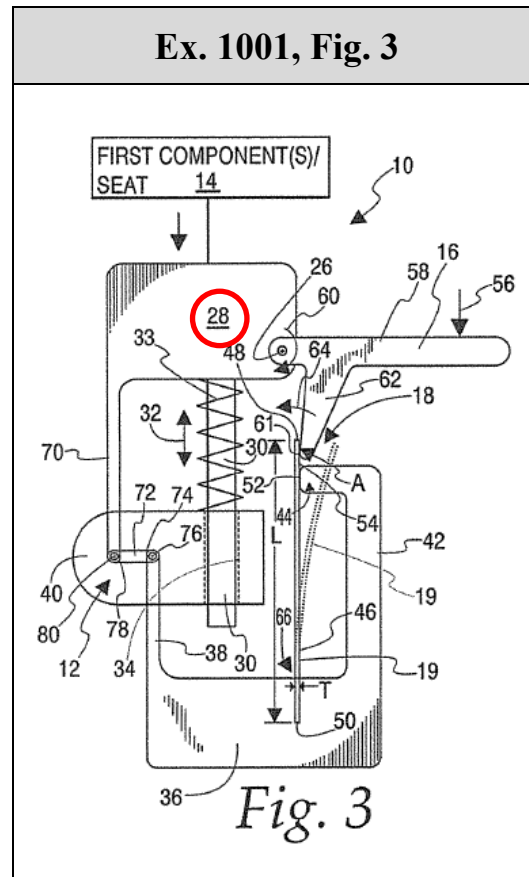
Here, the necessary structures are the two discussed above: the tilting spring and the weighing spring. Ex. 1012, ¶¶67, 61-64. As for tilting springs, the ’753 Patent discloses leaf springs, e.g., leaf spring 19 (Ex. 1001, 6:25-28); coil springs, e.g., coil spring 19⁶ (*id.*, 10:1-6, 10:31-34); and a “torsion component 168” (*id.*, 10:53-11:8). Ex. 1012, ¶¶61-62. As for weighing springs, the ’753 Patent discloses only coil springs, e.g., coil spring 33. Ex. 1001, 6:13-16; Ex. 1012, ¶¶64.

(ii) “a seat mounted on the frame”

“[A] seat mounted on the frame,” recited in claim 1, should be construed as: a seat mounted directly or indirectly on the frame. Ex. 1012, ¶¶69-71.

This construction is required by the dependent claims, which recite elements “mounted *directly*” to one another. Ex. 1001, 13:15-20; Ex. 1012, ¶¶70. Thus, “mounting” on its own encompasses both direct and indirect mounting. *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1374 (Fed. Cir. 2014) (applying claim differentiation).

Moreover, the '753 Patent does not disclose an embodiment in which a seat is mounted directly on a frame. Ex. 1012, ¶71. There are always intervening components, such as support 28. *Id.*; Ex. 1001, 6:9-13, Fig. 3.

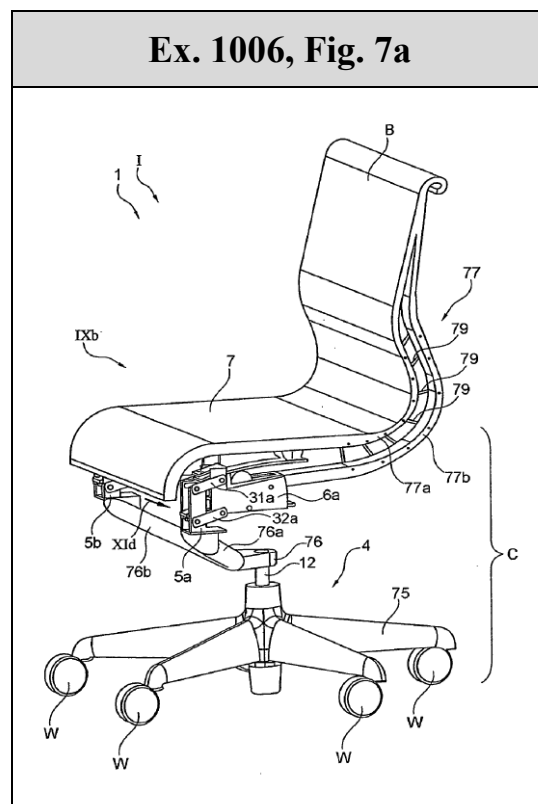


This confirms “mounted on the frame” should include direct and indirect mounting. Ex. 1012, ¶71; *Kaneka Corp. v. Xiamen Kingdomway Grp. Co.*, 790 F.3d 1298, 1304 (Fed. Cir. 2015) (construction should not exclude all embodiments).

V. OVERVIEW OF PRIOR ART

A. Schmitz '637

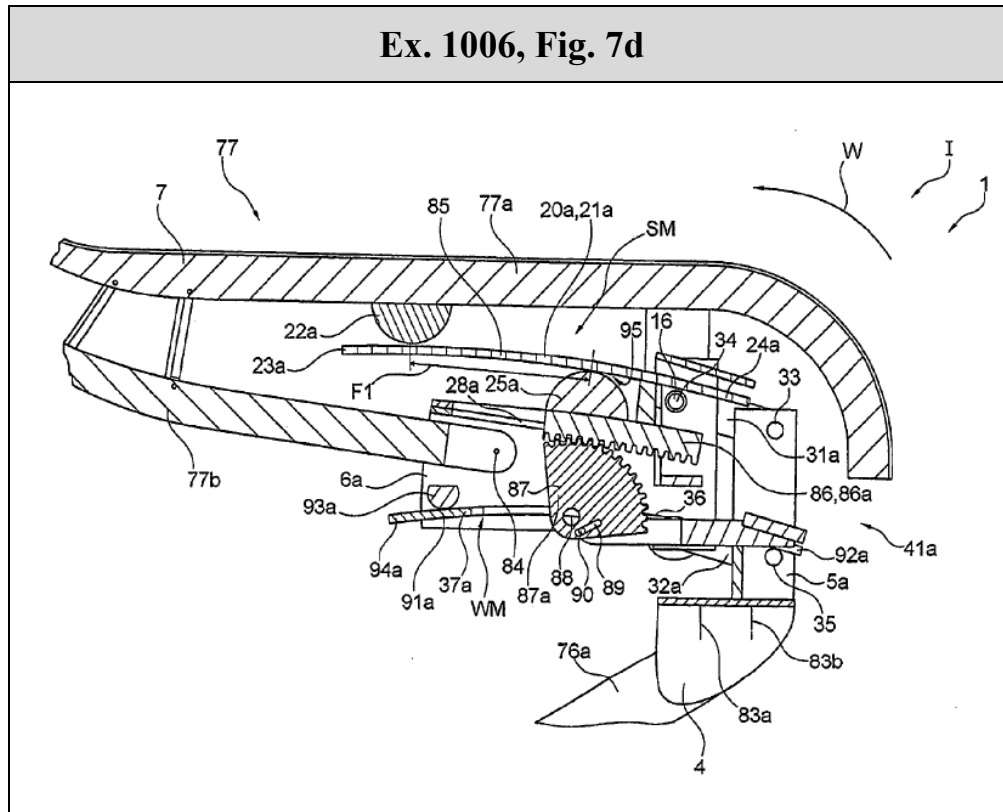
Publication No. US 2009/0261637A1 to Schmitz (“Schmitz '637”) published October 22, 2009 (Ex. 1006, 1) and is prior art under § 102(a)(1). Schmitz '637 discloses multiple seating mechanisms that automatically adjust tilting resistance based on the user's weight. *E.g.* Ex. 1006, Fig. 7a.



Referring to Figure 7c, two legs 77 and 78 of the chair's seat 7 are pivotally mounted to two “upper part[s]” 6a and 6b. Ex. 1006, Fig. 7c; *see id.*, ¶¶68, 70-71. Two leaf springs, 21a and 21b, resist the tilting of seat 7 about the upper parts. *Id.*, ¶¶70-71.

FIG. 1 is a perspective view of a mechanical assembly 1. The assembly includes a base 76 with two vertical supports 77a and 77b. A central shaft 78 is supported by bearings 79. A curved member 80 is attached to the shaft. A handle 5a is connected to the shaft via a linkage mechanism 41a, 41b. A control lever 6a is also shown. The assembly is labeled with various reference numerals.

20



As explained below, when a user sits on seat 7, rack gear 86a and thus support 25a are driven to the left (Ex. 1006, ¶71), thereby shortening the effective length of leaf spring 21a and increasing the tilting resistance. *Id.*

B. Takamatsu

U.S.P.N. 5,348,372 to Takamatsu (“Takamatsu”) issued September 20, 1994, Ex. 1007, 1, and is prior art under § 102(a)(1). Takamatsu also discloses multiple seating mechanisms that automatically adjust the tilting resistance based on the user’s weight. *E.g.* Ex. 1007, Fig. 2.

Ex. 1007, Fig. 2

22

Ex. 1007, Fig. 3

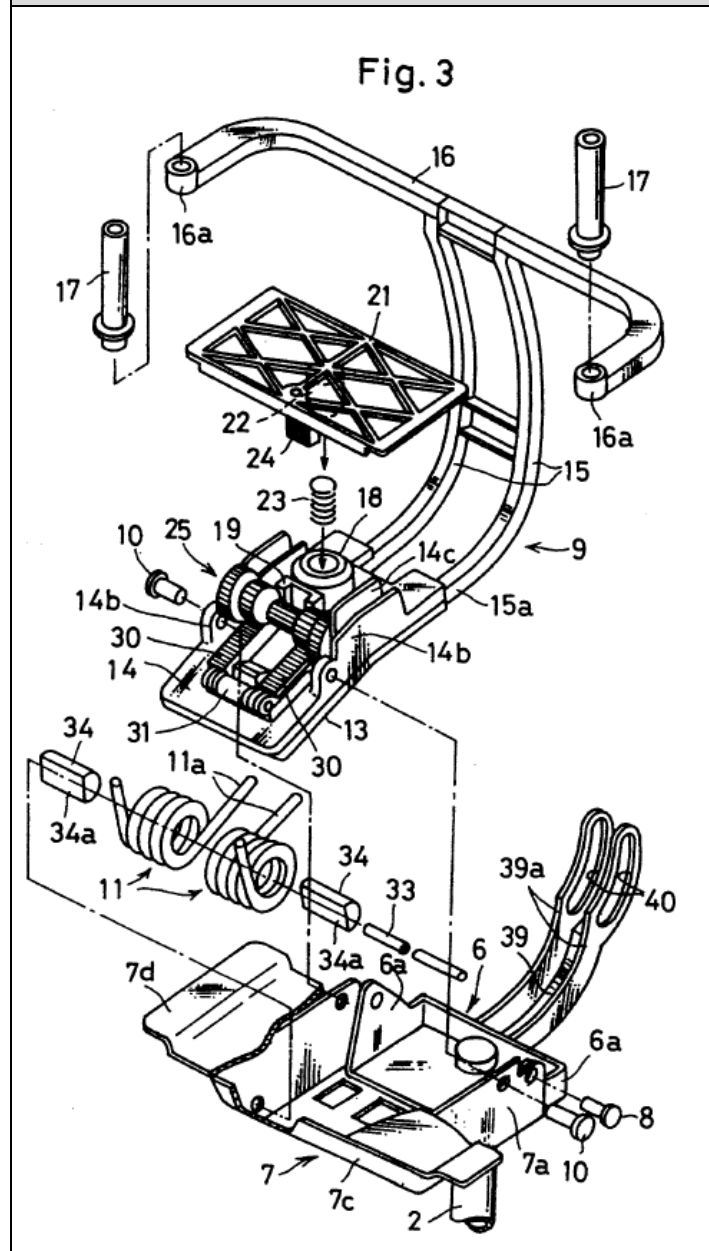
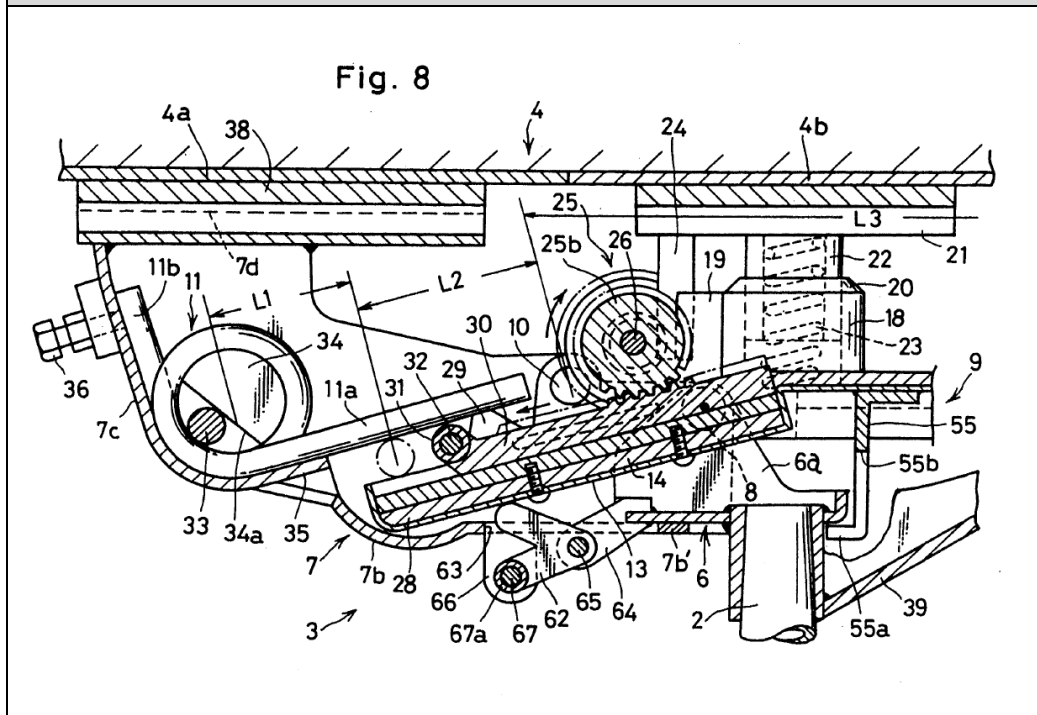


Figure 8 shows the mechanism. Ex. 1007, Fig. 8. Tiltable member 9 bears against tilting control springs 11 via a load applying pin 32 mounted on rack gear 30. Ex. 1007, 5:49-55.

Ex. 1007, Fig. 8



As explained below, when a user sits, rack gear 30 and load applying pin 32 are driven to the left (Ex. 1007, 7:13-25), thereby reducing the effective length of load receiving legs 11a of each tilting control spring 11 and increasing the tilting resistance. *Id.*, 7:25-30, 7:65-8:39.

C. Schmitz '738

U.S.P.N. 10,531,738 to Schmitz ("Schmitz '738") issued January 14, 2020 (Ex. 1008, 1) and is prior art to claim 16 of the '753 Patent under § 102(a)(2).

Claim 16 was effectively filed no earlier than February 10, 2016, the filing date of the '735 Application. Ex. 1001, 1; *see* Section III.C, *supra*.

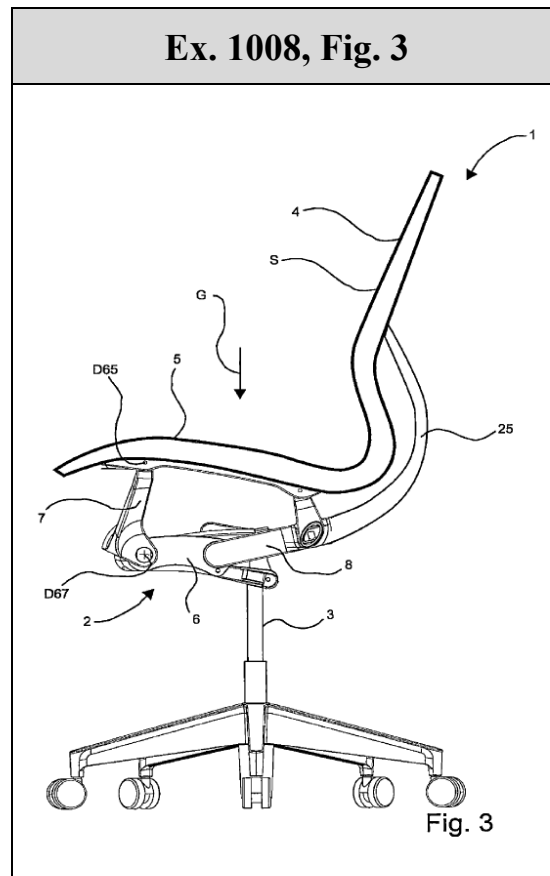
Schmitz '738 is prior art under § 102(a)(2) because it was effectively filed in relevant part prior to this date and does not name the same inventors. 35 U.S.C. § 102(a)(2). Ex. 1012, ¶¶74-76; *id.* at App. A. For prior art purposes, a patent is effectively filed as to “any subject matter described in [that] patent” as of “the filing date of the earliest [prior] application that describes the subject matter,” and to which the patent claims priority. 35 U.S.C. § 102(d)(2). In other words, the prior application “must describe the subject matter...relied upon in a rejection.” MPEP § 2154.01(b).

Schmitz '738 is the U.S. entry of PCT Application No. PCT/EP2016/055450, filed March 14, 2016. Ex. 1008, 1. Schmitz '738 and the PCT Application claim priority to German application DE102015003156 (“DE'156”), filed March 14, 2015—within one year of the PCT Application. *Id.* Schmitz '738 is thus entitled to claim priority to DE'156. *See* Ex. 1009, 10-11, 17, 94-137, 139.

DE'156 describes the subject matter of Schmitz '738 relied on herein to challenge claim 16. Ex. 1012, ¶¶75-76. Figures 1-19 of Schmitz '738, the figures relied on herein, are identical to Figures 1-19 of DE'156 (with the exception of reprinted reference numerals). *Compare* Ex. 1008, Figs. 1-19 *with* Ex. 1010, Figs. 1-19; *see* Ex. 1014, ¶¶3-5. And the written description of Schmitz '738 relied on herein is also described in DE'156, as shown by the certified English translation thereof. Ex. 1011; Ex. 1012, ¶75; *id.* at App. A (element-by-element support for relevant

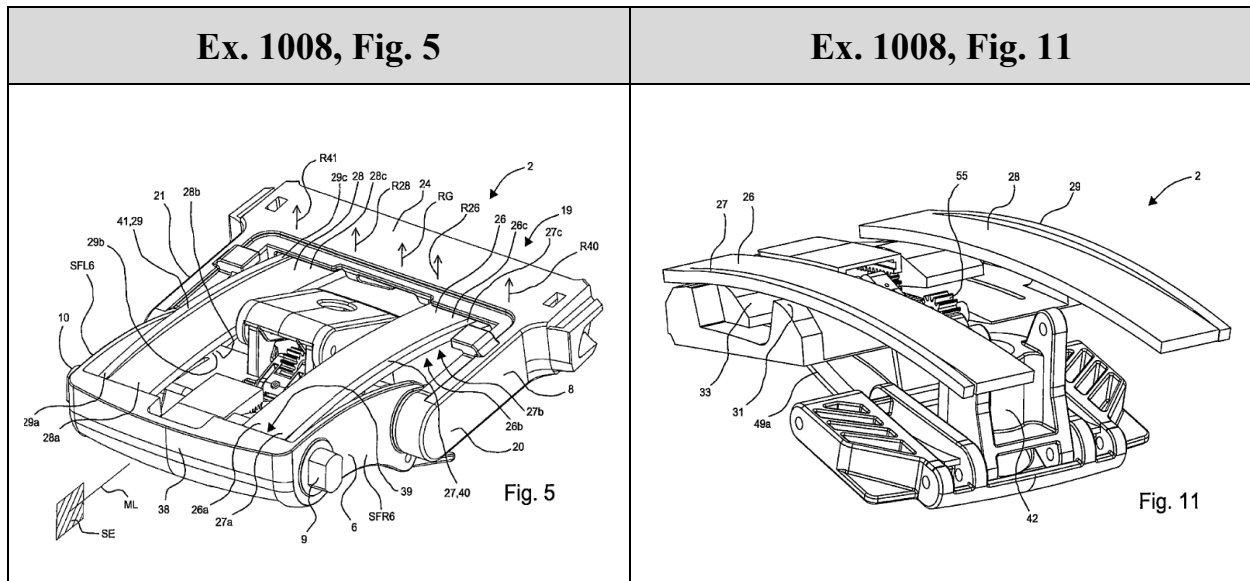
disclosure). Thus, Schmitz '738 is prior art to claim 16 under § 102(a)(2). 35 U.S.C. § 102(a)(2); *see id.* § 102(d); MPEP § 2154.01(b).

Schmitz '738 discloses a seating mechanism that automatically adjusts the tilting resistance based on the weight of the user. *E.g.* Ex. 1008, Fig. 3.



Referring to Figure 3, seat element 5 and back element 4 are pivotally mounted to support 6 via front swing arm 7 and rear swing arm 8. Ex. 1008, 6:62-65, 7:8-12. Back element 4 is also connected to rear swing arm 8 via appendage 25. *Id.*, 7:22-25.

Referring to Figures 5 and 11, the pivoting of rear swing arm 8—and thus seat element 5 and back element 4—is controlled by leaf springs 26-29, which are anchored in support 6. Ex. 1008, 7:26-28, 8:4-15.



Leaf springs 26 and 28 bend about displaceable bearings 33 and 34, which are mounted on a rack gear 55. Ex. 1008, 8:23-30, 9:40-41. As explained below, when a user sits, rack gear 55 and thus displaceable bearings 33 and 34 are driven toward the free ends of leaf springs 26 and 28 (Ex. 1008, 9:23-47), thereby reducing their effective length and increasing the tilting resistance. *Id.*

VI. SPECIFIC GROUNDS FOR UNPATENTABILITY

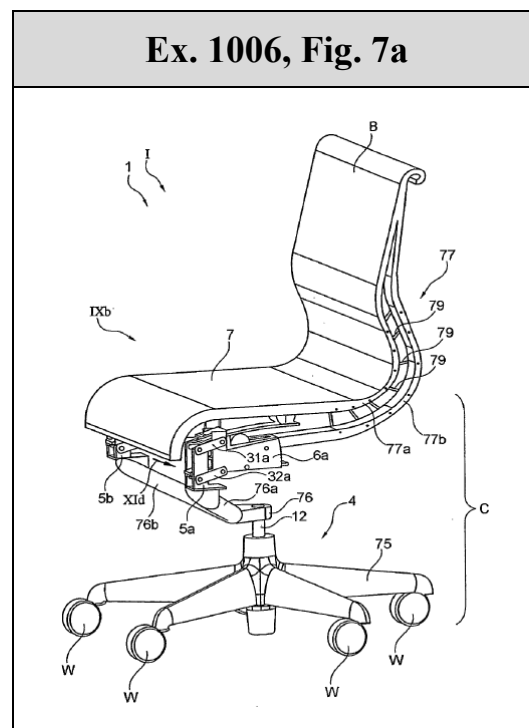
A. Ground I: Claims 1-6, 8-14, and 18-22 Are Anticipated by Schmitz '637

Schmitz '637 discloses an “adjusting assembly” with gears that adjusts the tilting resistance based on a user’s weight. Ex. 1004, 86. Schmitz '637 thus anticipates claim 1 of the '753 Patent and many dependent claims.

1. Independent Claim 1

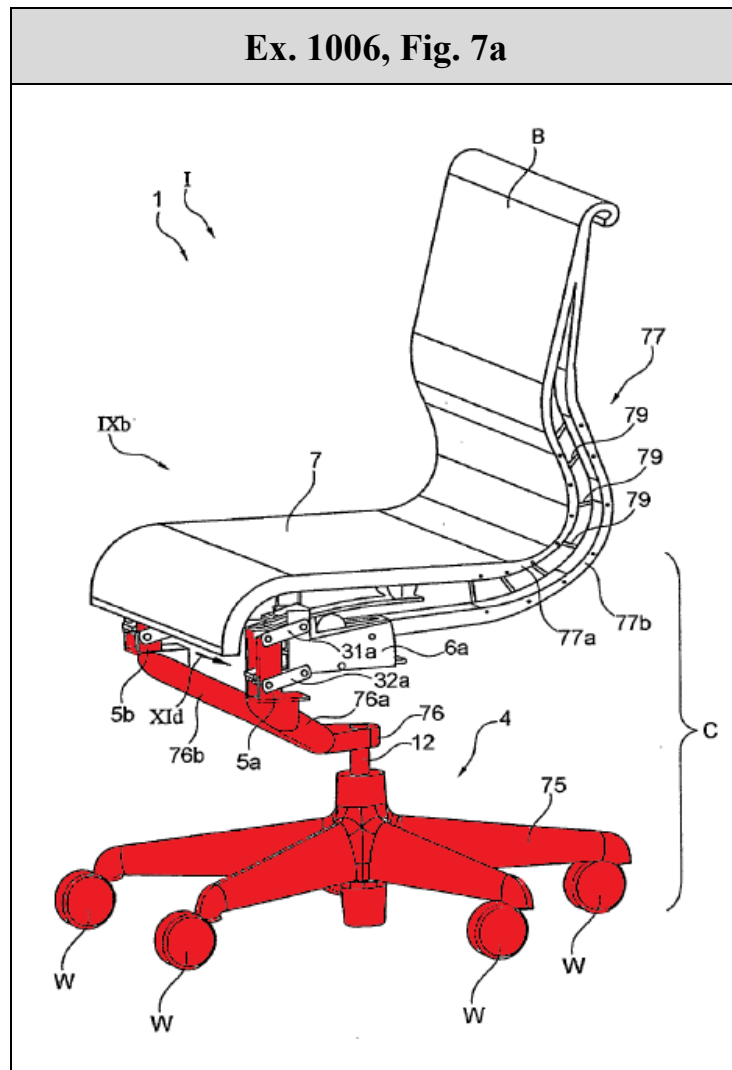
[1] A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:

Schmitz '637 discloses a chair that can be reconfigured. Ex. 1012, ¶¶80-81; Ex. 1006, ¶4, Fig. 7a.



[1.a] a frame;

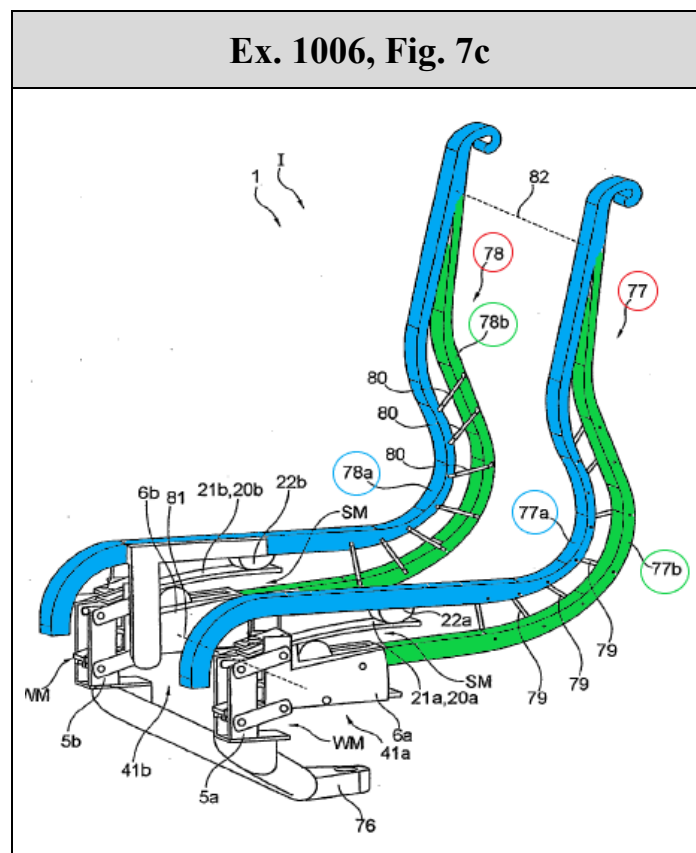
The chair includes “base C,” which comprises “lower part 4,” “two-part middle part 5a, 5b,” and “two-part upper part 6a, 6b.” Ex. 1006, ¶[0068]. The “lower part 4” and the “two-part middle part 5a, 5b” (red below) are the frame. Ex. 1012, ¶¶82-83; Ex. 1006, Fig. 7a.



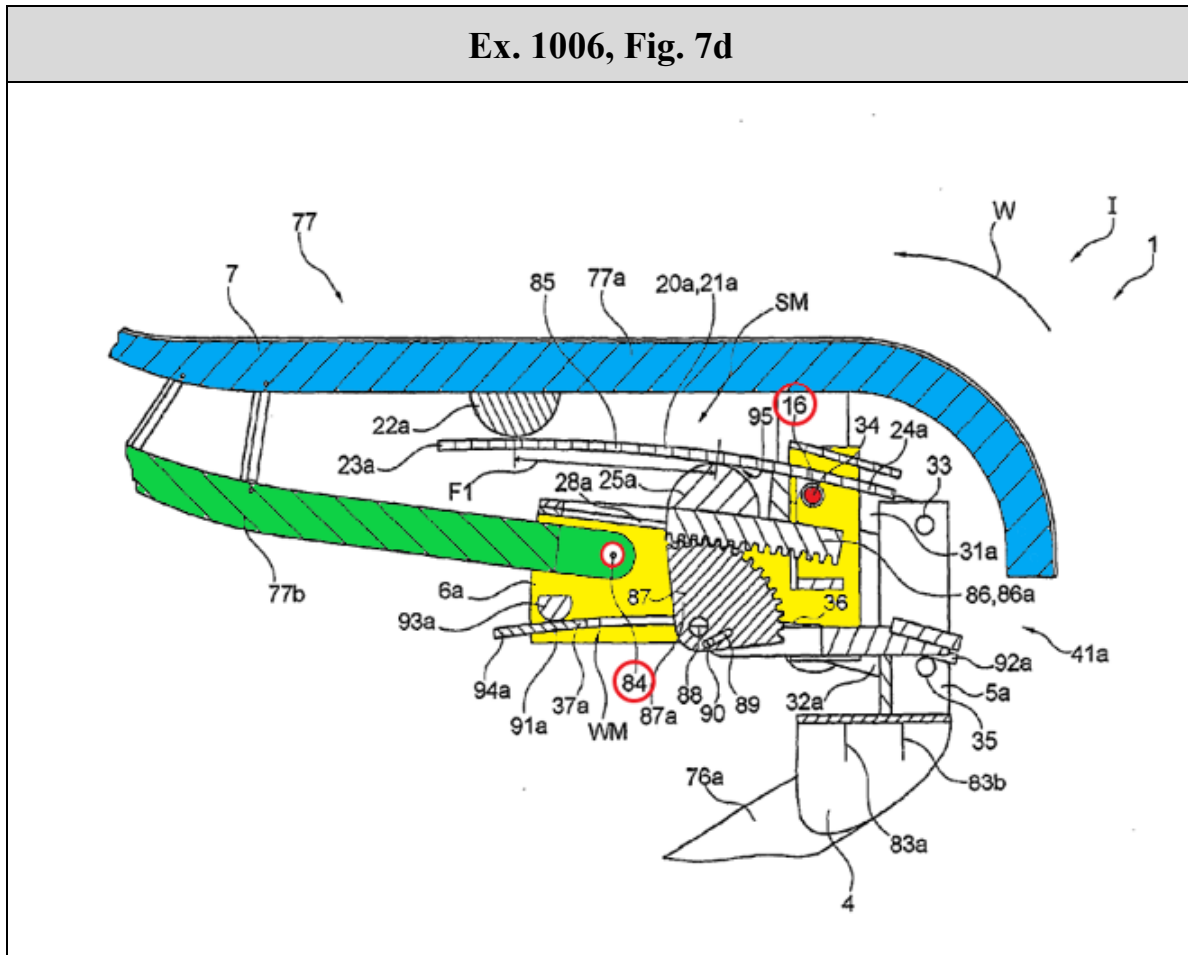
[1.b] a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat; and

A “seat 7” is indirectly mounted on the frame. Ex. 1006, ¶¶68; Ex. 1012, ¶¶85-91; Section IV.B.2.ii, *supra*.

To that end, seat 7 is mounted onto upper parts 6a, 6b. Ex. 1012, ¶¶86-88. As shown below, seat 7 includes “right carrier 77” and “left carrier 78,” each having an “upper leg” (77a and 78a, respectively—blue below) and a “lower leg” (77b and 78b, respectively—green below). Ex. 1006, ¶¶68, Fig. 7c.



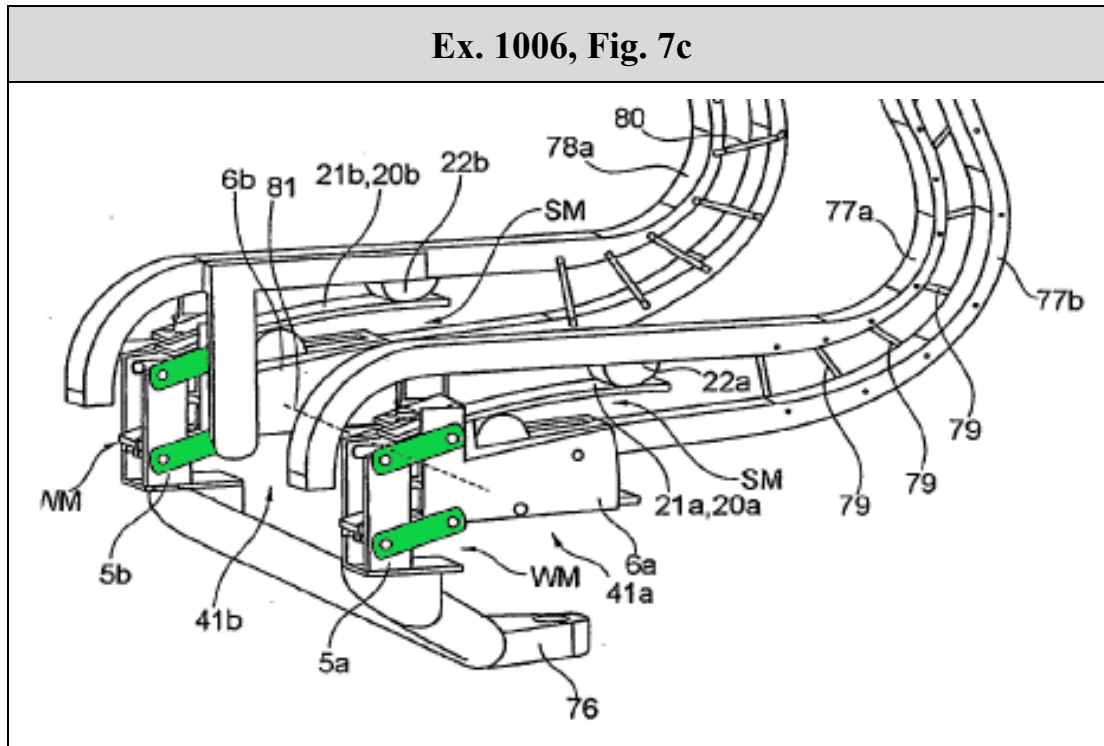
Each carrier is pivotally mounted to one of upper parts 6a, 6b. Ex. 1012, ¶¶87-88. Upper leg 77a (blue below) is mounted to upper part 6a (yellow) at “axis of rotation 16,” (red), and lower leg 77b (green) is mounted at “axis of rotation 84” (also red). Ex. 1006, ¶71; *id.*, Fig. 7d; Ex. 1012, ¶87.



Carrier 78 is pivotally mounted to upper part 6b in the same fashion. Ex. 1012, ¶88.

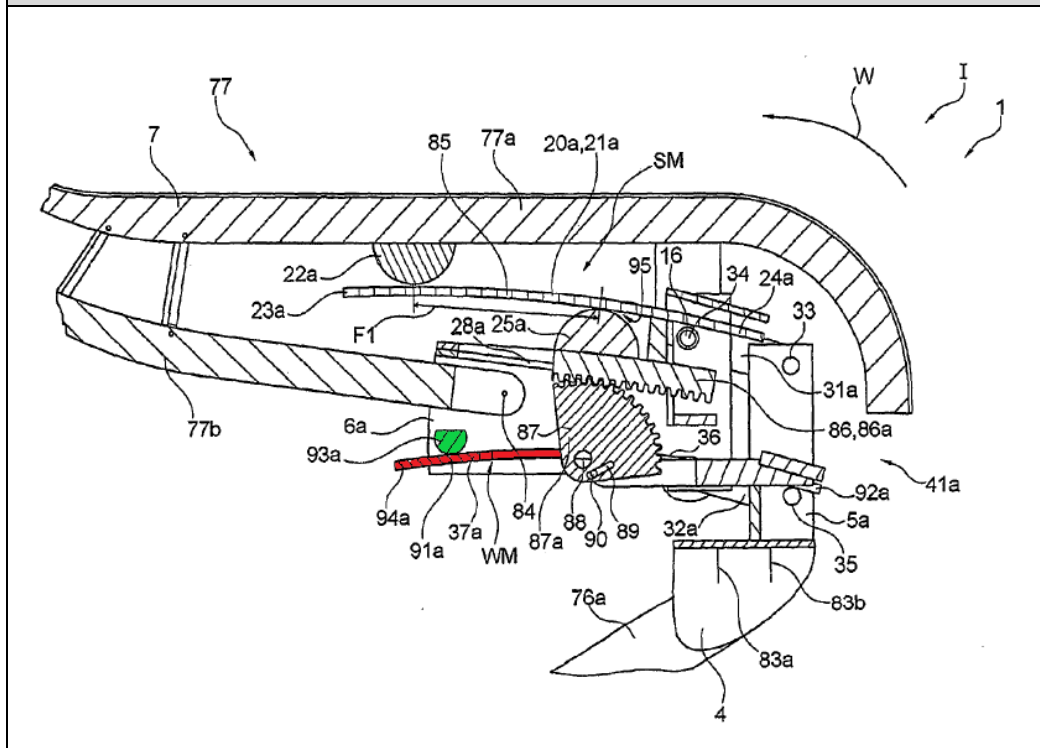
Upper parts 6a and 6b are movably mounted on middle parts 5a and 5b, respectively. Ex. 1012, 89-91. Schmitz '637 explains that “upper part 6a is

articulated movably upward and downward on the middle part 5a via the parallel arms 31a, 32a.” Ex. 1006, ¶71; Ex. 1012, ¶89. Upper part 6b is movably mounted on middle part 5b the same way via parallel arms 31b and 32b (green below). Ex. 1012, ¶90; Ex. 1006, Fig. 7c.



Two leaf springs anchored in middle parts 5a and 5b support upper parts 6a, 6b, and seat 7 against downward movement. Ex. 1012, ¶¶95-96. Schmitz '637 explains that “leaf spring 91a” (red below), which is “held with a tension end 92a in the middle part 5a,” supports upper part 6a, which “acts with a bolt 93a” (green) on “a free end 94a of the leaf spring 91a.” Ex. 1006, ¶71; *id.*, Fig. 7d; Ex. 1012, ¶95.

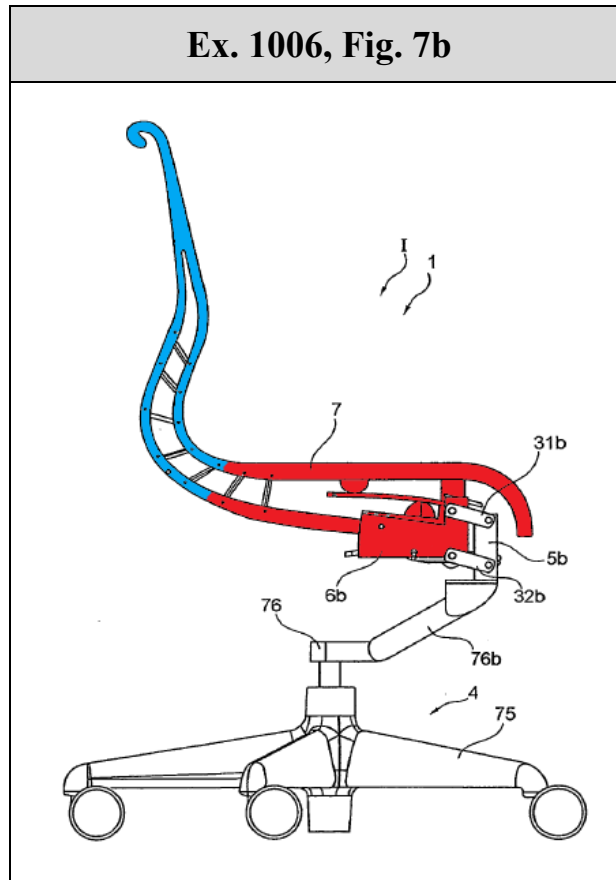
Ex. 1006, Fig. 7d



Thus, seat 7 moves down relative to middle parts 5a and 5b (between a “first position” and a “loaded position”) when a user sits. Ex. 1012, ¶¶96-97. “When the seat 7 is loaded with a weight force, the upper part 6a, on which the seat 7 is supported...is lowered slightly with respect to the position I shown in FIG. 7d,” described as the “nonloaded position.” Ex. 1006, ¶71; Ex. 1012, ¶¶96-97.

[1.c] a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame

Seat 7 includes a “back part” (blue below—a backrest) and a “seat part” (red).
Ex. 1012, ¶99; Ex. 1006, ¶6, Fig. 7b.

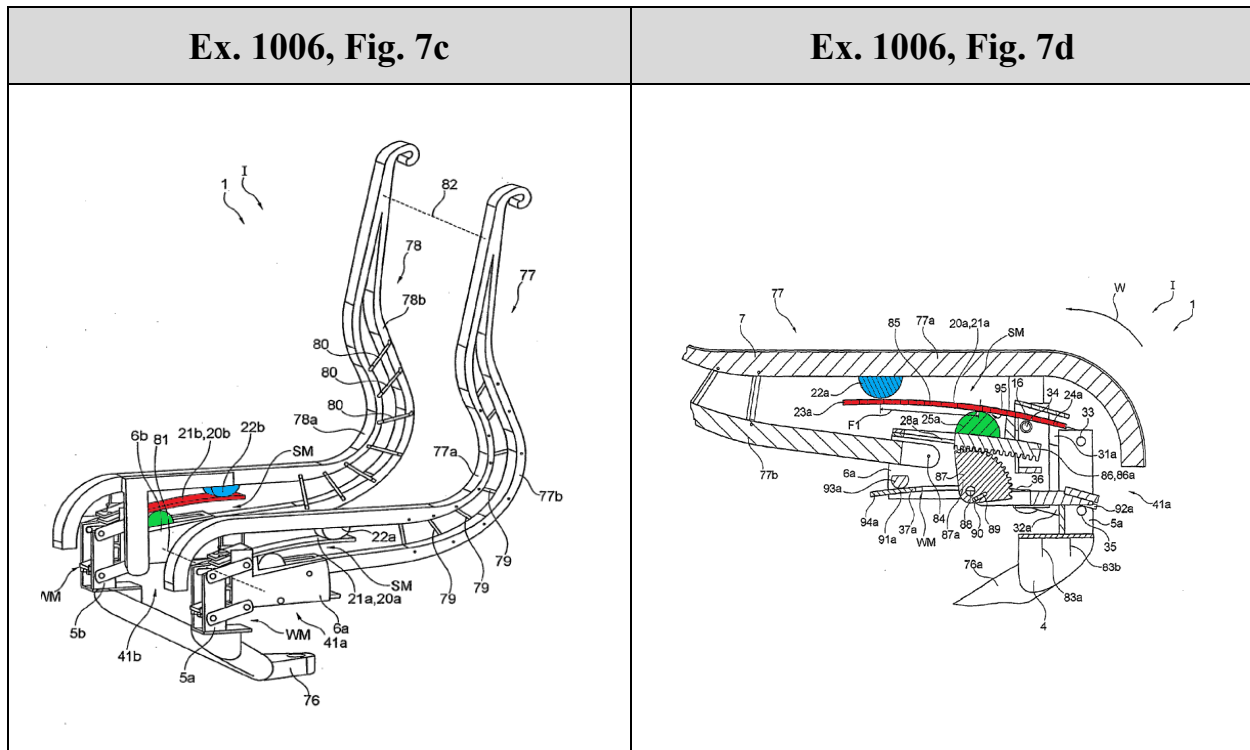


A user can lean against the backrest to change its angular orientation. Ex. 1012, ¶¶101-103. As explained above, seat 7 is pivotally mounted to upper parts 6a and 6b via “axes of rotation 16 and 84.” Ex. 1006, ¶71. Thus, seat 7 and its back can rotate relative to the frame. Ex. 1012, ¶101.

Two leaf springs resist this rotation. Ex. 1012, ¶¶102, 105-107. Schmitz ’637 discloses “two spring mechanisms SM” embodied as “leaf springs 21a and 21b.” Ex. 1006, ¶70. In reference to leaf spring 21a, Schmitz ’637 explains it is “tension-mounted into the upper part 6a” and “supported in a middle region 85...by a support 25a when a person sitting on the seat reclines.” Ex. 1006, ¶71. Seat 7 bears against

the leaf springs (red below) via projections 22a and 22b (blue) that extend down from upper legs 77a and 78a and bend the leaf springs about supports 25a (green).

Ex. 1006, ¶¶70-71; Ex. 1012, ¶¶106-107; Ex. 1006, Figs. 7c, 7d.



The “reaction forces of the spring mechanisms SM” resist “an inclination movement of the seat 7,” including the backrest, “in the direction of rotation w.” Ex. 1006, ¶71. Thus, a user can lean on the backrest to change its angular orientation against the support of leaf springs 21a, 21b. Ex. 1012, ¶¶102-103.

[1.d] the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;

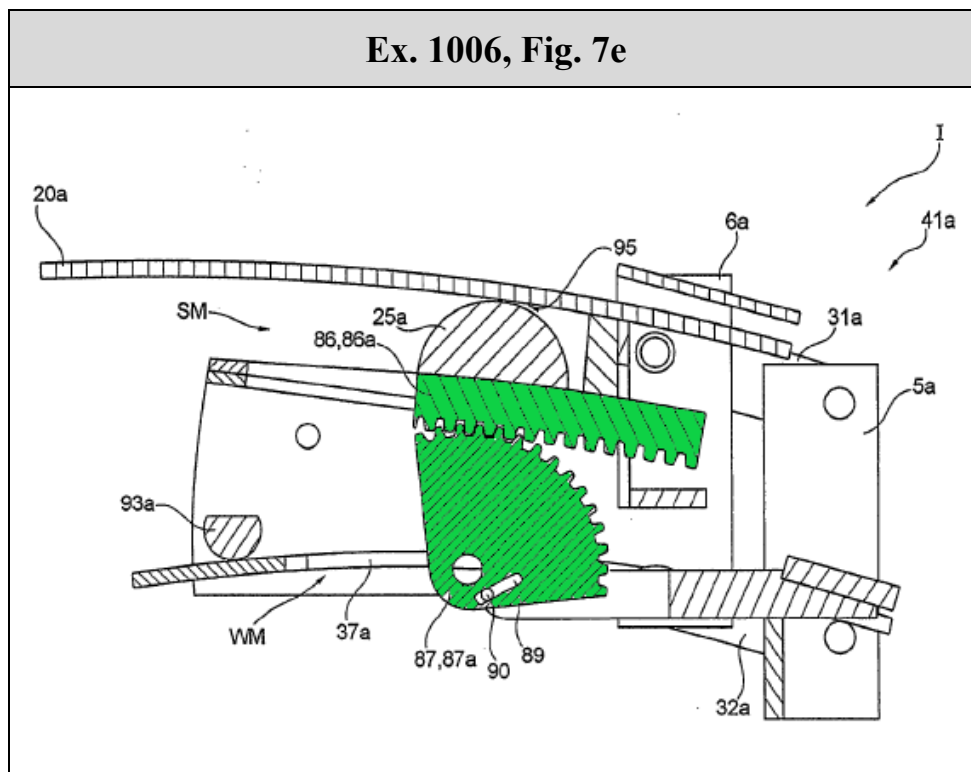
As discussed above, seat 7 and its backrest are pivotally mounted to upper parts 6a and 6b and are supported against rotation by leaf springs 21a and 21b. Ex. 1012, ¶¶87-88, 101-102, 105-106. Ex. 1006, ¶71. Thus, a “first leaning force” is required to change the angular orientation of the backrest against the force of leaf springs 21a and 21b with no user in seat 7. Ex. 1012, ¶108.

[1.e] and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position,

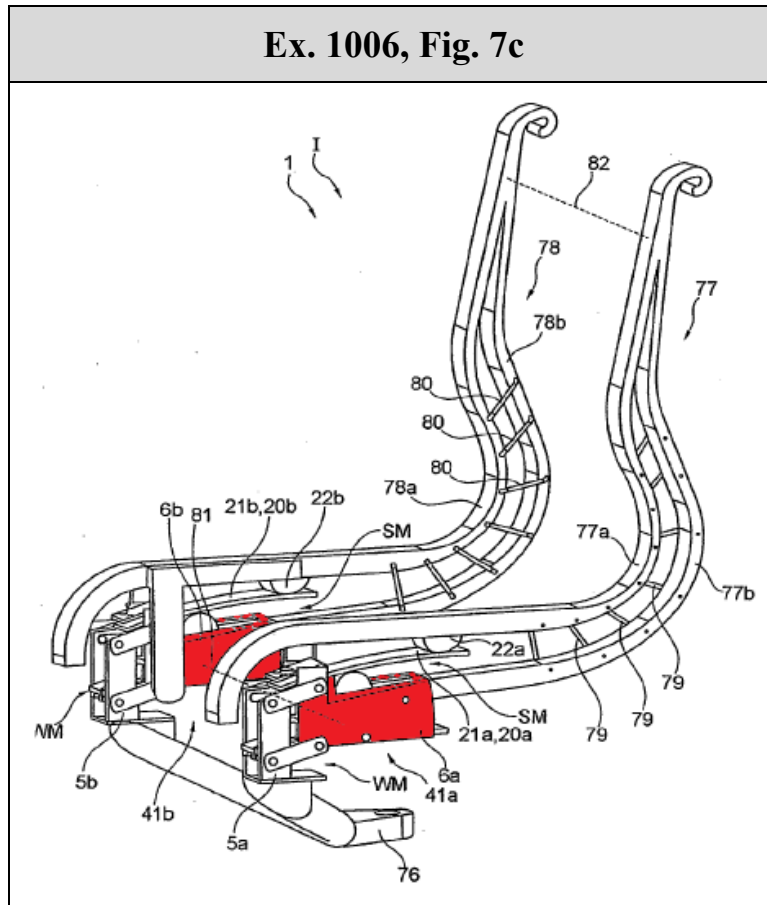
“[A]djusting assembly” is a means-plus-function element. Section IV.B.2.i, *supra*. Schmitz ’637 discloses this limitation regardless of MPF construction. Ex. 1012, ¶110.

First, Schmitz ’637 discloses gears that cooperate when the seat moves from a first position to a loaded position. Ex. 1012, ¶¶111-113. Schmitz ’637 discloses two “movement converter[s],” 41a and 41b, that are “designed similarly.” Ex. 1006, ¶71. In reference to movement converter 41a, Schmitz ’637 discloses a “toothed slide 86” positioned in a “guide 28a on the upper part 6a,” and a “toothed quadrant

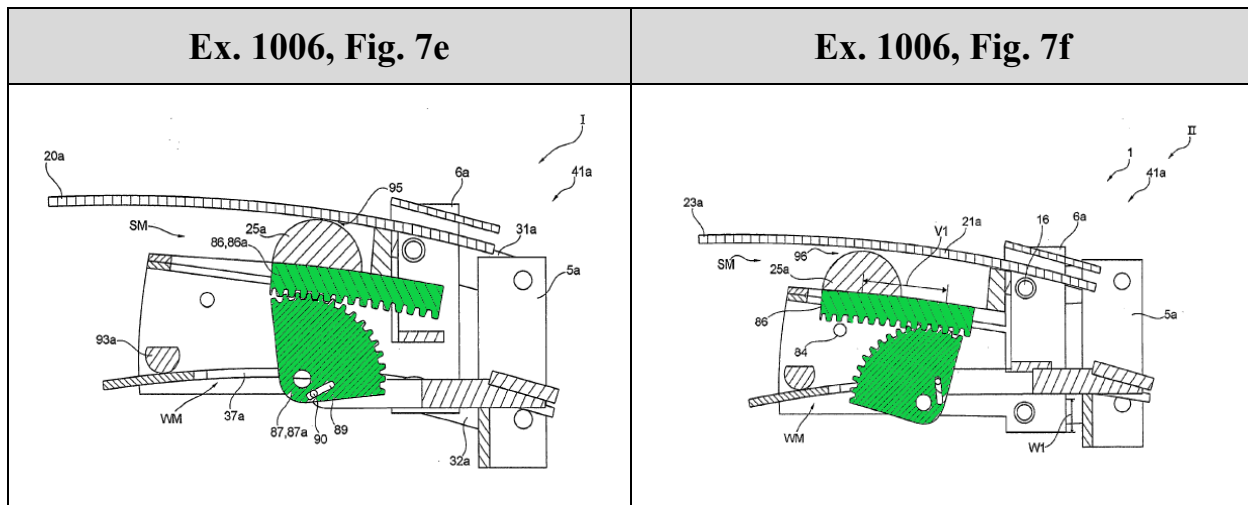
87” rotatably “fastened to the upper part 6a” about “axis of rotation 88” (both toothed gears shown in green below). Ex. 1006, ¶71; *id.*, Fig. 7e; Ex. 1012, ¶111.



Movement converter 41b (red below) includes a second “toothed slide 86” and a second “toothed quadrant 87.” Ex. 1012, ¶¶116, 131; Ex. 1006, ¶71; *id.*, Fig. 7c.

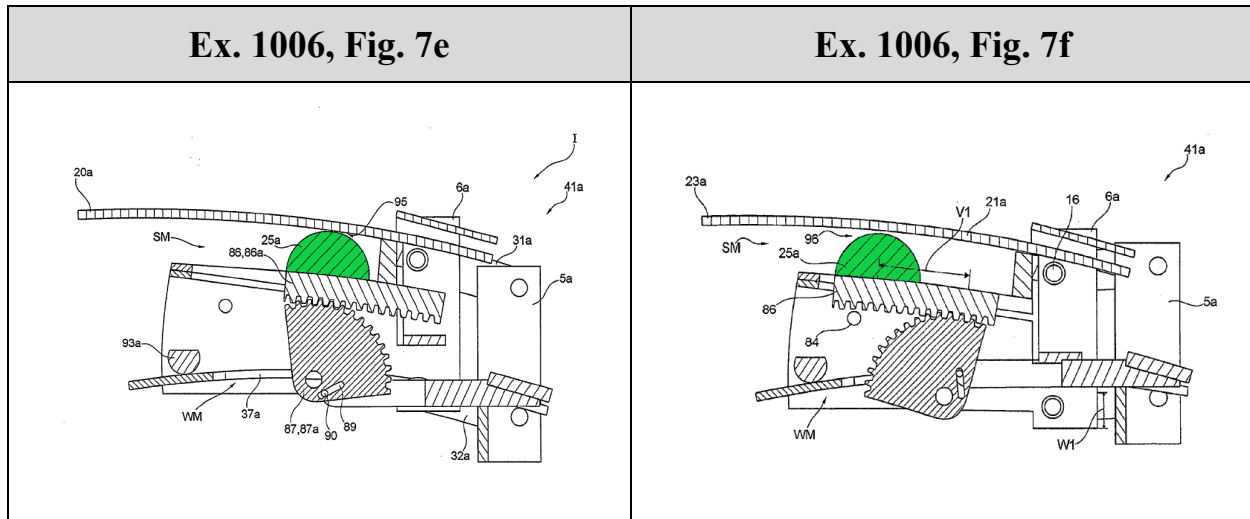


Each pair of gears cooperates when seat 7 moves into the loaded position. Ex. 1012, ¶¶113, 116. Toothed quadrant 87 has a “long hole 89,” and a “pin 90...fastened to the middle part 5a engages into the long hole 89.” Ex. 1006, ¶71. Thus, “when the seat 7 is loaded with a weight force” and upper part 6a is “lowered slightly,” the “toothed quadrant 87 is also moved downward” such that “pin 90...causes a rotation of the toothed quadrant 87.” Ex. 1006, ¶71. In turn, toothed quadrant 87 “meshes with[] the toothed slide 86,” causing it to “translate[]...to the left.” *Id.*; Ex. 1012, ¶113; *compare* Ex. 1006, Fig. 7e (unloaded position; gears in green below) *with id.*, Fig. 7f (loaded position).



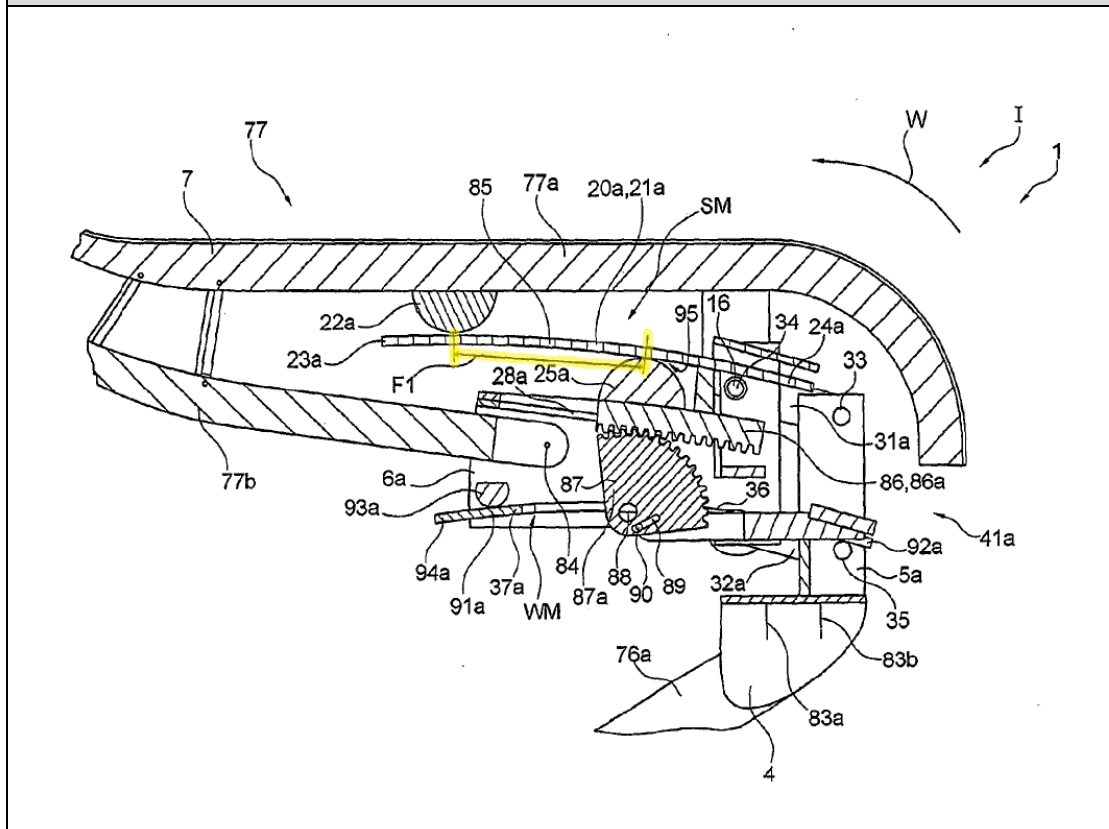
The second toothed quadrant and second toothed slide of movement converter 41b operate the same way. Ex. 1012, ¶116; Ex. 1006, ¶71.

Due to this cooperation, the resistance to tilting the back of seat 7 is increased. Ex. 1012, ¶¶114-115. As explained above, leaf springs 21a and 21b are supported by fulcrums in the form of supports 25a and 25b. Ex. 1012, ¶¶105-107; Ex. 1006, ¶71. Supports 25a and 25b are mounted on toothed slides 86 of movement converters 41a and 41b, respectively. Ex. 1012, ¶114; Ex. 1006, ¶71 (“The support 25a is arranged on a toothed slide 86.”). Thus, supports 25a and 25b move with toothed slides 86 when a user sits in seat 7: when the rotating “toothed quadrant 87...meshes with[] the toothed slide 86 and the support 25a fastened to the [toothed slide],” it “translates this support [25a] to the left in the direction of the free end 23a of the leaf spring 21.” Ex. 1006, ¶71; *compare id.*, Fig. 7e (unloaded position; support in green below) *with id.*, Fig. 7f (loaded position); Ex. 1012, ¶114.



This translation decreases the effective length of leaf springs 21a and 21b and increases the tilting resistance. Ex. 1012, ¶¶114-115. In reference to leaf spring 21a, Schmitz '637 explains that, due to translation of support 25a, a “spacing F1 between the support 25a and the projection 22a is thereby reduced,” which “causes a greater supporting of the seat 7 against an inclination movement...about the axes of rotation 16.” Ex. 1006, ¶71. The “spacing F1” (yellow below) is the effective length of leaf spring 21a, and reducing it increases the force required to tilt the back of seat 7. Ex. 1012, ¶114-115; Ex. 1006, Fig. 7d.

Ex. 1006, Fig. 7d

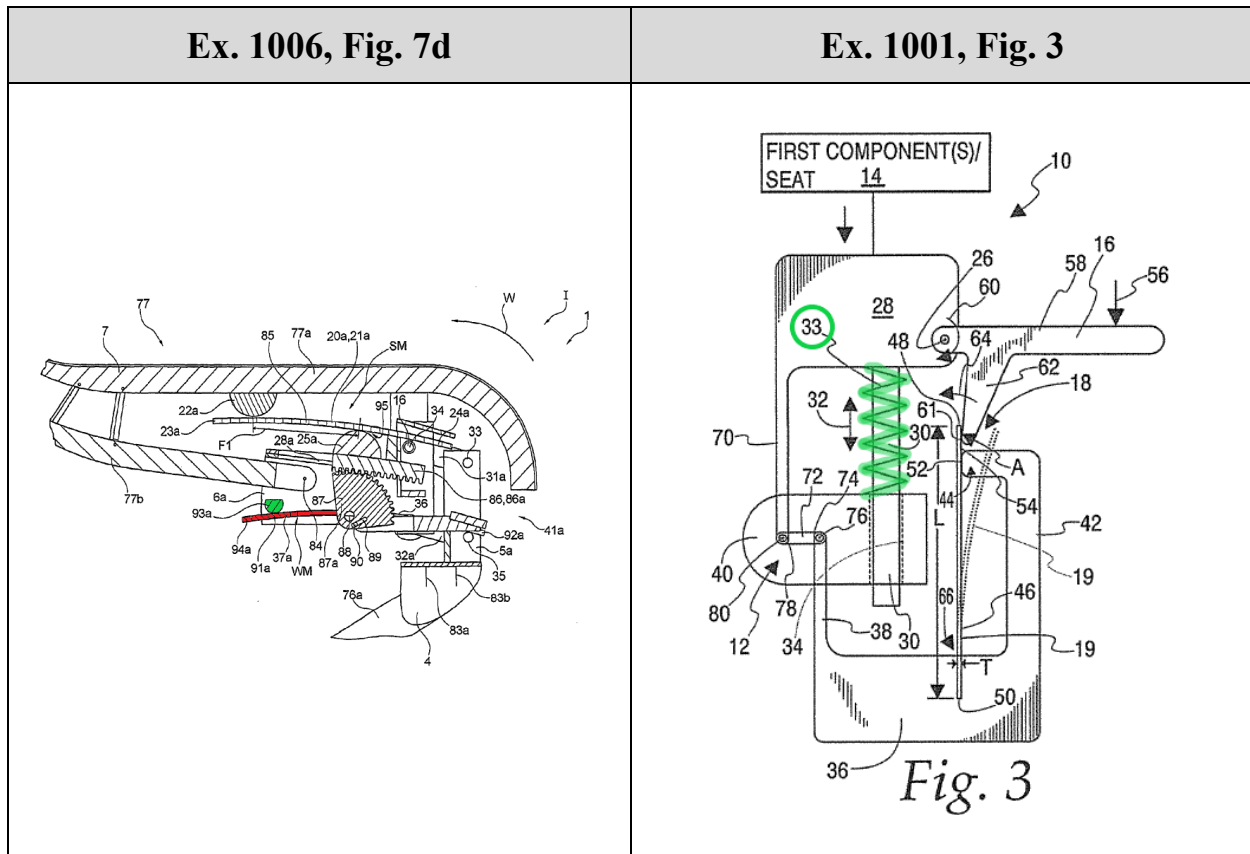


In this way, “the counterforce against an inclination movement of the seat,” including the back, is “generated as a function of the weight force with which a person acts on the seat.” Ex. 1006, ¶73; Ex. 1012, ¶115. Movement converter 41b operates in the same manner to reduce the effective length of leaf spring 21b. Ex. 1012, ¶116.

Finally, Schmitz ’637 discloses “adjusting assembly” if it is construed as a means-plus-function element because Schmitz ’637 discloses the same or equivalent structure that provides the same function, in substantially the same way, with

substantially the same result. *Regents of Univ. of Minnesota v. AGA Med. Corp.*, 717 F.3d 929, 940-41 (Fed. Cir. 2013).

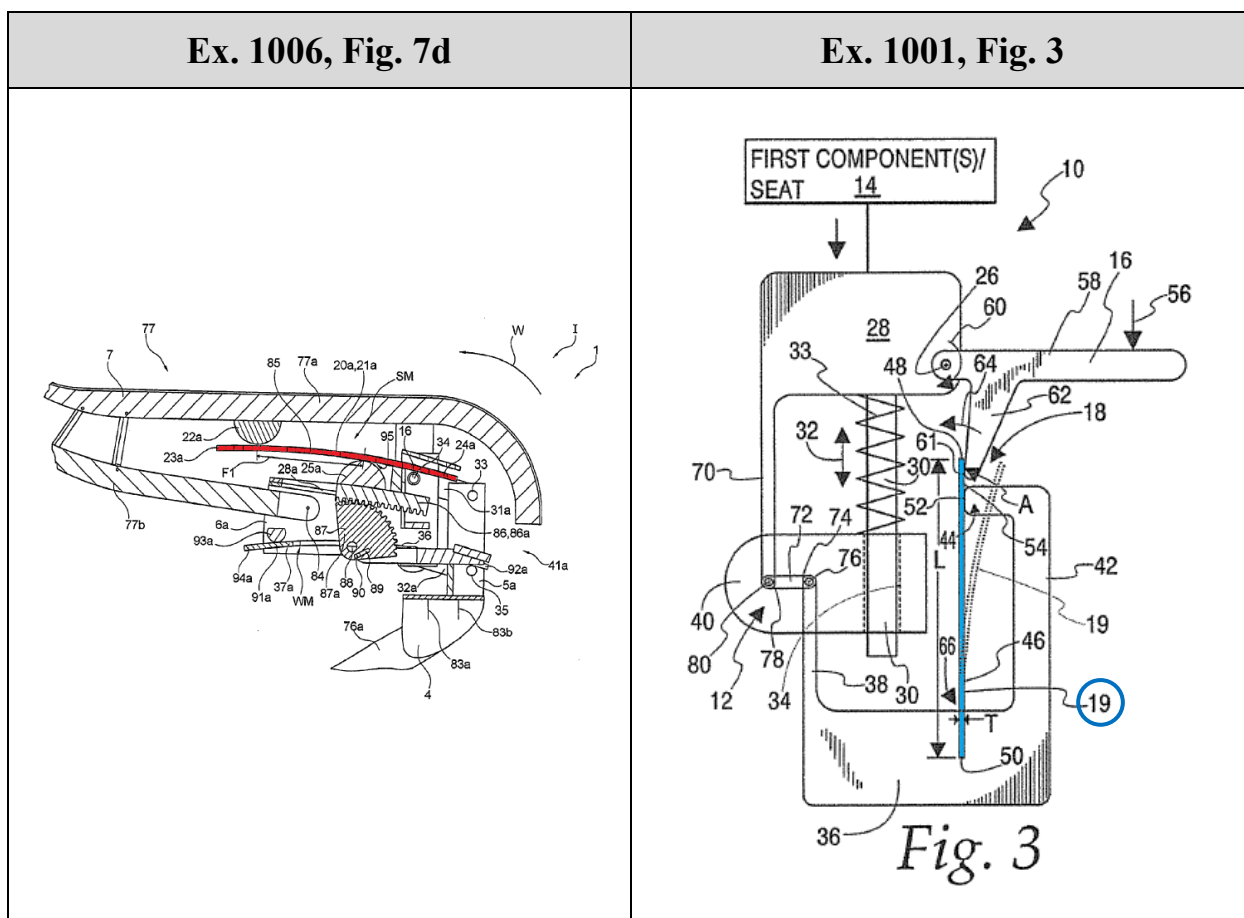
As for the weighing spring, Schmitz '637 discloses “leaf spring 91a” that supports seat 7 against downward movement such that it is “lowered slightly” in response to a user sitting. Ex. 1006, ¶71; Ex. 1012, ¶117. The “leaf spring 91a” (below-left in red) is equivalent to the coil spring 33 disclosed in the '753 Patent (below-right in green). Ex. 1012, ¶117-118; Ex. 1006, Fig. 7d; Ex. 1001, Fig. 3.



Any differences between the two structures are insubstantial: they provide the same function in substantially the same way (resiliently flexing against a weight

force) to provide substantially the same result (providing variable resistance to that force). Ex. 1012, ¶118.

As for the tilting spring, Schmitz '637 discloses leaf springs 21a and 21b that support seat 7 against rotation. Ex. 1006, ¶71; Ex. 1012, ¶119. Leaf springs 21a (below-left in red) and 21b are the same as leaf spring 19 in the '753 Patent (below-right in blue). Ex. 1012, ¶119; Ex. 1006, Fig. 7d; Ex. 1001, Fig. 3.



And, as discussed above, these structures provide the claimed function of “increas[ing] a resistance to changing of the angular orientation of the back rest from the starting angular position” as a result of a user sitting. Ex. 1012, ¶¶114-116, 120.

“When the seat 7 is loaded with a weight force, the upper part 6a, on which the seat 7 is supported...is lowered slightly,” which “causes a rotation of the toothed quadrant 87,” such that it “meshes with[] the toothed slide 86 and the support 25a fastened to the latter” and “translates this support to the left in the direction of the free end 23a of the leaf spring 21.” Ex. 1006, ¶71. Thus, a “spacing F1 between the support 25a and the projection 22a is thereby reduced,” which “causes a greater supporting of the seat 7 against an inclination movement.” *Id.*

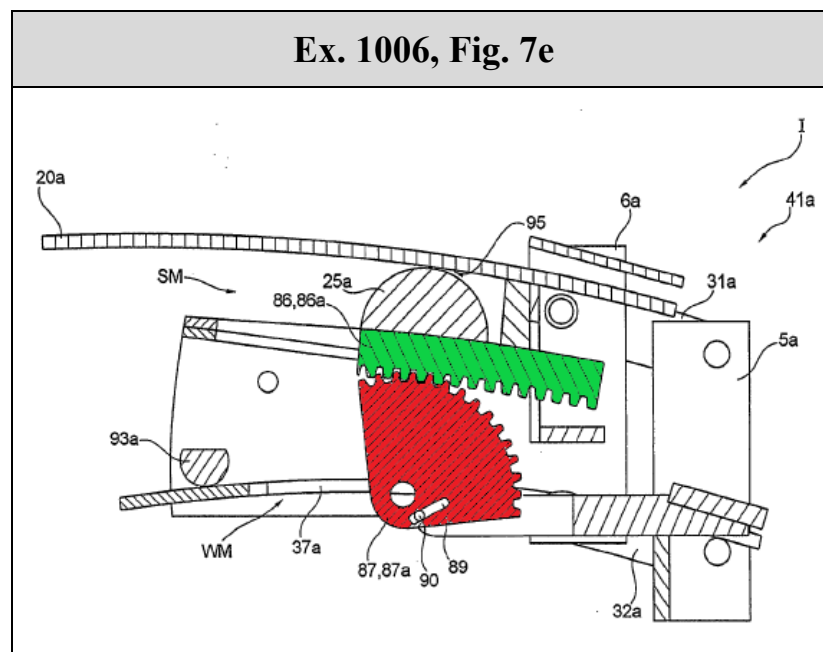
[1.f] whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.

When a user sits in seat 7, a greater force is required to tilt back as compared to with no user. Ex. 1012, ¶121-123. In short, “[w]hen the seat 7 is loaded with a weight force...[a] spacing F1 between the support 25a and the projection 22a is thereby reduced,” which “causes a greater supporting of the seat 7 against an inclination.” Ex. 1006, ¶71.

2. Dependent Claim 2

The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises a first rack gear and first pinion gear, the first rack gear and first pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position

Schmitz '637 discloses “toothed slide 86” (green below)—a rack gear—and “toothed quadrant 87” (red below)—a pinion gear. Ex. 1006, ¶71; *id.*, Fig. 7e; Ex. 1012, ¶¶125-127.



These gears cooperate. Ex. 1012, ¶127. Toothed quadrant 87 has a “long hole 89,” and a “pin 90 which is fastened to the middle part 5a engages into the long hole 89.” Ex. 1006, ¶71. Thus, “when the seat 7 is loaded with a weight force” and upper part 6a is “lowered slightly,” the “toothed quadrant 87 is also moved downward” such that the “pin 90...causes a rotation of the toothed quadrant 87.” Ex. 1006, ¶71.

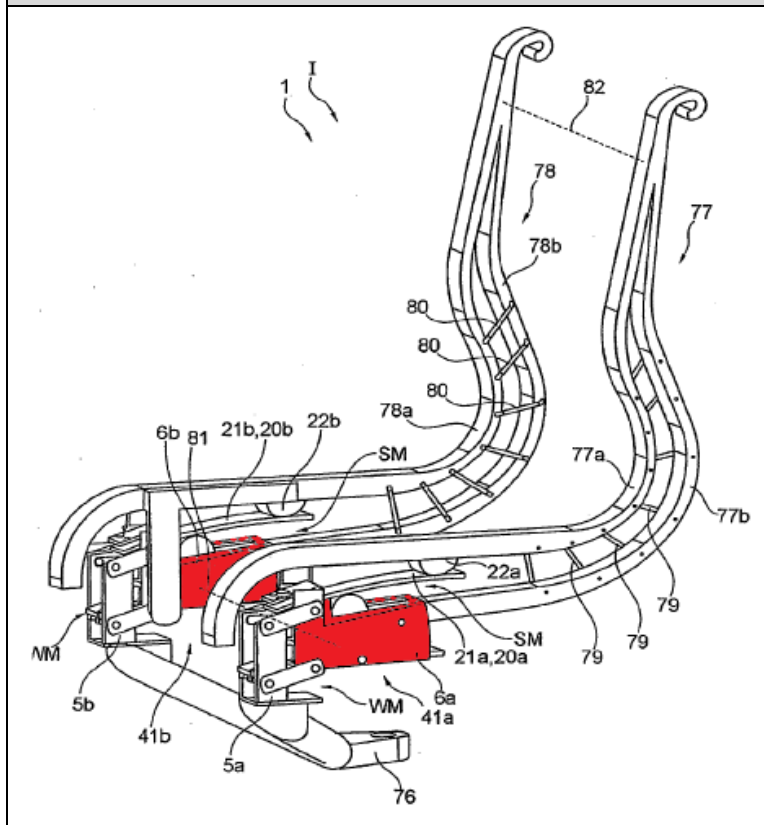
In turn, toothed quadrant 87 “meshes with[] the toothed slide 86,” causing it to “translate[]...to the left.” *Id.*, Ex. 1012, ¶127.

3. Dependent Claim 3

The reconfigurable apparatus for seating a user according to claim 2 wherein the plurality of gears comprises a second rack gear and a second pinion gear, the second rack gear and second pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position.

As explained above, Schmitz '637 discloses “toothed slide 86” and “toothed quadrant 87,” which form “movement converter 41a.” Ex. 1006, ¶71; Ex. 1012, ¶130. Schmitz '637 discloses a second “movement converter 41b” that is “designed similarly” to “movement converter 41a.” Ex. 1006, ¶71. Figure 7c, annotated below, shows the two upper parts 6a and 6b, which house movement converters 41a and 41b (red below). Ex. 1012, ¶130; Ex. 1006, Fig. 7c.

Ex. 1006, Fig. 7c

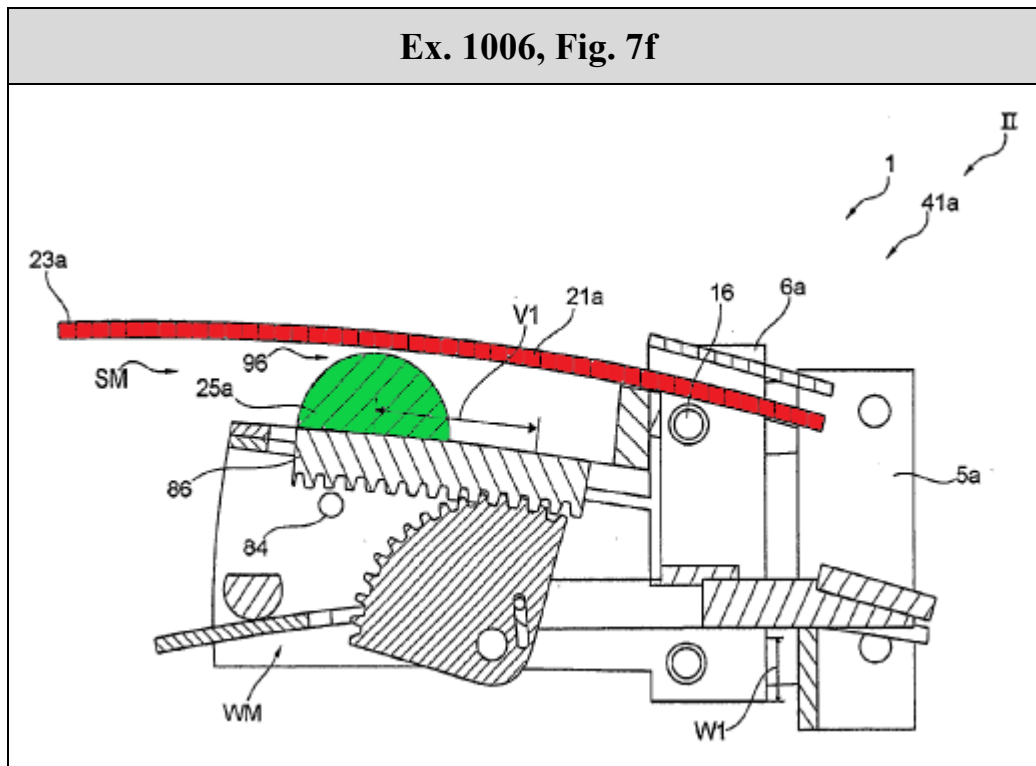


Movement converter 41b includes a second “toothed slide 86” and a second “toothed quadrant 87”—a second rack gear and a second pinion gear. Ex. 1012, ¶131. These gears cooperate and move relative to each other like the gears in movement converter 41a, as explained in Section VI.A.2 above. *See* Ex. 1006, ¶71; Ex. 1012, ¶132.

4. Dependent Claim 4

The reconfigurable apparatus according to claim 1 wherein the reconfigurable apparatus comprises an elongate spring bar having a length and that resists changing of the angular orientation of the back rest from the starting position by bending against a fulcrum part.

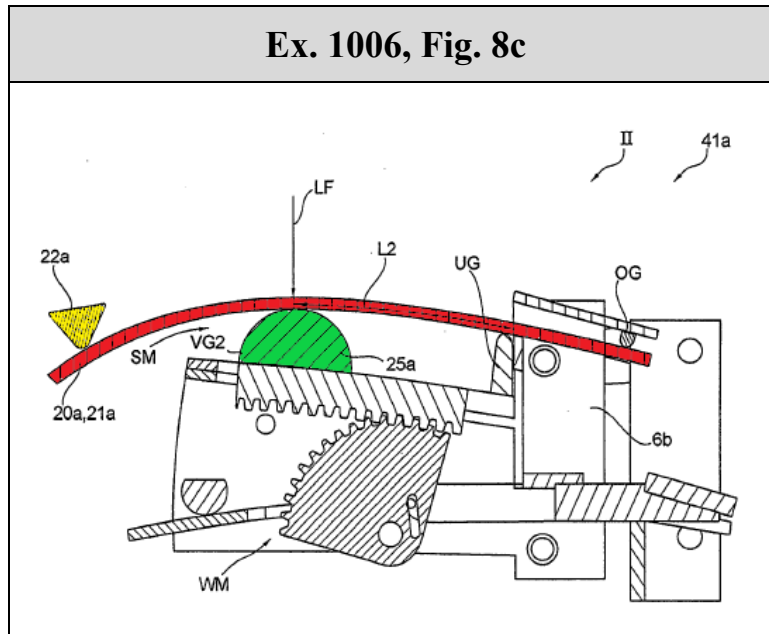
Schmitz '637 discloses “leaf spring 21a” (red below)—an elongate spring bar having a length—that resists tilting the back of seat 7 by bending against “support 25a” (green below)—a fulcrum part. Ex. 1006, ¶71; *id.*, Fig. 7f; Ex. 1012, ¶¶134-137.



Leaf spring 21a resists tilting by bending against support 25a. Ex. 1012, ¶136. As explained above, “spring mechanisms SM,” which comprise “leaf springs 21a, 21b” support “against an inclination movement of the seat 7,” including its back. Ex.

1006, ¶¶70-71; Ex. 1012, ¶136. Schmitz '637 further explains that “contact between the support 25a and the leaf spring 21a occurs...when [a] person reclines out of his upright sitting position,” and that an “increased and weight-dependent counterforce is generated...by the leaf spring 21a coming to lie on the support 25,” which “leads to an increase in the spring force which acts counter to the seat.” Ex. 1006, ¶74; Ex. 1012, ¶136.² Figure 8c depicts leaf spring 21a (red below) bending against support 25a (green) under the force of projection 22a (yellow). Ex. 1006, Fig. 8c; Ex. 1012, ¶136.

² The structure of the mechanism in Figs. 8a-8c has been “modified slightly as compared with Figs. 7a to 7f” in relation to how the leaf spring is mounted in the upper part. Ex. 1006, ¶74; Ex. 1012, ¶136 n.1. But the teachings thereof relating to how the leaf spring interacts with the support apply equally to Figs. 7a-7f. Ex. 1012, ¶136 n.1.



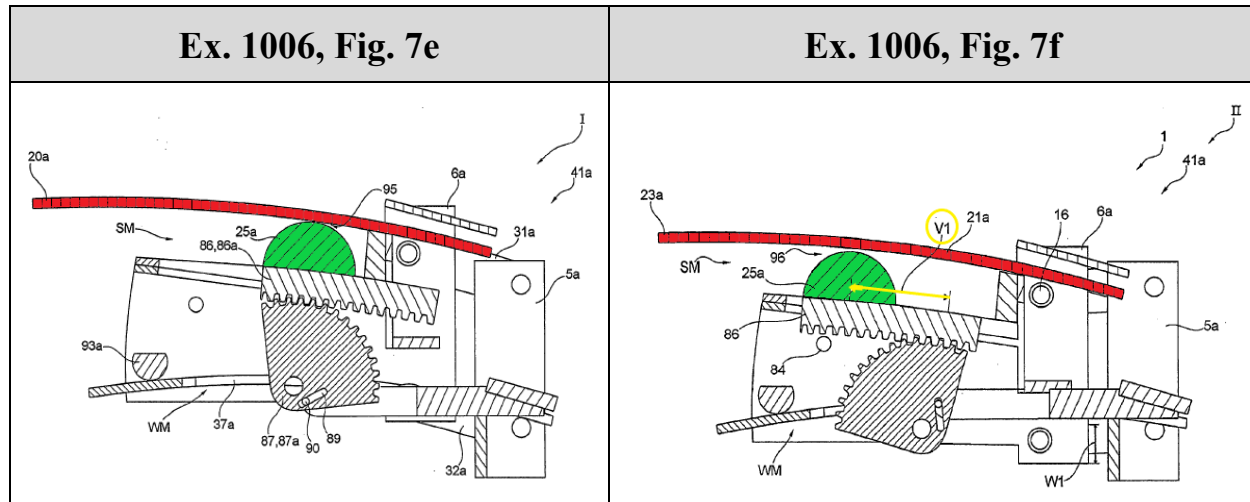
5. Dependent Claim 5

The reconfigurable apparatus for seating a user according to claim 4 wherein as an incident of the seat being changed from the first position into the loaded position the fulcrum part is caused to move along the length of the elongate spring bar so as to thereby increase a force required to bend the elongate spring bar about the fulcrum part and as an incident thereof increase the leaning force required to change the angular orientation of the back rest.

Schmitz '637 discloses that support 25a (fulcrum) moves along the length of leaf spring 21a (spring bar) when a user sits, thereby increasing the force required to bend leaf spring 21a about support 25a and tilt seat 7 back. Ex. 1012, ¶¶139-143.

First, support 25a moves along leaf spring 21a when a user sits. Ex. 1012, ¶¶140-141. As discussed above, when “seat 7 is loaded with a weight force,” toothed quadrant 87 “meshes with[] the toothed slide 86 and the support 25a” and “translates this support to the left in the direction of the free end 23a of the leaf spring 21.” Ex.

1006, ¶71; Ex. 1012, ¶140. Figure 7e (below-left) shows support 25a (green) before it has moved, and Figure 7f (below-right) shows support 25a after it has translated “displacement distance V1” (yellow) along spring 21a (red). Ex. 1012, ¶¶140-141; Ex. 1006, ¶73; *id.*, Figs. 7e, 7f.

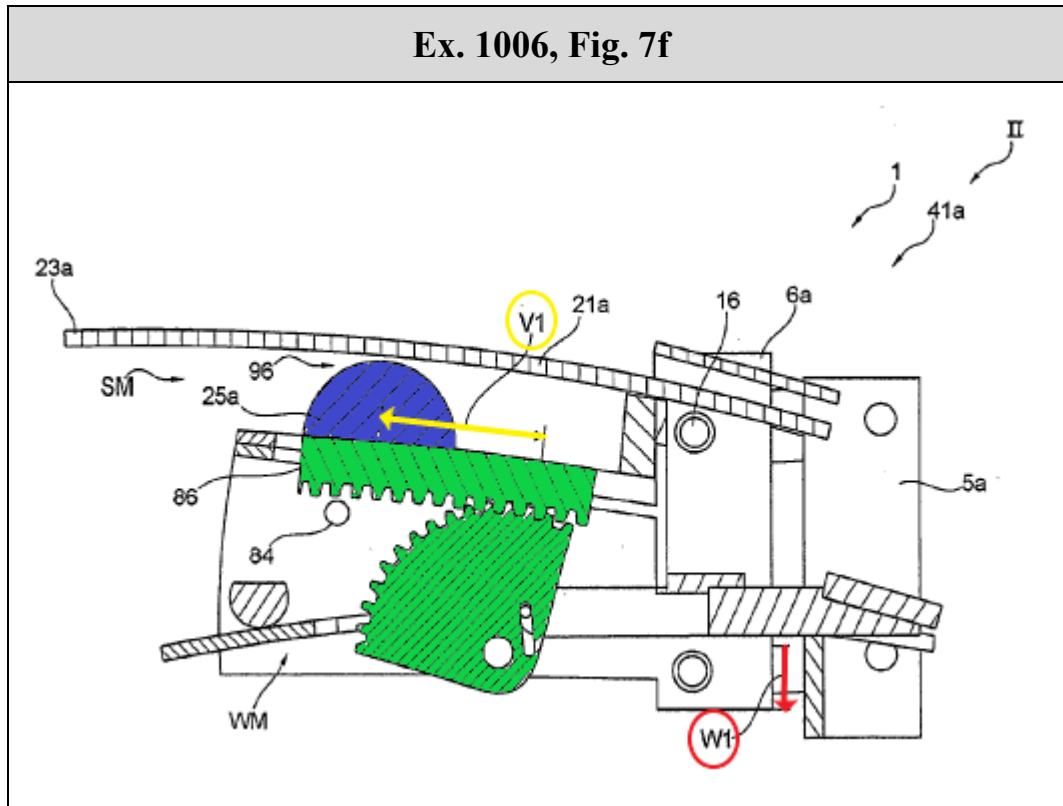


This displacement increases the force required to bend leaf spring 21a and thus tilt seat 7 back. Ex. 1012, ¶142. As explained above, “[a] spacing F1 between the support 25a and the projection 22a is thereby reduced,” which “causes a greater supporting of the seat 7,” including its back, “against an inclination movement.” Ex. 1006, ¶71.

6. Dependent Claim 6

The reconfigurable apparatus for seating a user according to claim 5 wherein the plurality of gears are configured so that the seat moves a first distance between the first and loaded positions and the fulcrum part moves greater than the first distance along the length of the fulcrum bar in response to a same movement of the seat relative to the frame.

When seat 7 moves down a first distance in response to a user sitting, support 25a moves a greater distance along leaf spring 21a. Ex. 1012, ¶¶145-148. Referring to Figure 7f, annotated below, when seat 7 is “loaded with a weight force of a person sitting,” upper part 6a, which supports seat 7, moves down a “weighing distance W1” (red below) that, in turn, causes support 25a to move a “displacement distance V1” (yellow below) along leaf spring 21a due to the interaction of the gears in “movement converter 41a.” Ex. 1006, ¶73; *id.*, Fig. 7f; Ex. 1012, ¶¶146-147.

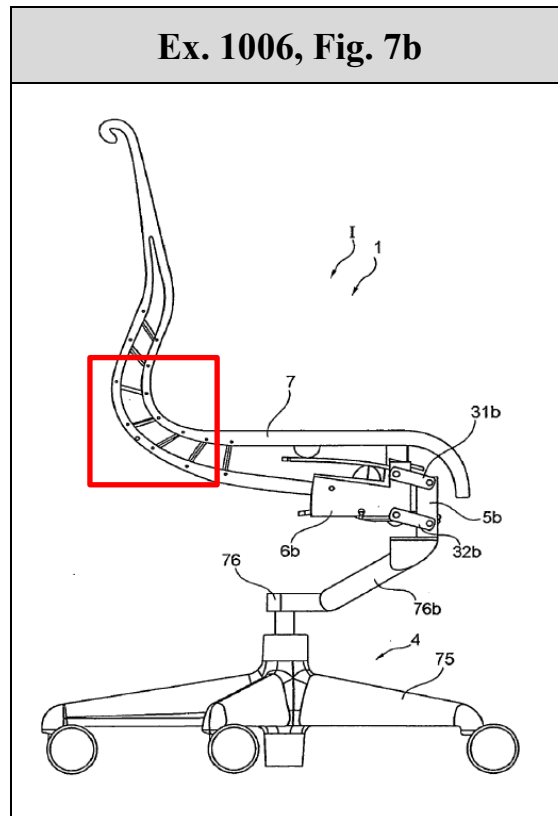


Displacement distance $V1$ is greater than weighing distance $W1$. Ex. 1012, ¶147. Schmitz '637 explains that a “step-up”—an increase—“of the weighing movement...takes place in the movement converter 41a.” Ex. 1006, ¶73; *see id.* (“[E]ven with a small weighing movement, a sensitive setting of the spring mechanism SM can be carried out on account of the step-up.”); Ex. 1012, ¶147. Schmitz '637 states that “ $W1=2.5 \times V1$ ” (Ex. 1006, ¶73), but a PHOSITA would understand from the “step-up” language and from Figure 7f, which depicts $V1$ as larger than $W1$, that this is a typo and should read “ $V1=2.5 \times W1$.” Ex. 1012, ¶147.

7. Dependent Claim 8

The reconfigurable apparatus for seating a user according to claim 1 wherein the back rest is mounted directly to the seat.

Schmitz '637 discloses that the back part of seat 7 is mounted directly (red below) to the seat part. Ex. 1012, ¶¶150-151; Ex. 1006, Fig. 7b; *see id.*, ¶6.



8. Dependent Claim 9

The reconfigurable apparatus for seating a user according to claim 8 wherein the back rest follows movement of the seat as the seat is changed from the first position into the loaded position.

Because the back part of seat 7 is mounted directly to the seat part, as shown above, the back part moves down with the seat part when a user sits. Ex. 1012, ¶154; Ex. 1006, Fig. 7b; *see id.*, ¶6.

9. Dependent Claim 10

The reconfigurable apparatus for seating a user according to claim 8 wherein the back rest is attached to and movable relative to the seat.

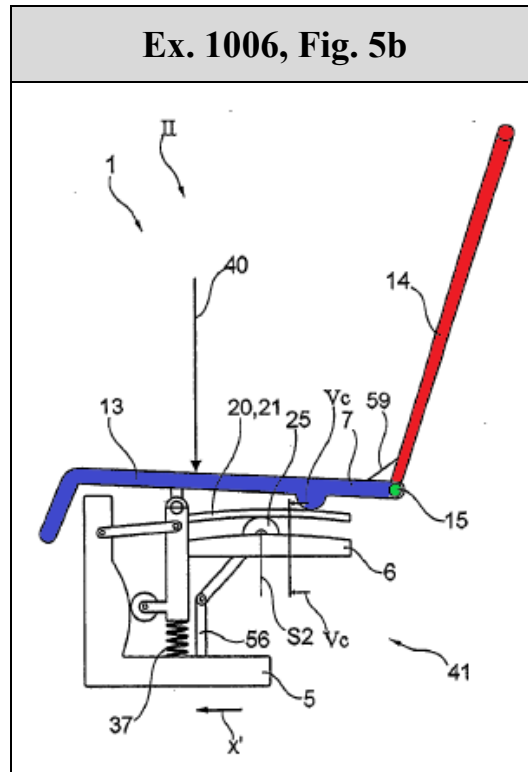
Schmitz '637 discloses this limitation two ways.

First, back part of seat 7 of Figs. 7a-7d is attached to and movable relative to the seat part. As discussed above, the back part is attached to the seat part. Ex. 1012, ¶¶150-151; Ex. 1006, Fig. 7b. Moreover, seat 7 is comprised of “right carrier 77” and “left carrier 78,” each having an “upper leg” (77a and 78a, respectively) and a “lower leg” (77b and 78b, respectively). Ex. 1006, ¶68; Ex. 1012, ¶157. The upper leg and lower leg of each carrier are connected by “linking members 79, 80” (red below). Ex. 1006, ¶68; *id.*, Fig. 7c; Ex. 1012, ¶157.

Ex. 1006, Fig. 7c

¶¶157-158. Thus, seat 7 discloses the elements of claim 10.

(blue) about “axis of rotation 15” (green). Ex. 1006, ¶61; *id.*, Fig. 5b; Ex. 1012, ¶159.



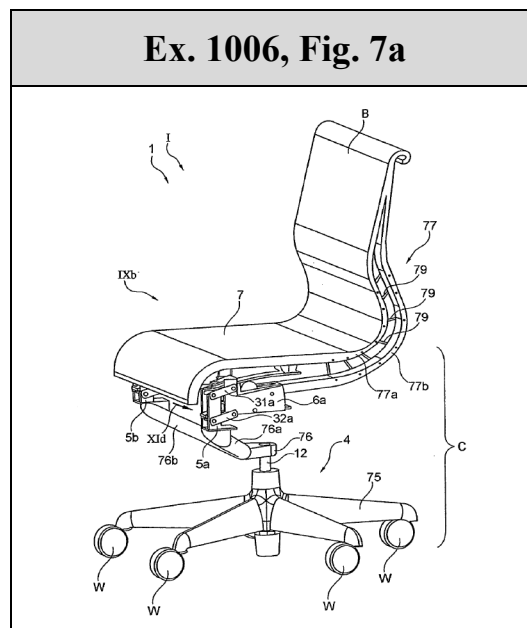
A PHOSITA would immediately envisage implementing seat 7 of Figure 5b with the chair and mechanism shown in Figures 7a-8c. Ex. 1012, ¶¶159-161. Schmitz '637 discloses only five seat part/back part combinations and expressly teaches that the disclosed “invention is not restricted to exemplary embodiments illustrated or described.” Ex. 1006, ¶85; Ex. 1012, ¶160. It would therefore be immediately apparent to a PHOSITA to use seat 7 of Figure 5b with the assembly shown in Figures 7a-8c, and it would be within the skill of a PHOSITA to implement this arrangement. Ex. 1012, ¶160. Such an arrangement likewise anticipates claim 10. *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2016) (“[A] reference can anticipate a claim...if a [PHOSITA]...would ‘at once envisage’ the

claimed arrangement.”); *Intuitive Surgical, Inc. v. Ethicon LLC*, IPR2018-00933, Paper 10, 12-15 (PTAB Dec. 4, 2018) (instituting IPR).

10. Dependent Claim 11

The reconfigurable apparatus for seating a user according to claim 1 wherein the sitting apparatus comprises a chair.

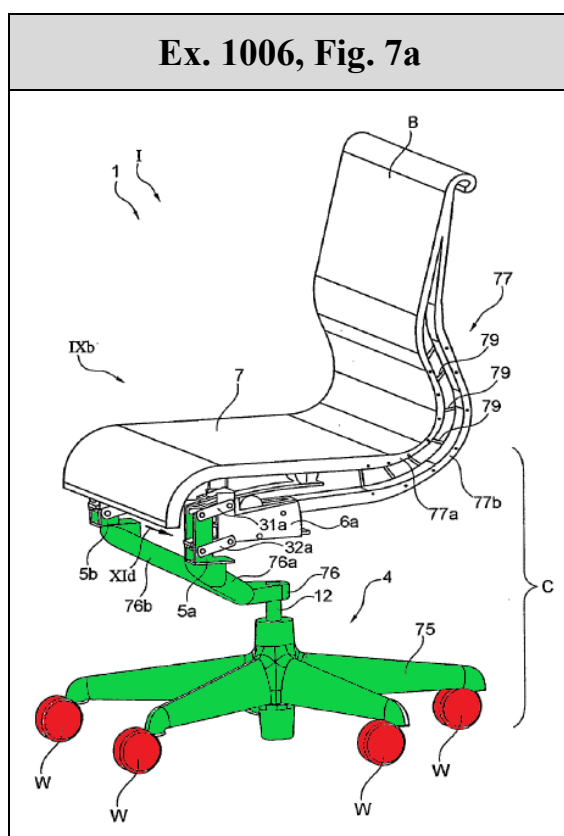
The sitting apparatus is a chair, as shown in Figure 7a. Ex. 1012, ¶¶163-164; Ex. 1006, Fig. 7a; *id.*, ¶1 (“[T]he invention relates to a piece of furniture...for example, [a] chair.”).



11. Dependent Claim 12

The reconfigurable apparatus for seating a user according to claim 11 wherein the frame comprises wheels that support the chair on a subjacent surface.

“[B]ase C” of the chair “comprises a lower part 4,” which includes “a base 75” (green below) “with wheels W” (red below) that support the chair on a subjacent surface. Ex. 1006, ¶68; *id.*, Fig. 7a; Ex. 1012, ¶¶166-167.



12. Dependent Claim 13

The reconfigurable apparatus for seating a user according to claim 11 wherein the chair comprises a pair of armrests.

Schmitz '637 discloses armrests. Ex. 1012, ¶¶169-170. Schmitz '637 explains that its invention “relates to a piece of furniture” such as “[an] armchair”—a chair

with armrests (Ex. 1006, ¶1), and Schmitz '637 notes that a benefit of its invention is that “weight force [of a user] can be detected, irrespective of whether it acts on a seat part and/or a back part and/or *armrests* of the seat” (*id.*, ¶13 (emphasis added)). Ex. 1012, ¶170.

A PHOSITA would immediately envisage the use of armrests with the chair depicted in Figures 7a-8c of Schmitz '637. Ex. 1012, ¶¶171-174. Schmitz '637 discloses only two possibilities in this regard: a chair with armrests and a chair without armrests. Ex. 1012, ¶172. And Schmitz '637 expressly teaches that the disclosed “invention is not restricted to exemplary embodiments illustrated or described.” Ex. 1006, ¶85. It would therefore be immediately apparent to a PHOSITA to implement armrests with the chair shown in Figures 7a-8c, and it would be well within the skill of a PHOSITA to do so. Ex. 1012, ¶¶172-173. Such an arrangement anticipates claim 13 of the '753 Patent. *E.g. Blue Calypso*, 815 F.3d at 1341; *Intuitive Surgical*, Paper 10, 12-15.

13. Dependent Claim 14

The reconfigurable apparatus for seating a user according to claim 11 wherein the chair is a task chair.

A task chair is designed for a variety of tasks and is adjustable for different users. Ex. 1012, ¶177; Ex. 1001, 1:21-25 (“[T]ask chairs are routinely engineered so

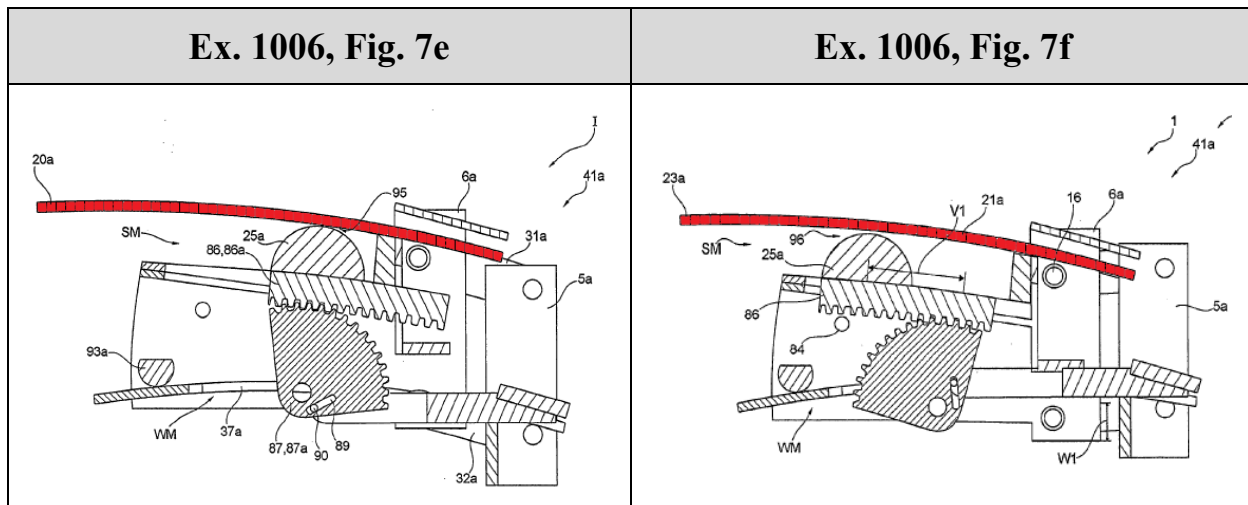
that a single design can be offered with a substantial amount of versatility in terms of how it can be adapted to size and weight of different individuals.”).

The chair shown in Figure 7a of Schmitz ’637 is a task chair: it is suitable for a variety of tasks, and it includes multiple types of adjustment, including “height adjustment device 12” (Ex. 1006, ¶68) and automatic adjustment of “the counterforce against an inclination movement of the seat” as “a function of the weight force with which a person acts on the seat” (*id.*, ¶73). Ex. 1012, ¶178.

14. Dependent Claim 18

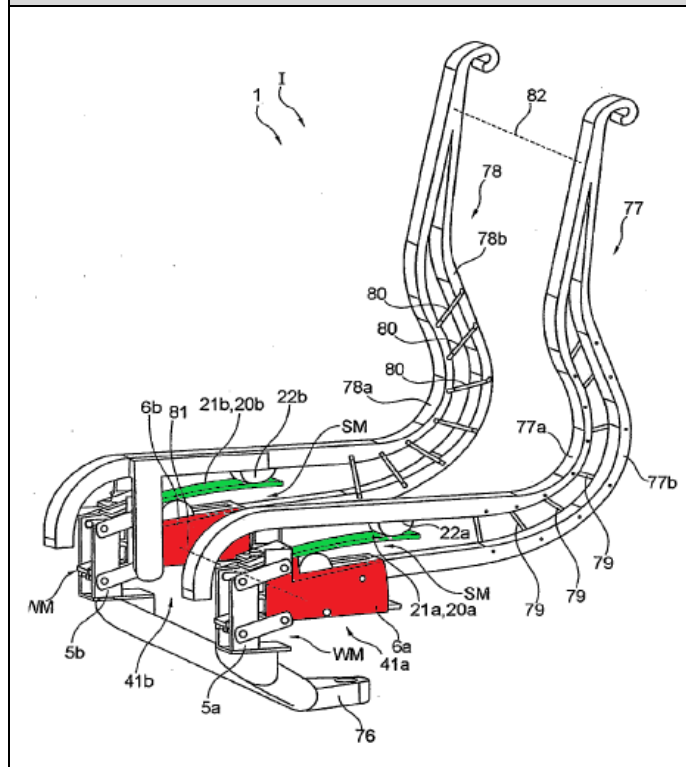
The reconfigurable apparatus for seating a user according to claim 1 wherein the reconfigurable apparatus comprises at least one spring bar that is bent under forces applied by a user to the reconfigurable apparatus to resist reconfiguration of a part of the reconfigurable apparatus.

Schmitz ’637 discloses leaf spring 21 (a spring bar) that is bent under forces applied by a user to resist tilting of seat 7. Ex. 1012, ¶¶181-184. Figures 7e and 7f show “spring element[] 20a,” “designed as leaf spring[] 21a,” in red below. Ex. 1006, ¶70; *id.*, Fig. 7e, 7f; Ex. 1012, ¶182.



Leaf spring 21a is bent under forces applied by a user to resist tilting of seat 7. Ex. 1012, ¶183. Schmitz '637 explains that “spring mechanisms SM,” which comprise “leaf springs 21a, 21b” support “against an inclination movement of the seat 7.” Ex. 1006, ¶71. Schmitz '637 further explains that “[a]n operative connection...between the support 25a and the leaf spring 21a occurs...when [a] person reclines out of his upright sitting position”—thereby applying force to seat 7—and that the “increased and weight-dependent counterforce is generated...by the leaf spring 21a coming to lie on the support 25.” *Id.*, ¶74. Figure 8c, annotated below, shows leaf spring 21a (red), bending against support 25a (green), under the force of projection 22a (yellow). Ex. 1006, Fig. 8c; Ex. 1012, ¶183.

Ex. 1006, Fig. 7c

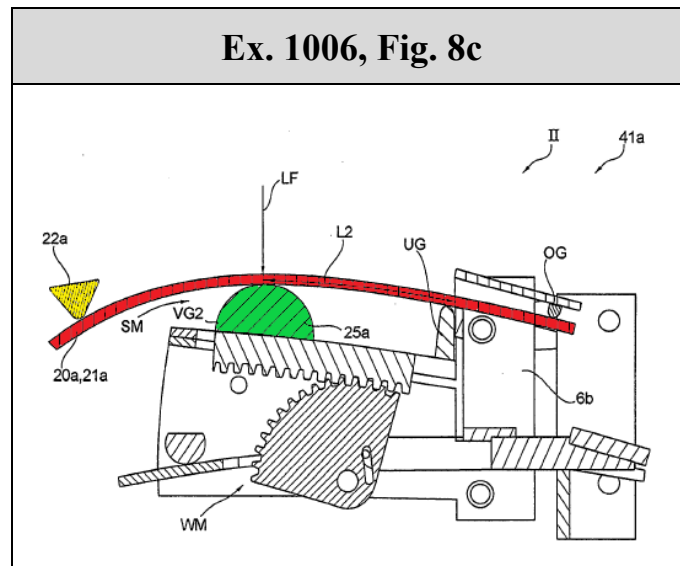


16. Dependent Claim 20

The reconfigurable apparatus for seating a user according to claim 19 wherein at least one of the spring bars comprises an elongate spring bar with a length and the elongate spring bar resists reconfiguration of the reconfigurable apparatus by being bent transversely to the length of the elongate spring bar.

As explained in Section VI.A.14 regarding claim 18, Schmitz '637 discloses leaf spring 21a, which is a spring bar that is bent under forces applied by a user to resist tilting of seat 7. Ex. 1012, ¶¶181-184. Leaf spring 21a (red below) is also an elongate spring bar with a length that resists tilting of seat 7 by being bent transversely to its length about support 25a (green below), as shown in Figure 8c

below. Ex. 1012, ¶¶190-192; Ex. 1006, ¶71 (leaf spring 21a resists against “inclination movement of the seat 7”); *id.*, ¶74 (“An operative connection or contact between the support 25a and the leaf spring 21a occurs...when [a] person reclines out of his upright sitting position.”); *id.*, Fig. 8c.

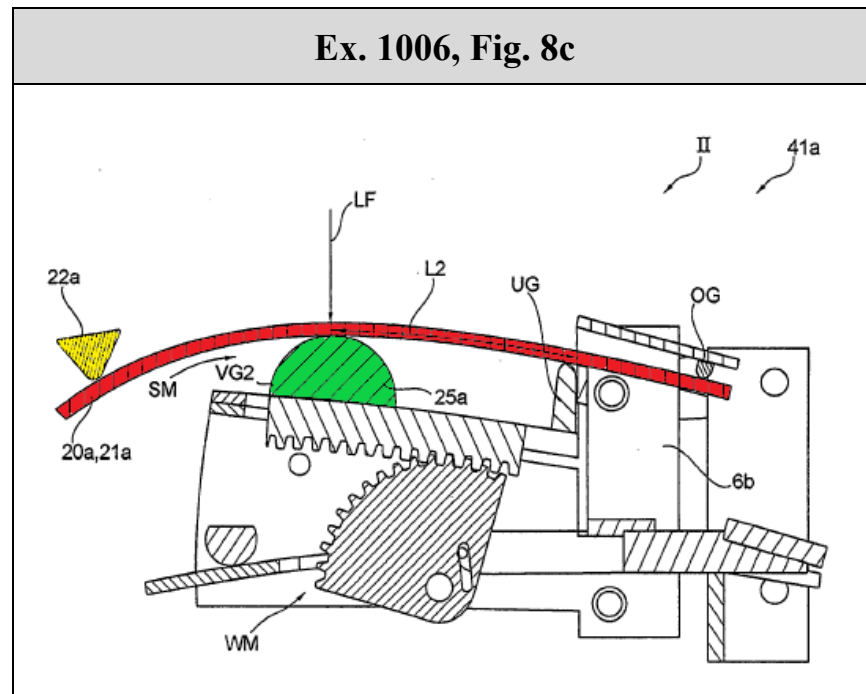


17. Dependent Claim 21

The reconfigurable apparatus for seating a user according to claim 3 wherein the reconfigurable apparatus comprises an elongate spring bar having a length and that resists changing of the angular orientation of the back rest from the starting position by bending against a fulcrum part, the seat moves a first distance between the first and loaded positions, and the first and second rack and pinion gears are configured so that as an incident of the seat moving from the first position into the loaded position there is relative movement of the elongate spring bar and fulcrum along the length of the elongate spring bar a distance different than the first distance.

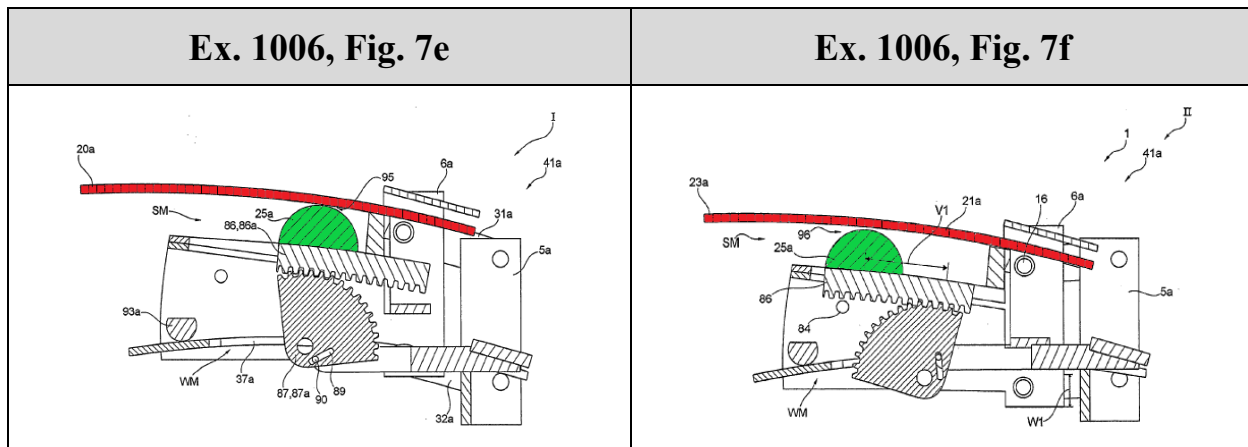
First, as explained in Section VI.A.4 regarding claim 4, Schmitz '637 discloses leaf spring 21a, which is an elongate spring bar having a length, that resists changing of the angular orientation of the back part of seat 7 by bending against

support 25a, which is a fulcrum part. Ex. 1012, ¶¶134-137, 195-197; Ex. 1006, ¶¶71, 74. Fig. 8c, annotated below, depicts the elongate spring bar (red), bending against the fulcrum part (green), under the force of projection 22a (yellow). Ex. 1006, Fig. 8c; Ex. 1012, ¶197.



Second, as explained in Section VI.A.6 regarding claim 6, Schmitz '637 discloses that the rack and pinion gears are configured such that when seat 7 is lowered into the loaded position, support 25a moves along the length of leaf spring 21a (a relative movement of the elongate spring bar and the fulcrum). Ex. 1012, ¶¶146-148, 198-200; Ex. 1006, ¶¶71, 73. Figure 7e, below-left, shows the support 25a (green) in the first position, and Figure 7f, below-right, shows the support 25a after it has been displaced relative to leaf spring 21a (red) as a result of cooperation

of the rack and pinion gears when a user sits in seat 7. Ex. 1012, ¶140; Ex. 1006, Figs. 7e, 7f.



In addition, as also explained in Section VI.A.6 regarding claim 6, the distance support 25a moves—“displacement distance V1”—is different from the distance the seat moves—“weighing distance W1”—when a user sits. Ex. 1012, ¶¶146-147, 201-202; Ex. 1006, ¶73.

18. Dependent Claim 22

The reconfigurable apparatus for seating a user according to claim 4 wherein the seat moves a first distance between the first and loaded positions and the plurality of gears comprises first and second gear pairs configured so that as an incident of the seat moving from the first position into the loaded position there is relative movement of the elongate spring bar and fulcrum along the length of the elongate spring bar a distance different than the first distance.

First, as explained in Sections VI.A.2 and VI.A.3 regarding claims 2 and 3, the plurality of gears comprises a first rack gear and a first pinion gear and a second

rack gear and a second pinion gear—first and second gear pairs. Ex. 1012, ¶¶125-132, 207-209; Ex. 1006, ¶71.

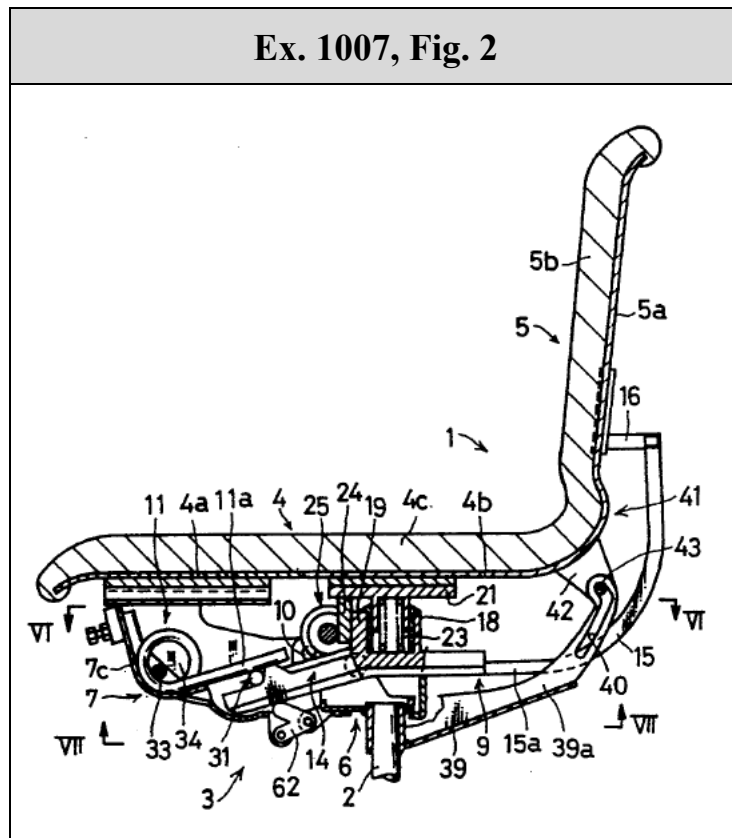
Second, as explained in Section VI.A.17 regarding claim 21, the rack and pinion gears are configured such that when the seat moves down a “weighing distance W1” in response to a user sitting in seat 7, the support 25a, a fulcrum, moves along the length of leaf spring 21a, the elongate spring bar, a “displacement distance V1,” which is different from “weighing distance W1.” Ex. 1012, ¶¶198-202, 210-213; Ex. 1006, ¶¶71, 73.

B. Ground II: Claims 1-3, 7, 15, and 17 Are Anticipated by Takamatsu

1. Independent Claim 1

[1] A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:

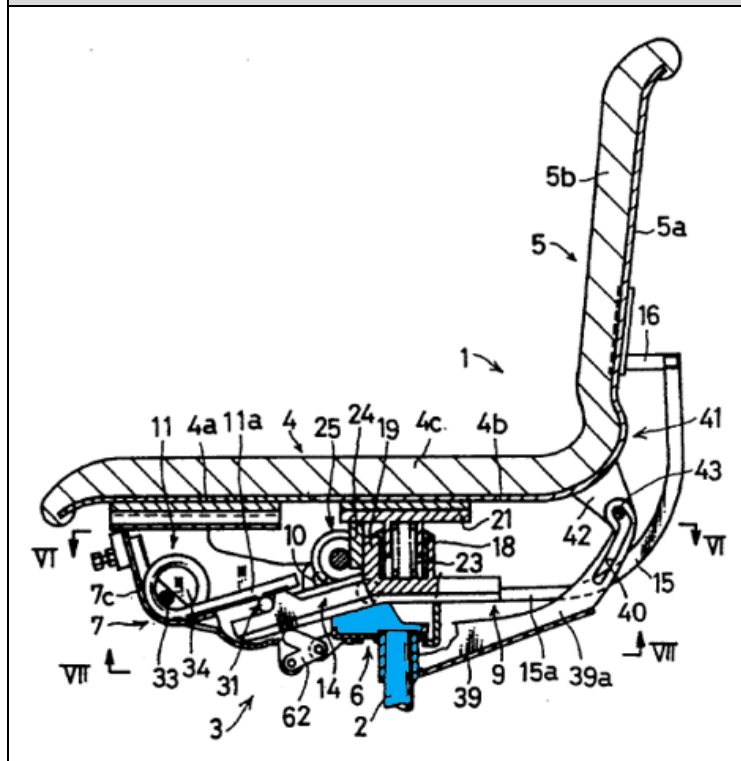
Takamatsu discloses a chair that can be reconfigured. Ex. 1012, ¶¶216-217; Ex. 1007, 1:51-57; *id.*, Fig. 2.



[1.a] a frame,

The chair comprises “support device 3,” which includes “a fixed frame 6 attached to the upper end of the chair leg post 2,” and a “forwardly pivotal frame 7” attached to “the fixed frame 6.” Ex. 1007, 4:6-9. The “chair leg post 2” and the “fixed frame 6” (blue below) are the frame. Ex. 1012, ¶¶218-220; Ex. 1007, Fig. 2.

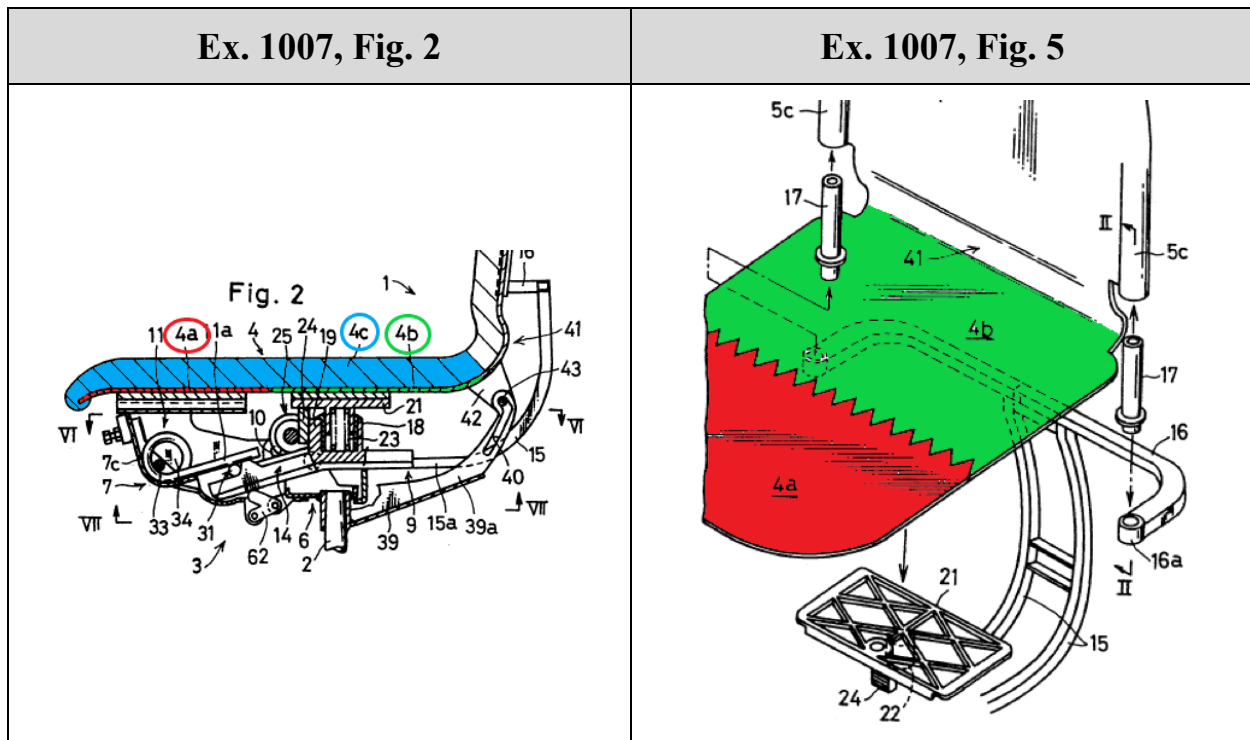
Ex. 1007, Fig. 2



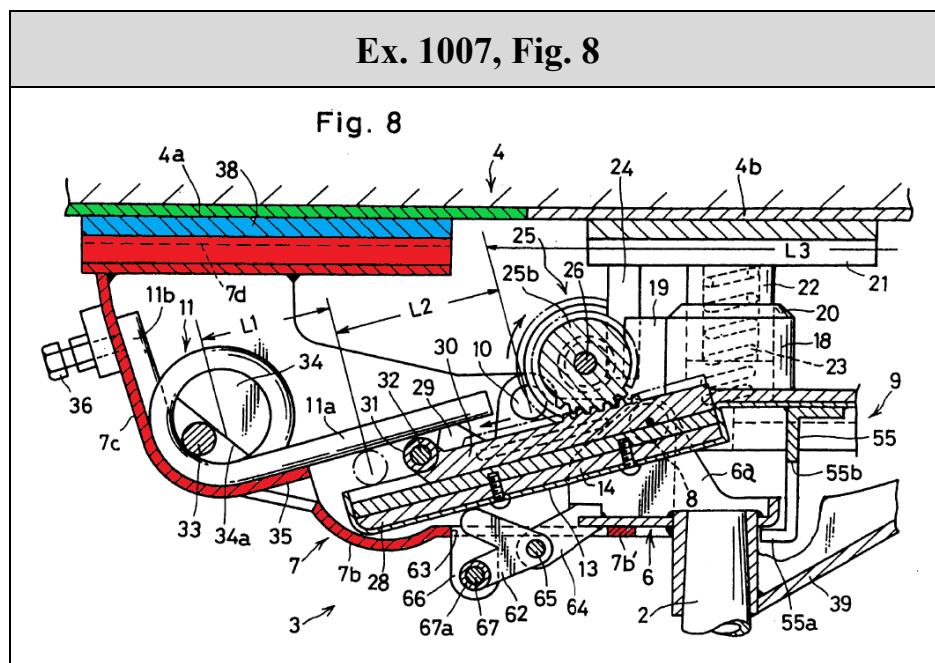
[1.b] a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat,

Takamatsu discloses a “seat 4” indirectly mounted to frame 6. Ex. 1007, 3:54-59; Ex. 1012, ¶¶222-229; Section IV.B.2.ii, *supra*.

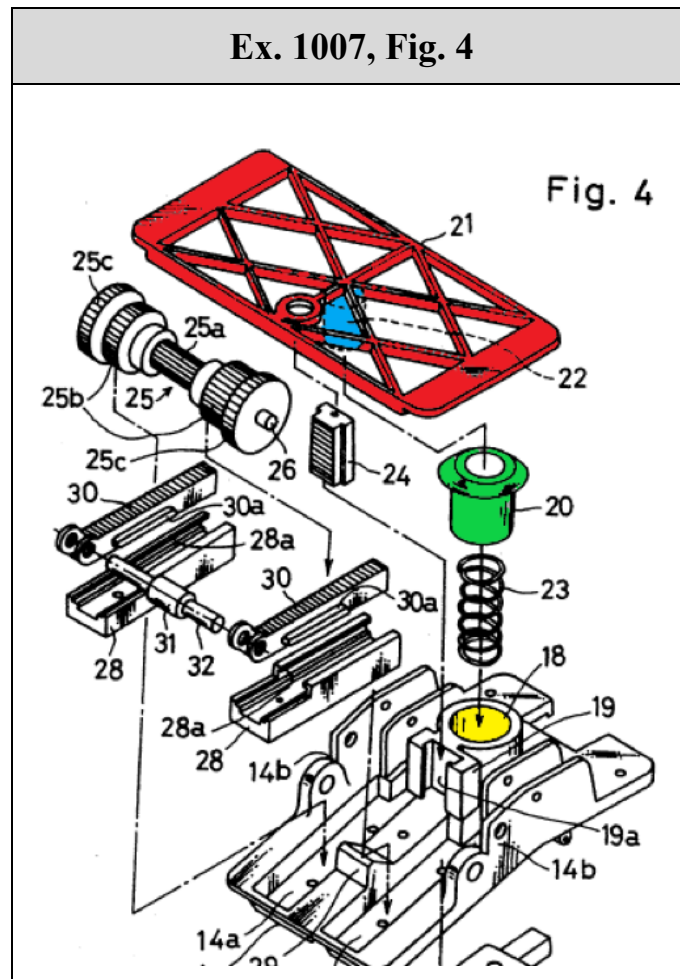
Seat 4 includes “seat cushion 4c” (blue below—Fig. 2 only) attached to a “seat front carrier plate 4a” (red) and a “seat tail carrier plate 4b” (green). Ex. 1007, 3:60-63; *id.*, Figs. 2, 5; Ex. 1012, ¶223.



Front carrier plate 4a (green below) is attached to “front support plate 38” (blue), which is attached to “side flanges 7d of pivotal frame 7” (red). Ex. 1007, 6:27-30; *id.*, Figs. 8, 3; Ex. 1012, ¶224.

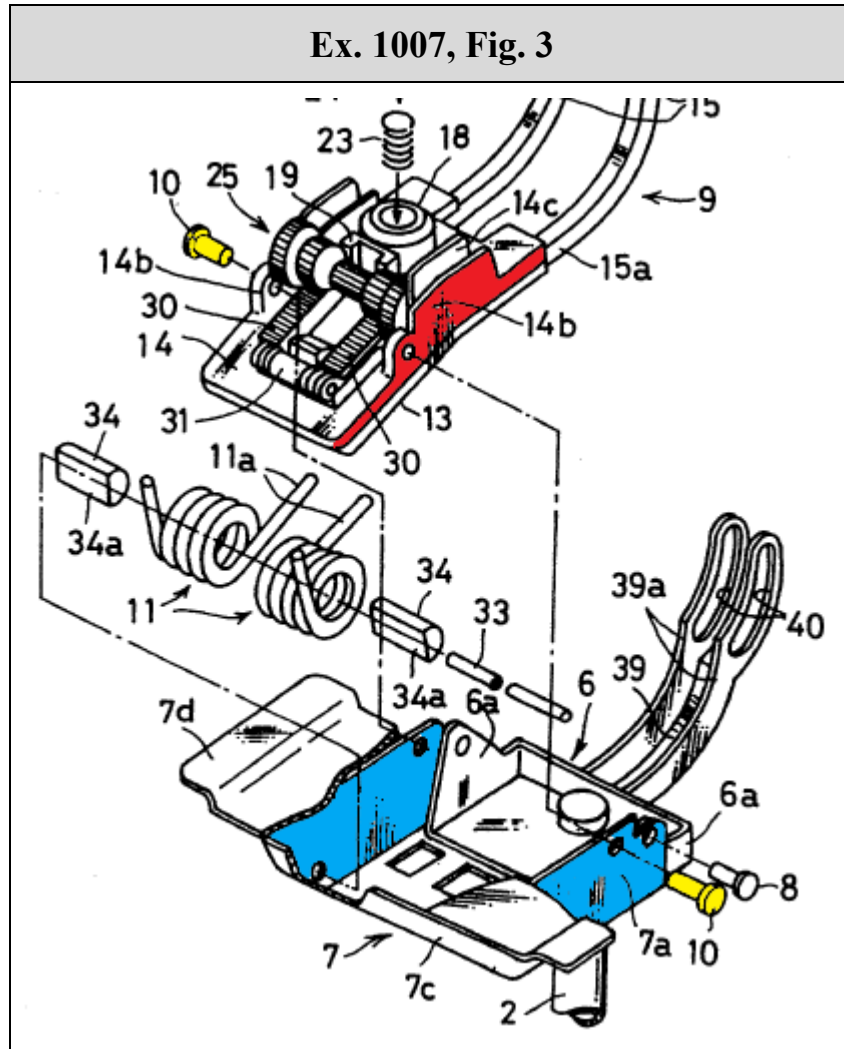


Seat tail carrier plate 4b is attached to a “rear support plate 21” mounted on “mechanism carrier 14” of “tiltable member 9.” Ex. 1007, 5:2-15. Rear support plate 21 (red below) has a “downwardly directed housing cylinder 22” (blue) received in “guide bush 20” (green) that, in turn, is received in “cylindrical boss 18” (yellow) formed in “mechanism carrier 14.” *Id.*; *id.*, Figs. 4, 5; Ex. 1012, ¶¶225-226.



Tiltable member 9 is pivotally connected to frame 7: “mechanism carrier 14” of tiltable member 9 “has a pair of upwardly directed outer side brackets 14b” (red

“second pivots 10” (yellow). Ex. 1007, 4:48-53; *id.*, Fig. 3; Ex. 1012, ¶227.



id., Fig. 3; Ex. 1012, ¶228.

[illegible]

74

Ex. 1007, Fig. 4

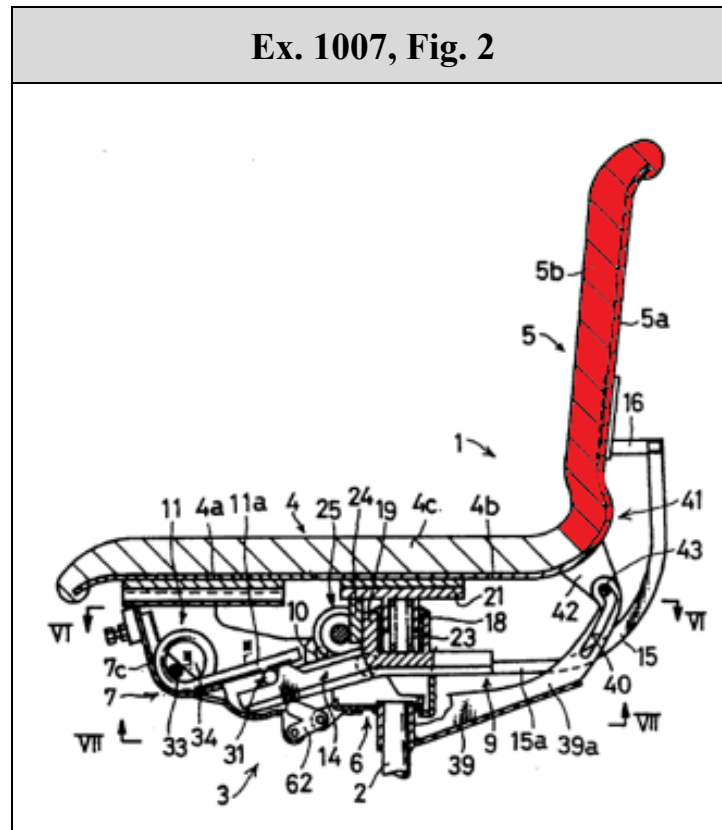
Fig. 4

Fig. 4 is an exploded perspective view of a mechanical assembly. The assembly includes a base plate (21) with a grid pattern, a central component (22) with a blue square, a cylindrical component (20) with a spring (23) inside, and various other parts labeled 24, 25a, 25b, 25c, 26, 28, 28a, 29, 30, 30a, 31, 32, 14a, 14b, 19, and 19a. The spring (23) is highlighted with a red circle.

75

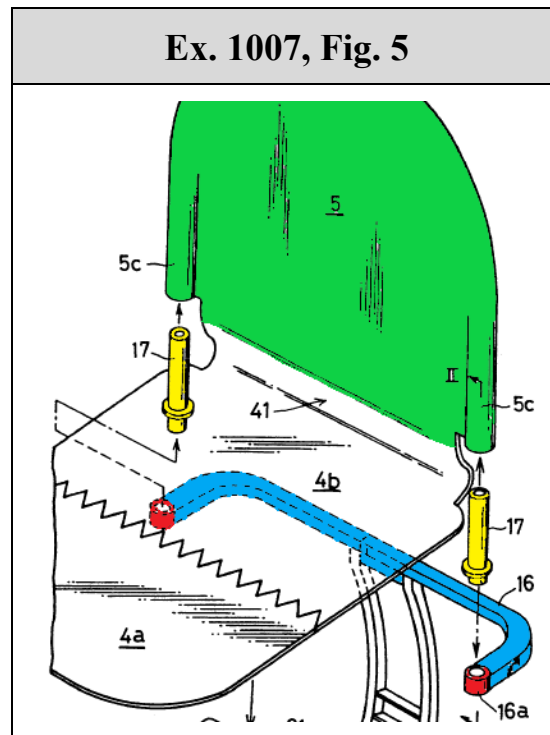
[1.c] a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame,

Takamatsu discloses a “seat back 5” (red below) that is “integral with the seat 4.” Ex. 1007, 3:58-59; *id.*, Fig. 2; Ex. 1012, ¶236.



A user can lean against seat back 5 to change its angular orientation relative to the frame. Ex. 1012, ¶¶237-242; Ex. 1007, 1:61-65. Seat back 5 is attached to and pivots with tilting member 9. Ex. 1012, ¶¶238-241. In particular, tiltable member 9 includes “a pair of generally L-shaped frame bars 15,” the upper end of which is “fixed to a horizontal connecting bar 16.” Ex. 1007, 4:35-39; *id.*, 4:60-62. The ends

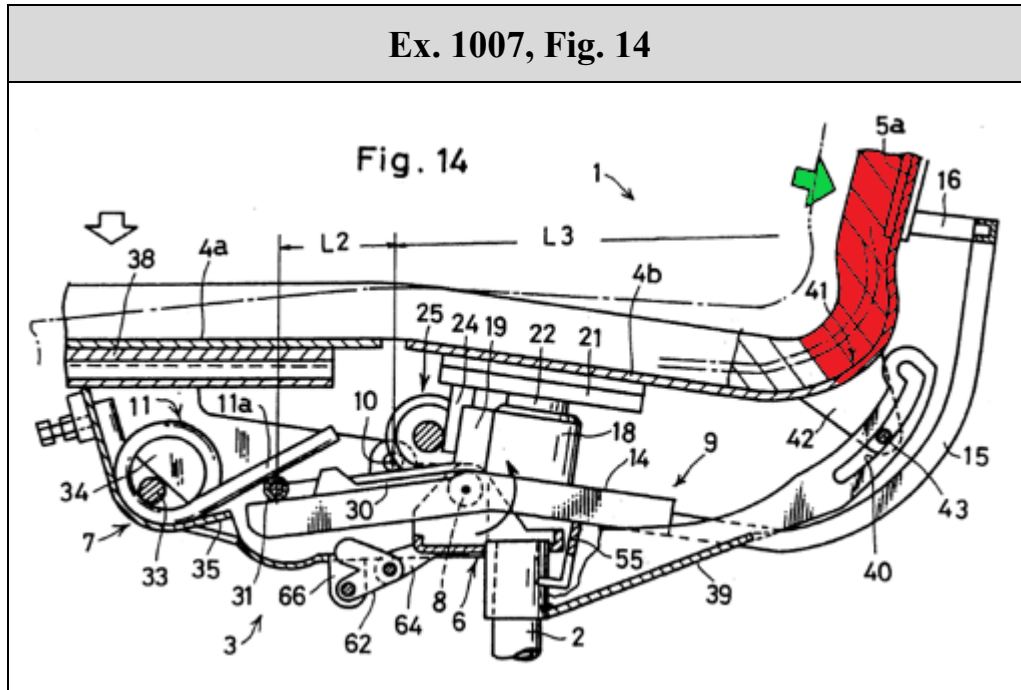
of horizontal connecting bar 16 (blue below) are provided with “bushes 16a” (red) that receive “cylindrical member[s] 17” (yellow) that, in turn, are received in “cylindrical receptacle[s] 5c” of back carrier plate 5a (green)—part of seat back 5. Ex. 1007, 4:62-5:2; *id.*, Fig. 5; Ex. 1012, ¶¶238-239.



Thus, “seat back 5 is tiltable with the tiltable member 9.” Ex. 1007, 5:1-2; Ex. 1012, ¶240.

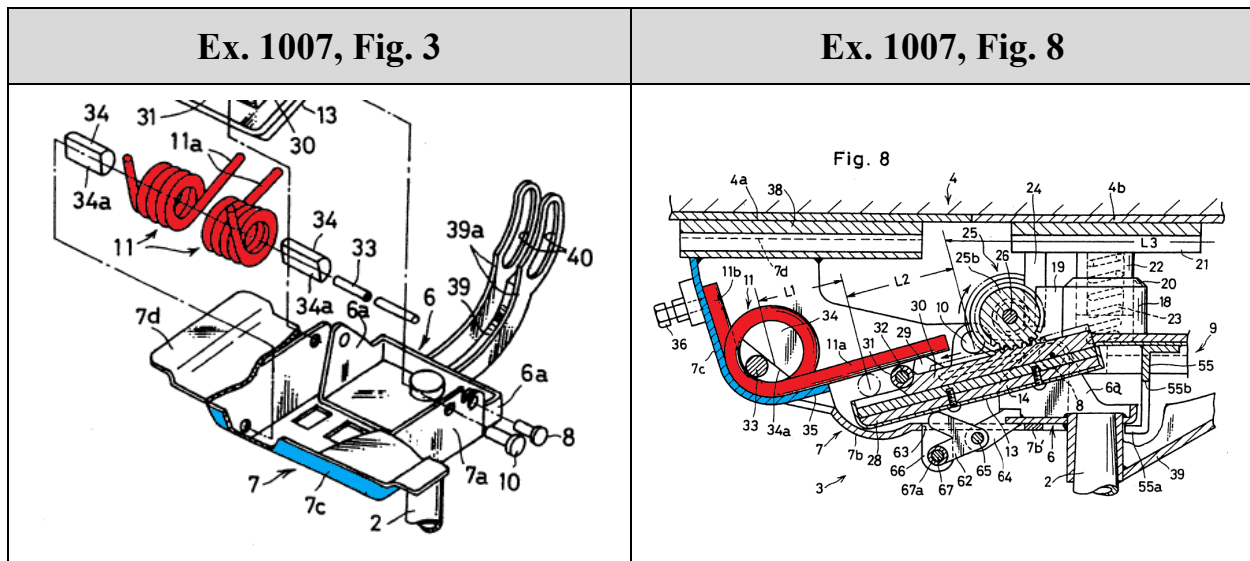
As explained above, moreover, tiltable member 9 is pivotally mounted to pivotal frame 7 about second pivots 10. Ex. 1012, ¶227; Ex. 1007, 4:48-53. Thus, “if the user leans against the seat back 5 (green arrow below), the tiltable member 9 together with the seat back 5” (red) are “tilted rearwardly downward about the

second pivots 10, as shown in FIG. 14.” Ex. 1007, 7:31-34; *id.*, Fig. 14; Ex. 1012, ¶241.



[1.d] the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;

A first leaning force is required to tilt seat back 5 relative to its starting position with no user in the seat. Ex. 1012, ¶¶243-246. A “pair of tilting control springs 11,” embodied as “torsion coil spring[s],” “elastically control[.]” tilting of tiltable member 9 and seat back 5. *Id.*, ¶244; Ex. 1007, 4:26-34. Each coil spring 11 (red below) has “a load receiving leg 11a and an anchoring leg 11b engaging against the front wall 7c” (blue) of the pivotal frame 7. Ex. 1012, ¶244; Ex. 1007, 4:26-34; *id.*, Figs. 3, 8.



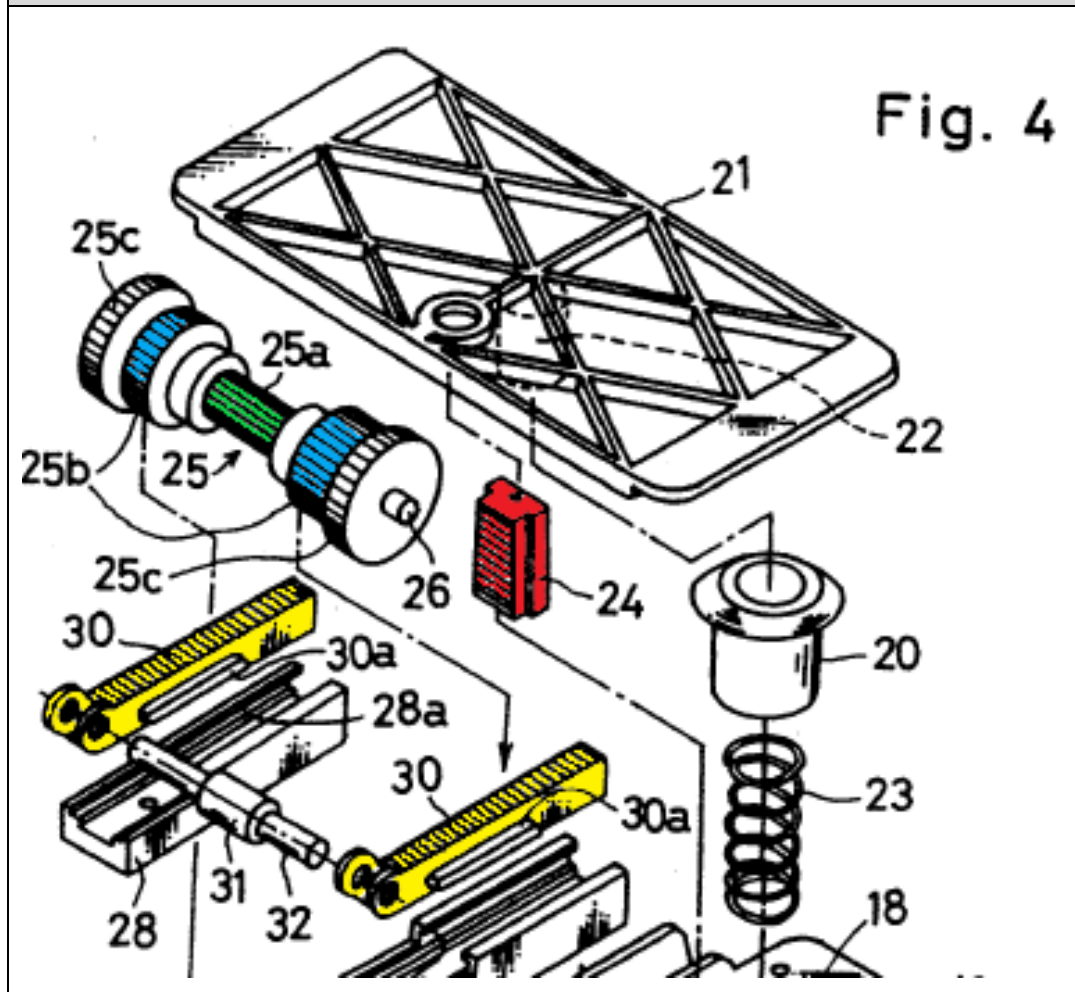
Tiltable member 9 bears against load receiving legs 11a of the control springs 11 via a “horizontal load applying pin 32” provided with a “load applying roller 31.” Ex. 1007, 5:49-55; Ex. 1012, ¶245. Thus, when seat back 5 is reclined, “the load receiving legs 11a of the tilting control springs 11 are elastically raised upward by the load applying roller 31.” Ex. 1007, 7:35-39.

Accordingly, a “first leaning force” is required to raise the load receiving legs 11a of the tilting control springs 11 and thereby change the angular orientation of seat back 5 with no user in seat 4. Ex. 1012, ¶245.

[1.e] and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position,

“[A]djusting assembly” is a means-plus-function element. Section IV.B.2.i, *supra*. But Takamatsu discloses this limitation regardless of MPF construction. Ex. 1012, ¶247.

First, Takamatsu discloses gears that cooperate when the seat moves from the first position into the loaded position. Ex. 1012, ¶¶248-252. A “first rack 24” (red below), which is part of “rear support plate 21,” engages with “the first pinion 25a” (green), which is part of a larger “pinion assembly 25” that also includes a pair of “second pinions 25b” (blue) that mesh with a pair of “second rack[s] 30” (yellow) arranged in “second rack guide[s] 28” disposed on mechanism carrier 14. Ex. 1007, 5:19-37; *id.*, Figs. 4, 6; Ex. 1012, ¶248-250.



When a user sits, “downward movement of the seat tail carrier plate 4b” causes “downward movement of the first rack 24,” which “engag[es] with the first pinion 25a, thereby rotating the pinion assembly 25.” Ex. 1007, 7:13-24. This rotation (yellow-highlighted arrow below) “causes the second racks 30 in mesh with the second pinions 25b to advance” (green-highlighted arrow) along with “load applying pin 32” (red) that is carried by the second racks 30. *Id.*; *id.*, Fig. 8; Ex. 1012, ¶¶251-252.

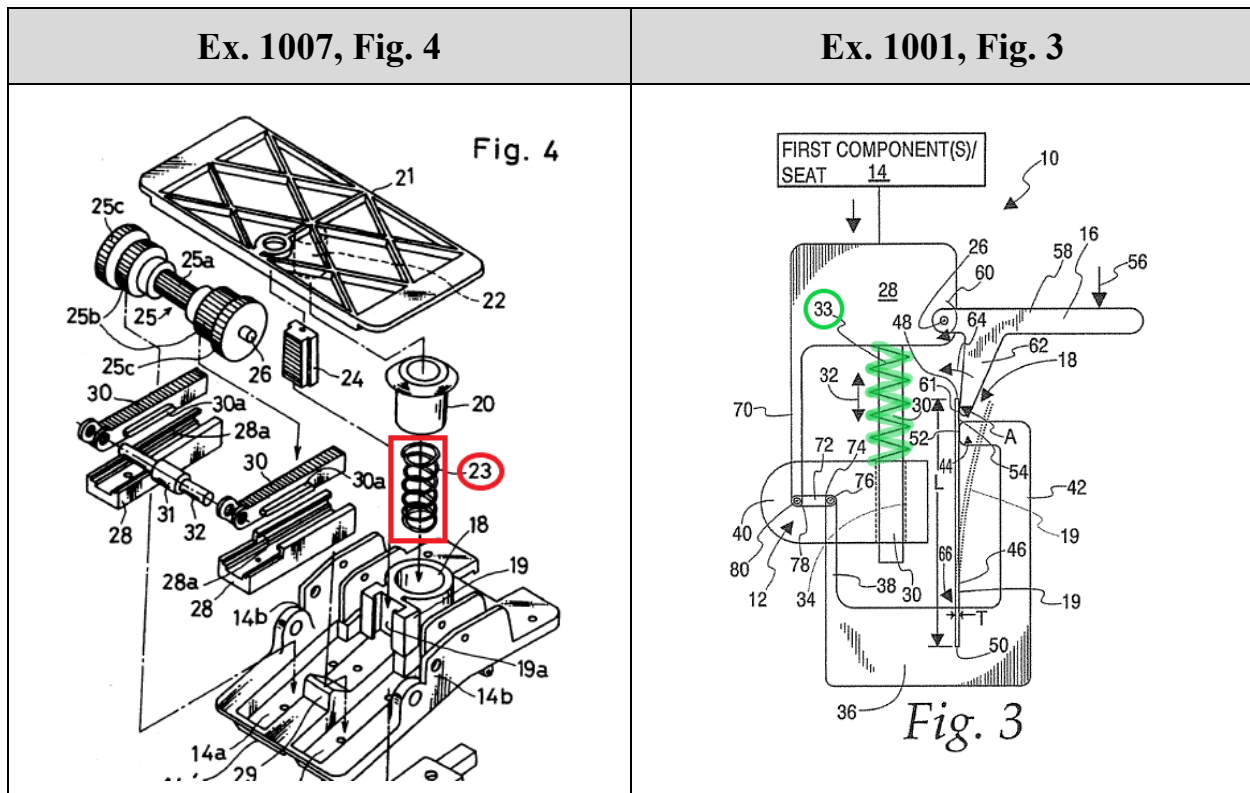
Ex. 1007, Fig. 8

82

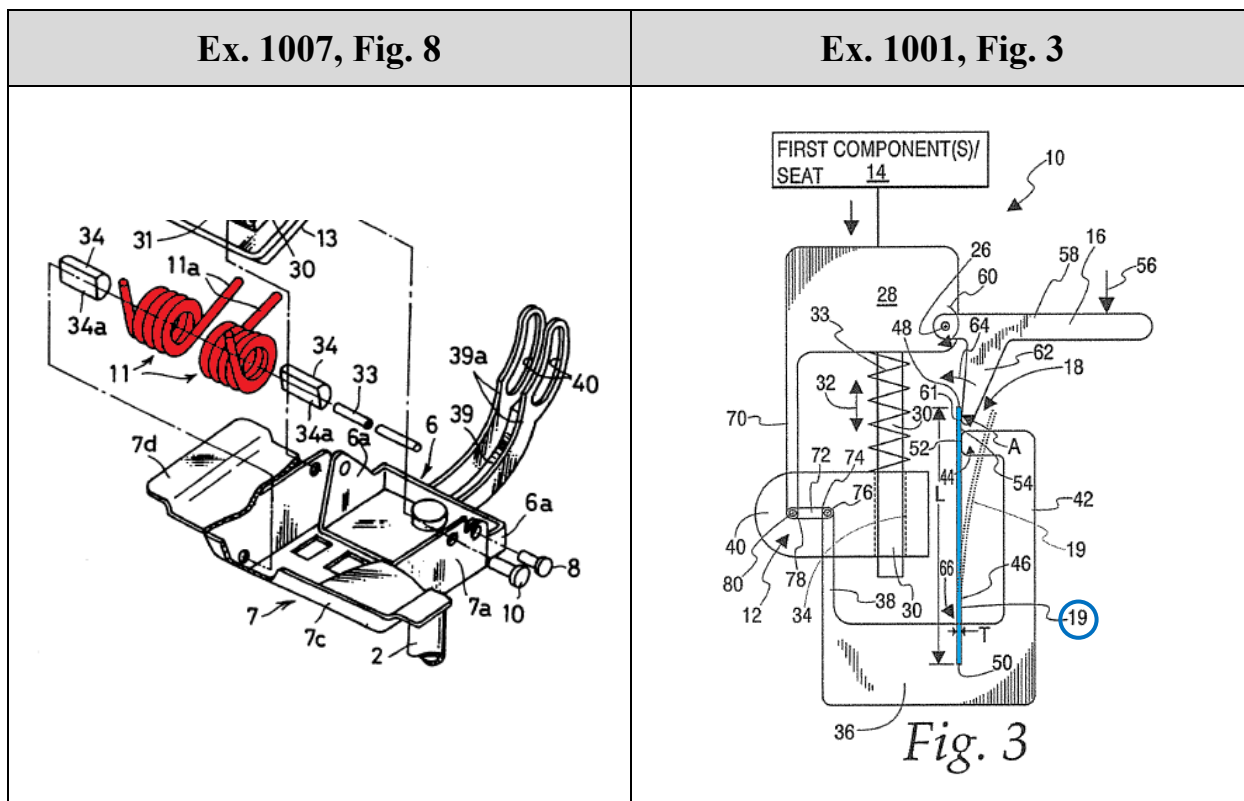
spring 11 provides a larger supportive force for a heavier user than for a lighter user.”); Ex. 1012, ¶¶256-258.

Finally, Takamatsu also discloses the “adjusting assembly” if it is construed as a means-plus-function element because Takamatsu discloses the same or equivalent structure that provides the same function, in substantially the same way, with substantially the same result. *Regents of Univ. of Minnesota*, 717 F.3d at 940-41; Ex. 1012, ¶¶259-262.

As for the weighing spring, Takamatsu discloses “weight responsive coil spring 23” that allows seat 4 to move down “by an amount which is substantially proportional to the weight of the user.” Ex. 1007, 5:13-18; Ex. 1012, ¶259. The “weight responsive coil spring 23” (below-left in red) is the same as the coil spring 33 disclosed in the ’753 Patent (below-right in green). Ex. 1012, ¶259; Ex. 1007, Fig. 4; Ex. 1001, Fig. 3.



As for the tilting spring, Takamatsu discloses torsion coil springs 11 that elastically control “rearward tilting of the seat back 5.” Ex. 1007, 7:35-39; Ex. 1012, ¶260. The torsion coil springs 11, below-left in red, are equivalent to leaf spring 19 disclosed in the ’753 Patent, below-right in blue. Ex. 1012, ¶260; Ex. 1007, Fig. 8; Ex. 1001, Fig. 3.



Any differences between the two structures are insubstantial: they provide the same function in substantially the same way (resilient flexing against a tilting force) to provide substantially the same result (providing variable resistance to that force). Ex. 1012, ¶261.

And, as discussed above, these structures provide the claimed function of “increas[ing] a resistance to changing of the angular orientation of the back rest from the starting angular position” as a result of a user sitting. In short, “when the user sits on the seat 4,” the “effective length L_1 ...of the load receiving leg 11a of each tilting control spring 11...reduces generally proportionally to the weight of the user,”

which increases the resistance to the tilting of seat back 5. Ex. 1007, 7:13-30; Ex. 1012, ¶262.

[1.f] whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.

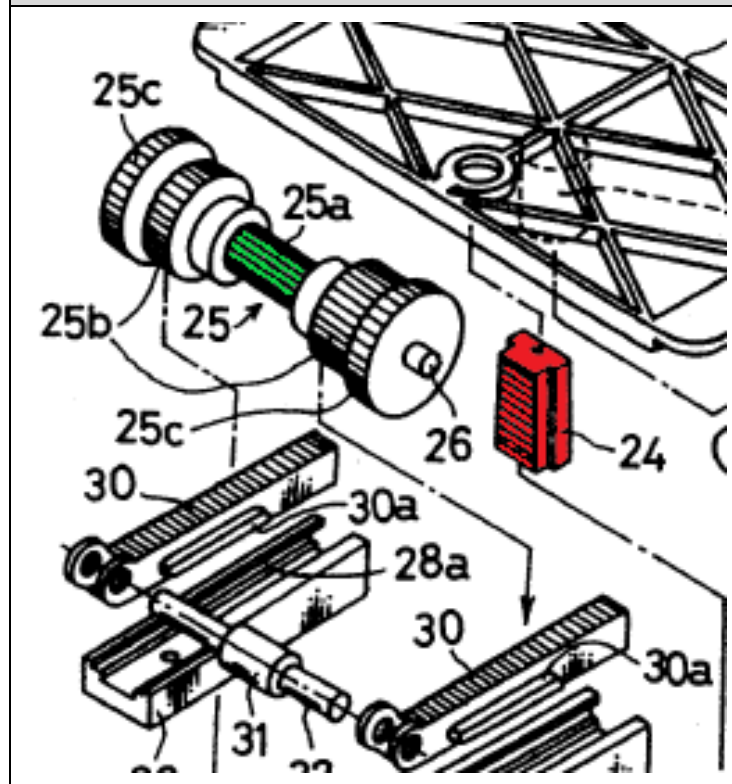
When a user sits, a greater force is required to tilt seat back 5 compared to when no user is seated. Ex. 1012, ¶¶263-264. “[W]hen the user sits on the seat 4,” the “effective length L1...of the load receiving leg 11a of each tilting control spring 11...reduces generally proportionally to the weight of the user.” Ex. 1007, 7:13-30. This increases the force required to tilt seat back 5: “the tilting control spring 11 provides a larger supportive force for a heavier user than for a lighter user.” *Id.*, 8:5-12; *see id.*, 8:13-39; Ex. 1012, ¶264.

2. Dependent Claim 2

The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises a first rack gear and first pinion gear, the first rack gear and first pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position.

Takamatsu discloses a “first rack 24” (red below) that engages with “first pinion 25a” (green). Ex. 1007, 5:19-37; *id.*, Fig. 4; Ex. 1012, ¶266-268.

Ex. 1007, Fig. 4



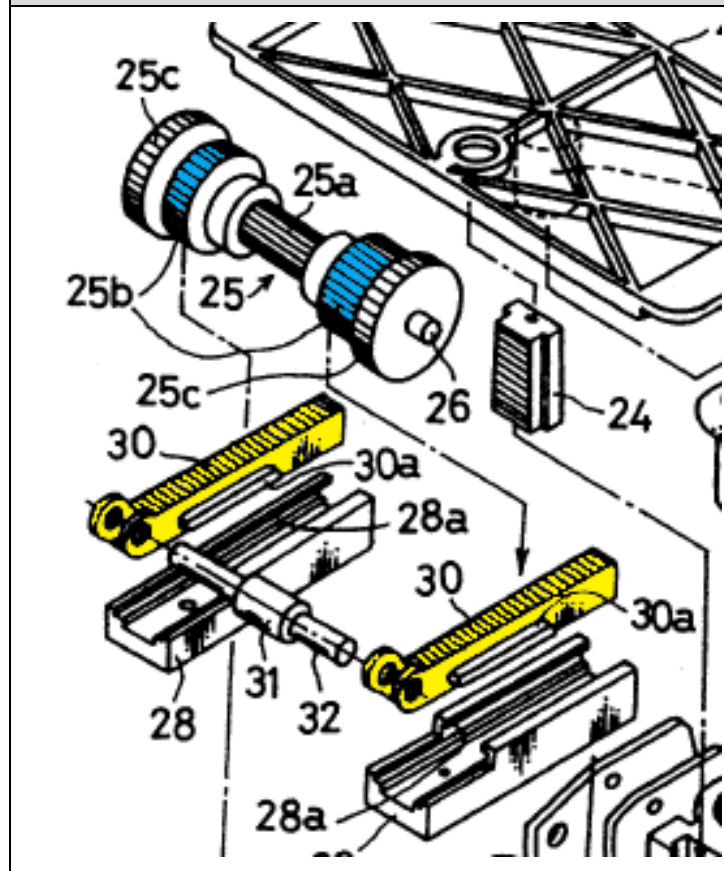
These gears cooperate: “when the user sits on the seat 4,” first rack 24 “engag[es] with the first pinion 25a, thereby rotating the pinion assembly 25.” Ex. 1007, 7:13-21.

3. Dependent Claim 3

The reconfigurable apparatus for seating a user according to claim 2 wherein the plurality of gears comprises a second rack gear and a second pinion gear, the second rack gear and second pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position.

Takamatsu discloses “second racks 30” (yellow below) that “mesh with” the “second pinions 25b” (blue). Ex. 1007, 7:13-24; *id.*, Fig. 4; Ex. 1012, ¶¶271-274.

Ex. 1007, Fig. 4



These gears cooperate; as explained above, when a user sits, pinion assembly 25 rotates, which “causes the second racks 30 in mesh with the second pinions 25b to advance with the load applying pin 32.” Ex. 1007, 7:13-24; Ex. 1012, ¶272.

4. Dependent Claim 7

The reconfigurable apparatus for seating a user according to claim 1 wherein the back rest is mounted directly to the frame.

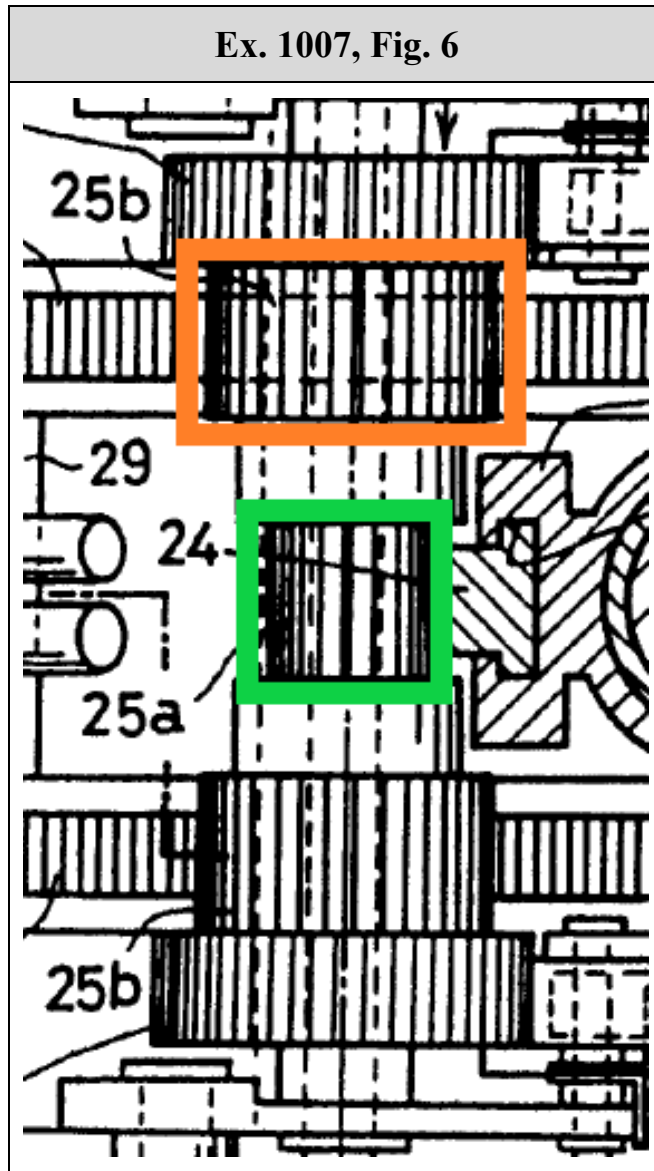
Takamatsu discloses wherein seat back 5 is mounted directly to the frame. Ex. 1012, ¶¶276-279. As discussed above, “seat back 5 is connected to a tiltable member 9.” Ex. 1007, 4:23-24. A PHOSITA would understand that tiltable member 9 is part

of the back rest structure. Ex. 1012, ¶277. Tilttable member 9 is “pivotable about the second pivots 10 relative to the pivotal frame 7 which itself is pivotable about the first pivots 8 relative to the fixed frame 6,” which is part of the claimed frame. *Id.*, 4:53-56. Thus, because “tiltable member 9” is part of the back rest structure, the back rest is mounted directly to the frame. Ex. 1012, ¶¶278-279.

5. Dependent Claim 15

The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises first and second gears that each turns around an axis and the first and second gears have different diameters.

Takamatsu discloses “first pinion 25a” and “second pinions 25b,” which are “mounted on the common shaft 26 for simultaneous rotation.” Ex. 1007, 8:45-49. Ex. 1012, ¶¶280-282. The “second pinions 25b” (orange below) are “diametrically larger than the first pinion 25a” (green). Ex. 1007, 8:45-47; *id.*, Fig. 6; Ex. 1012, ¶¶283-284.



6. Dependent Claim 17

The reconfigurable apparatus for seating a user according to claim 15 wherein the first and second gears turn around a same axis.

“[F]irst pinion 25a” and “second pinions 25b” are “mounted on the common shaft 26 for simultaneous rotation.” Ex. 1007, 8:45-49. Common shaft 26 is the “axis” on which both gears turn. Ex. 1012, ¶¶286-287.

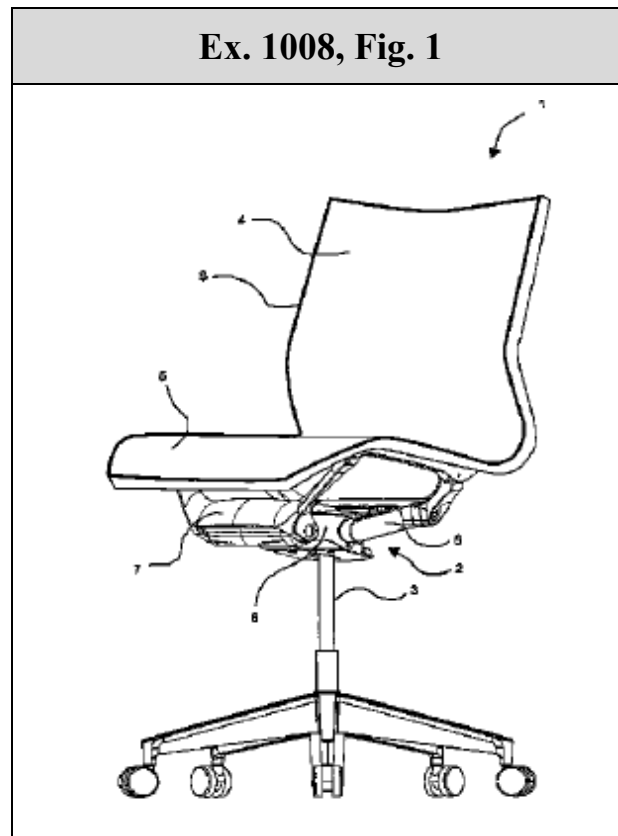
C. Ground III: Claim 16 Is Anticipated by Schmitz '738

Schmitz '738 is prior art to and anticipates at least claim 16 of the '753 Patent. Because claim 16 depends from claims 1 and 15, the elements of those claims are addressed first.

1. Independent Claim 1

[1] A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising:

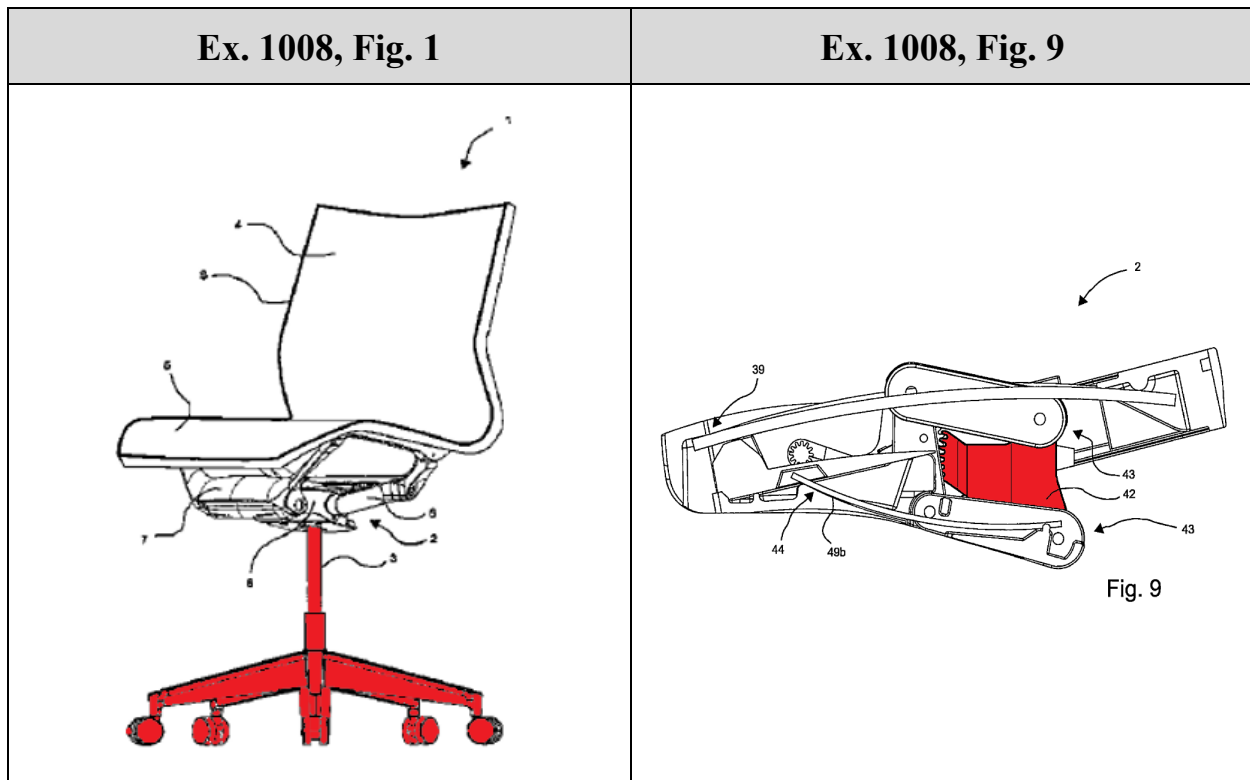
Schmitz '738 discloses a chair that can be reconfigured. Ex. 1008, 1:32-36; *id.*, Fig. 1; Ex. 1012, ¶¶289-290.



[1.a] a frame

The chair includes “a foot element 3, a back element 4, and a seat element 5.”

Ex. 1008, 6:54-56. A “flange 42” is “connected to the foot element 3.” *Id.*, 8:31-36; *see also id.*, 9:12-14. The foot element 3 (below-left in red) and flange 42 (below-right in red) are the frame. *Id.*, Figs. 1, 9; Ex. 1012, ¶¶291-293.

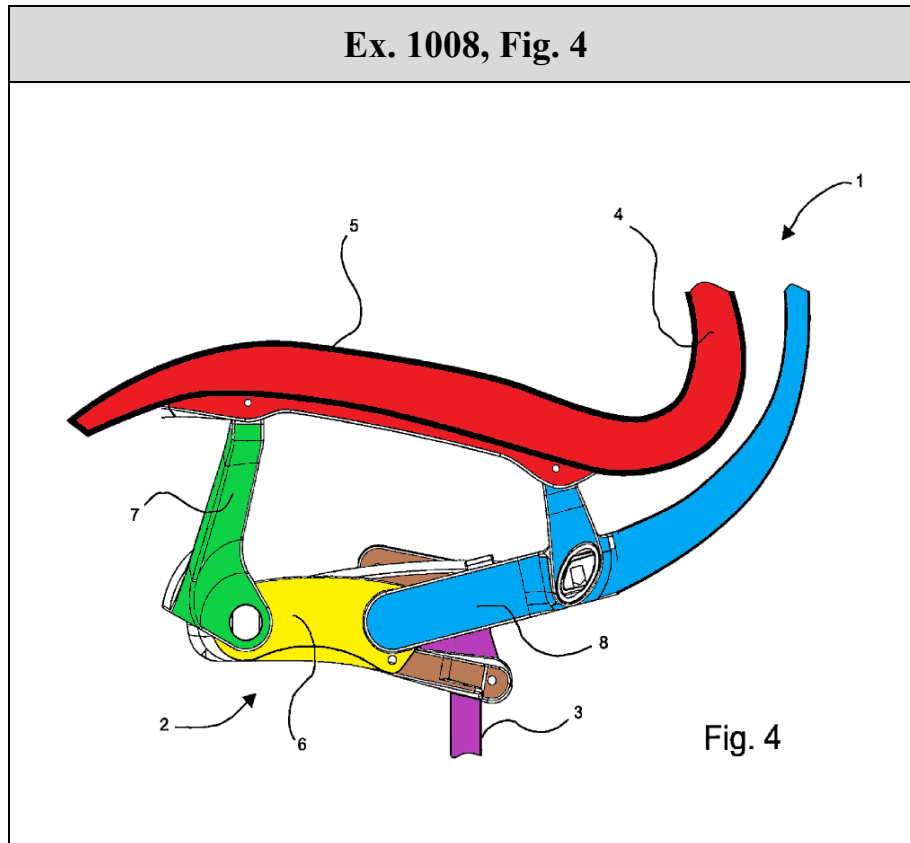


[1.b] a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat;

Schmitz '738 discloses “seat element 5” that is indirectly mounted to “flange 42” (part of the frame). Ex. 1008, 6:54-56; Ex. 1012, ¶¶295-297; Section IV.B.2.ii, *supra*.

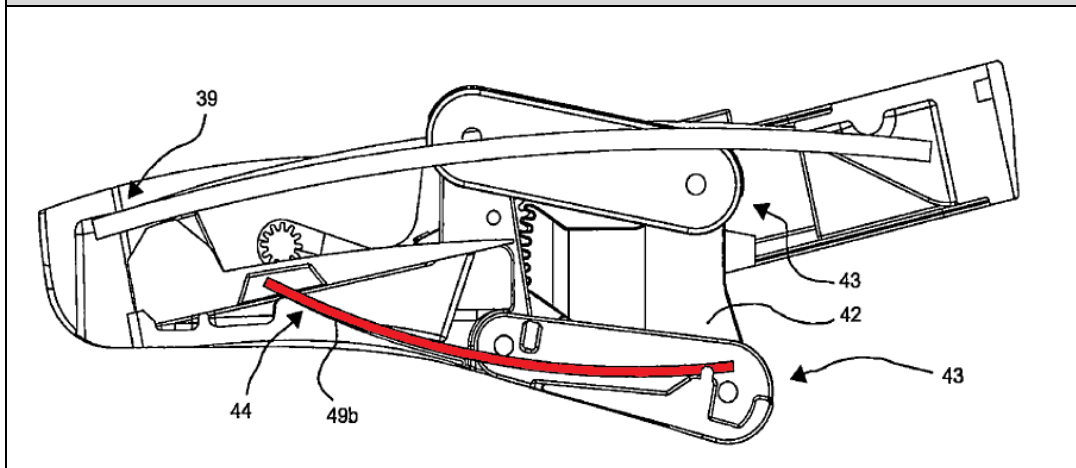
First, seat element 5 is pivotally connected to a “support 6”: a “front swing arm 7” is “connected to the seat element 5 so as to be pivotable about a rotation axis D65” and is “articulated on the support 6 so as to be pivotable about a rotation axis D67.” Ex. 1008, 6:62-65. In addition, a “rear swing arm 8” is “connected to the seat shell S,” which includes seat element 5, “so as to be pivotable about a rotation axis D56” and is “articulated on the support 6 so as to be pivotable about a rotation axis D68.” *Id.*, 7:8-12.

Second, support 6 is movably mounted on flange 42 via “articulation means 43,” Ex. 1008, 8:36-37, embodied as “two levers 43a, 43b” that “operate in parallel,” *id.*, 10:15-18. Figure 4, annotated below, depicts the “seat element 5” (red), the “front swing arm 7” (green), the “rear swing arm 8” (blue), the “support 6” (yellow), the “articulation means 43” (brown), and the “flange 42” and “foot element 3” (purple). *Id.*, Fig. 4; Ex. 1012, ¶¶296-297.



Further, seat element 5 moves between a first position and a loaded position when a user sits. Ex. 1012, ¶¶298-302. “[A]rticulation means 43 is configured as a four-point articulation having four articulation axes,” which “enable[s] the support 6 to be lowered when stressed by a person sitting down.” Ex. 1008, 8:31-42. Support 6, and thus seat element 5, are supported against downward movement by “weighing means 44,” in the form of “weighing springs 49a, 49b” (red below). *Id.*, 8:37-46; *id.*, Fig. 9; Ex. 1012, ¶¶299-300.

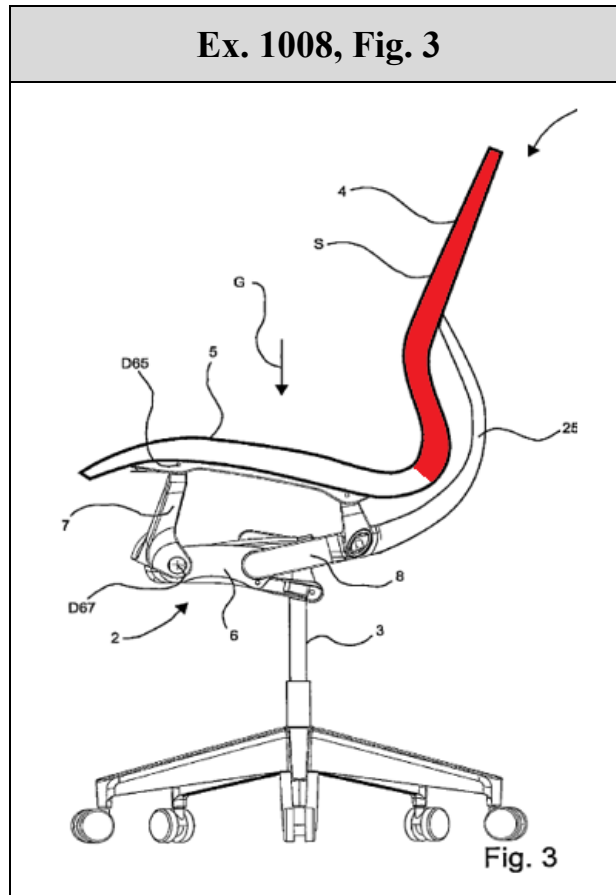
Ex. 1008, Fig. 9



Thus, “support 6,” and seat element 5, are “lowered when stressed by a person sitting down...until the stress...is compensated for by the weighing means 44,” and “[a]s soon as the person stands up again, the weighing springs 49a, 49b raise the support 6 again.” Ex. 1008, 8:41-48. Figure 12 shows support 6 in the “unstressed position” (the first position), and in Figure 13, support 6 has been “lowered” (a loaded position) due to “light stress acting on the seat element 5.” *Id.*, 9:14-28; *id.*, Figs. 12, 13; Ex. 1012, ¶¶301-303.

[1.c] a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame,

The chair includes a “back element 4” (red below) and a “seat element 5” that form “seat shell S.” Ex. 1008, 6:54-57; *id.*, Fig. 3; Ex. 1012, ¶¶304-305.



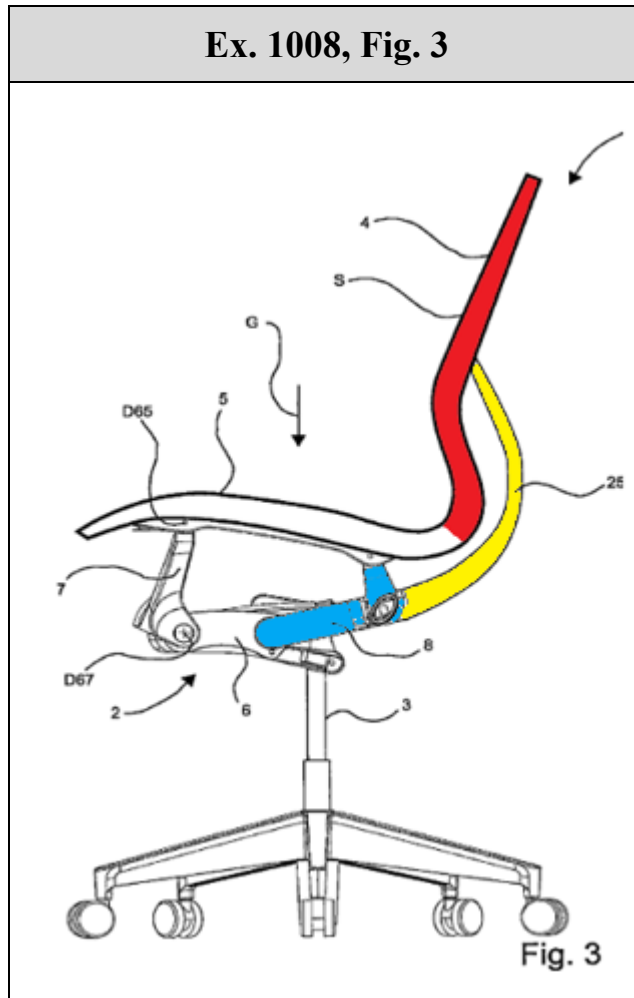
A user can lean against back element 4 to change its angular orientation. Ex. 1012, ¶¶306-311. As explained above, seat shell S, including back element 4, is pivotally mounted to support 6 via front swing arm 7 and rear swing arm 8, and is thus capable of rotation relative to support 6. Ex. 1008, 6:62-65, 7:8-12; Ex. 1012, ¶306.

Leaf springs resist this rotation: “four leaf springs 26, 27, 28, and 29” (green below), Ex. 1008, 7:26-28, which are “fixed to the support 6,” *id.*, 8:4-8, “indirectly support the seat shell S [and] directly support the rear swing arm 8,” *id.*, 8:9-15. *Id.*, Fig. 5; Ex. 1012, ¶¶307-308.

Ex. 1008, Fig. 5

Fig. 5

97



Thus, a user can lean on back element 4 and change its angular orientation against the supportive force of leaf springs 26, 27, 28, and 29. Ex. 1012, ¶¶310-311.

[1.d] the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;

As discussed above, seat shell S, including back element 4, is pivotally connected to support 6 via front swing arm 7 and rear swing arm 8. Ex. 1008, 6:62-

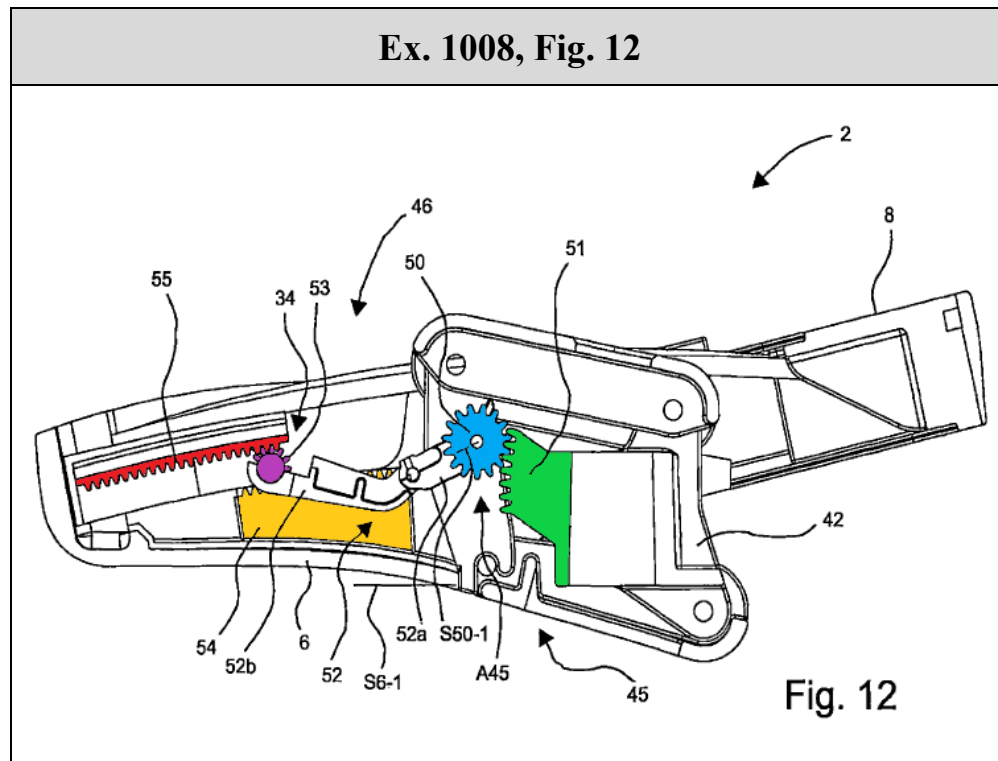
65, 7:8-12; Ex. 1012, ¶313. As further discussed above, leaf springs 26, 27, 28, and 29 support rear swing arm 8 to resist tilting of seat shell S and back element 4 via a “total restoring force.” Ex. 1008, 8:17-22; Ex. 1012, ¶314. Thus, a “first leaning force” is required to rotate seat shell S and back element 4 against the restoring force of the leaf springs with no user in the seat. Ex. 1012, ¶315.

[1.e] and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position,

“[A]djusting assembly” is a means-plus-function element. Section IV.B.2.i, *supra*. But Schmitz ’738 discloses this limitation regardless of MPF construction. Ex. 1012, ¶316.

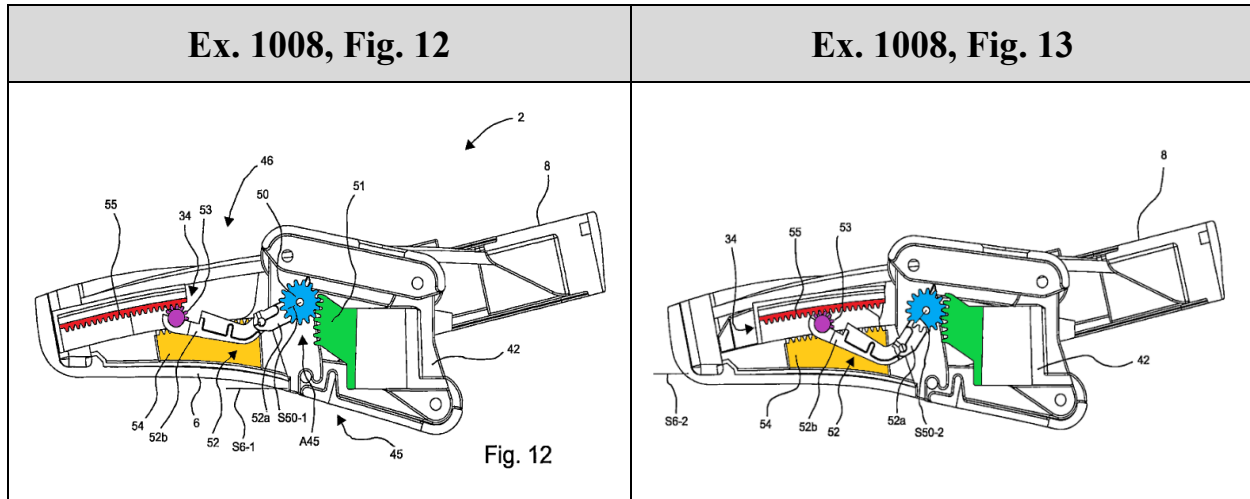
First, Schmitz ’738 discloses gears that cooperate when the seat moves from the first position into the loaded position. Ex. 1012, ¶¶317-321. Schmitz ’738 discloses “a gear wheel 50...rotatably mounted on the support 6” that “meshes with a rack 51...configured on the flange 42.” Ex. 1008, 9:19-22. A “second gear wheel 53” is connected to gear wheel 50 via “articulated lever 52” that “runs between a further rack 54 which is configured on the support 6 and a rack 55 which is configured on [a] displaceable bearing 34.” *Id.*, 9:31-41. Figure 12, annotated below,

shows rack 51 (green), gear wheel 50 (blue), second gear wheel 53 (purple), rack 54 (orange), and rack 55 (red). *Id.*, Fig. 12; Ex. 1012, ¶318.

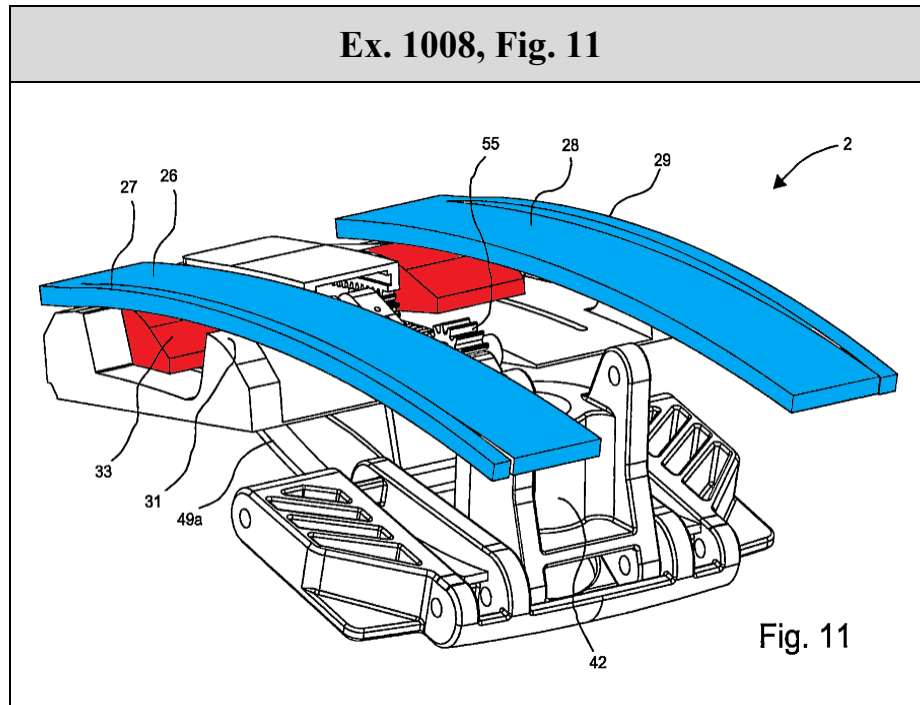


The gears cooperate when a user sits in the chair. Ex. 1012, ¶320. In “the event of light stress acting on the seat element 5,” which causes support 6 to be “lowered in relation to the flange 42,” the “gear wheel 50 is driven by the rack 51 and rotates in an anticlockwise manner.” Ex. 1008, 9:23-30. This causes articulated lever 52, which is “rigidly connected to the gear wheel 50” and which “rotatably supports a further gear wheel 53,” to “slightly buckle.” *Id.*, 9:31-37. This buckling causes gear wheel 53 to “roll[] on the lower rack 54” and move closer to gear wheel 50. *Id.*, 9:37-41. On “account of its right-hand rotation and its change of position, the second gear wheel 53 moves the third rack 55...to the right in the direction of the flange 42.” *Id.*,

9:41-44. Figure 12, below-left, shows the gears in an unstressed, or first, position, and Figure 13, below-right, shows the gears in a loaded position. *Id.*, Figs. 12, 13; Ex. 1012, ¶¶318, 321.



Second, due to this cooperation, the resistance to changing the angular orientation of the back is increased. Ex. 1012, ¶¶322-327. As discussed above, Schmitz '738 discloses four leaf springs 26, 27, 28, and 29 that support rear swing arm 8 and that resist tilting of seat shell S and back element 4. Ex. 1008, 7:26-28, 8:4-15; Ex. 1012, ¶323. Two of these leaf springs, “internal leaf springs 26, 28” (blue below), are supported by “displaceable bearings 33, 34” (red), Ex. 1008, 8:23-30, which are connected to rack 55, *id.*, 9:40-41. *Id.*, Fig. 11; Ex. 1012, ¶323.



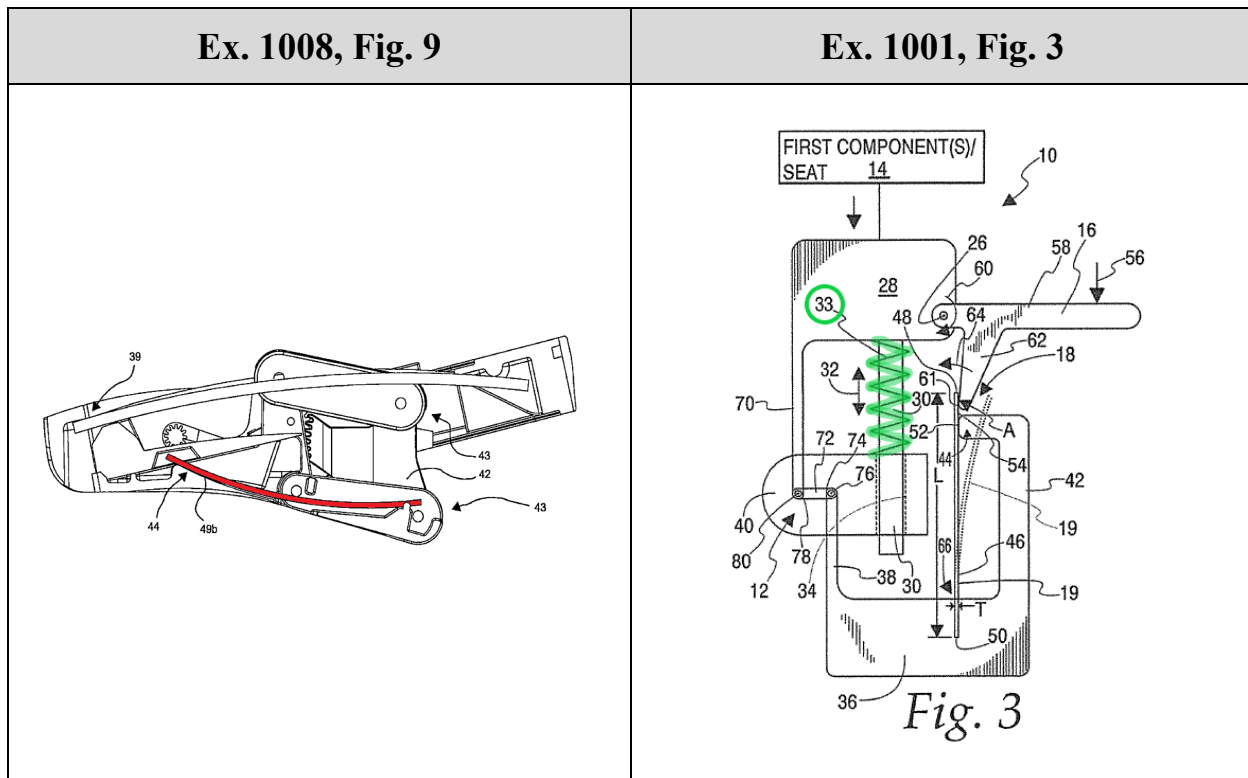
When a user sits, displaceable bearings 33 and 34 move toward the free ends of leaf springs 26 and 28, thereby increasing the amount of force required to pivot back element 4. Ex. 1012, ¶¶324-326. As discussed above, when a user sits, “second gear wheel 53 moves the third rack 55 and thus the bearing 34”—which is connected to rack 55—“in the direction of the flange 42.” Ex. 1008, 9:23-44; Ex. 1012, ¶¶324-326. In this way, “leaf spring 28 which is assigned to the bearing 34 is subject to increasing support and, on account thereof, exerts a greater restoring force on the rear swing arm 8.” Ex. 1008, 9:44-47. Likewise, bearing 33 is similarly driven to the right in response to a user sitting, such that leaf spring 26 also provides a greater restoring force on the rear swing arm 8. Ex. 1012, ¶325; Ex. 1008, 9:64-10:2

(“transmission 47...comprises all the components mentioned, such that [] the other bearing 33 is [also] movable.”).

In short, a user sitting shortens the effective length of leaf springs 26 and 28, thereby increasing the amount of force required to tilt seat shell S and back element 4. Ex. 1012, ¶¶326-327.

Finally, Schmitz '738 discloses the “adjusting assembly” if it is construed as a means-plus-function element because Schmitz '738 discloses the same or equivalent structure that provides the same function, in substantially the same way, with substantially the same result. *Regents of Univ. of Minnesota*, 717 F.3d at 940-41; Ex. 1012, ¶¶328.

As for the weighing spring, Schmitz '738 discloses weighing springs 49a and 49b that allow support 6 and seat shell S to be “lowered when stressed by a person sitting down...until the stress...is compensated for.” Ex. 1008, 8:41-48; Ex. 1012, 328. Weighing springs 49a and 49b (below-left in red), which are leaf springs, are equivalent to the coil spring 33 disclosed in the '753 Patent (below-right in green). Ex. 1012, ¶¶328-329; Ex. 1008, Fig. 9; Ex. 1001, Fig. 3.



Any differences between the two structures are insubstantial: they provide the same function in substantially the same way (resilient flexing against a weight force) to provide substantially the same result (providing variable resistance to that force). Ex. 1012, ¶329.

As for the tilting spring, Schmitz '738 discloses leaf springs 26, 27, 28, and 29 that support seat shell S and back element 4 against rotation. Ex. 1008, 7:26-28; Ex. 1012, ¶330. Leaf springs 26, 27, 28, and 29 (below-left in green) are the same as leaf spring 19 in the '753 Patent (below-right in blue). Ex. 1012, ¶330; Ex. 1008, Fig. 5; Ex. 1001, Fig. 3.

[1.f] whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.

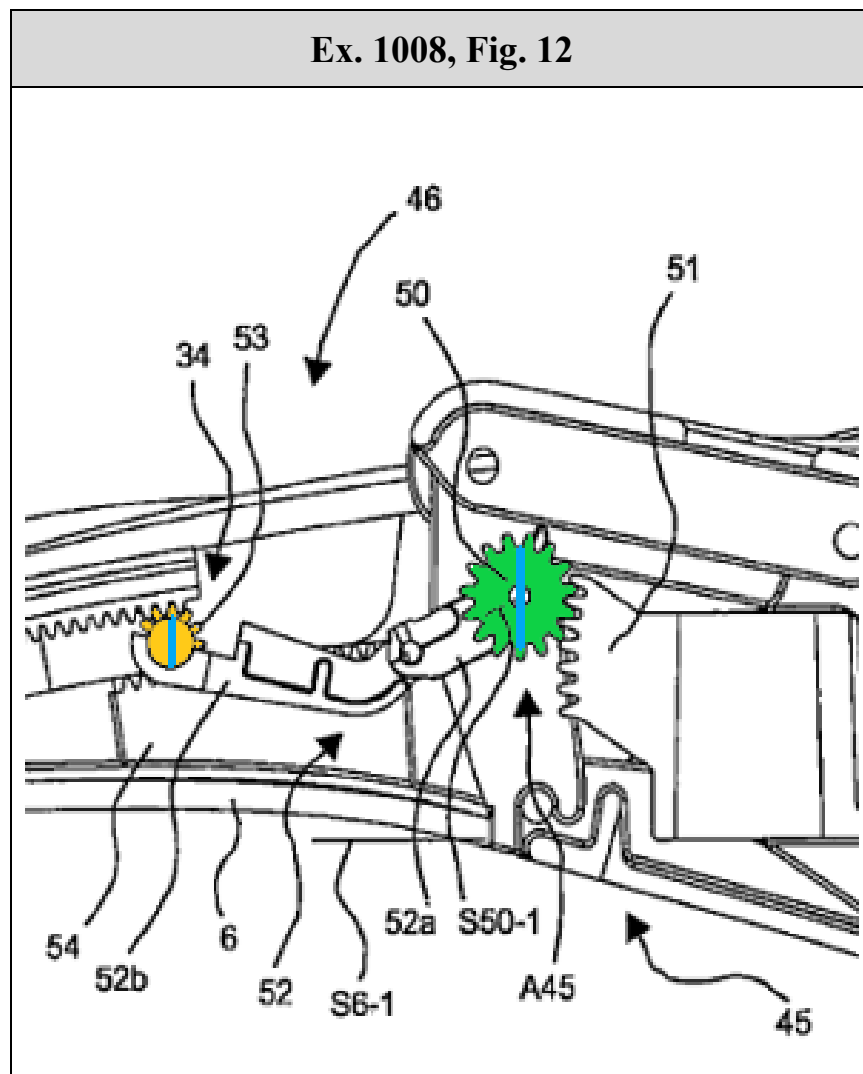
As discussed above, a greater force is required to tilt seat shell S and back element 4 when a user sits. Ex. 1012, ¶¶333-335. Again, “[i]n the event of light stress acting on the seat element 5...the second gear wheel 53 moves the third rack 55 and thus the bearing 34 to the right in the direction of the flange 42, such that the leaf spring 28 which is assigned to the bearing 34 is subject to increasing support and, on account thereof, exerts a greater restoring force on the rear swing arm 8.” Ex. 1008, 9:23-47. As explained above, because back element 4 pivots with seat shell S, which is directly connected to rear swing arm 8, and because back element 4 is also directly connected to rear swing arm 8 via appendage 25, a “greater restoring force on the rear swing arm 8” means more force is required to change the angular orientation of back element 4. Ex. 1012, ¶335.

2. Dependent Claim 15

The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises first and second gears that each turns around an axis and the first and second gears have different diameters.

Schmitz ’738 discloses “gear wheel 50” and “gear wheel 53” (Ex. 1008, 9:19-20, 9:35-36) that turn around an axis: “gear wheel 50...rotates” (*id.*, 9:28-29), and “second gear wheel 53...rolls” (*id.*, 9:38-41). Ex. 1012, ¶337-338. Gear wheel 50

(green below) has a larger diameter than second gear wheel 53 (yellow). Ex. 1008, Fig. 12; Ex. 1012, ¶339.

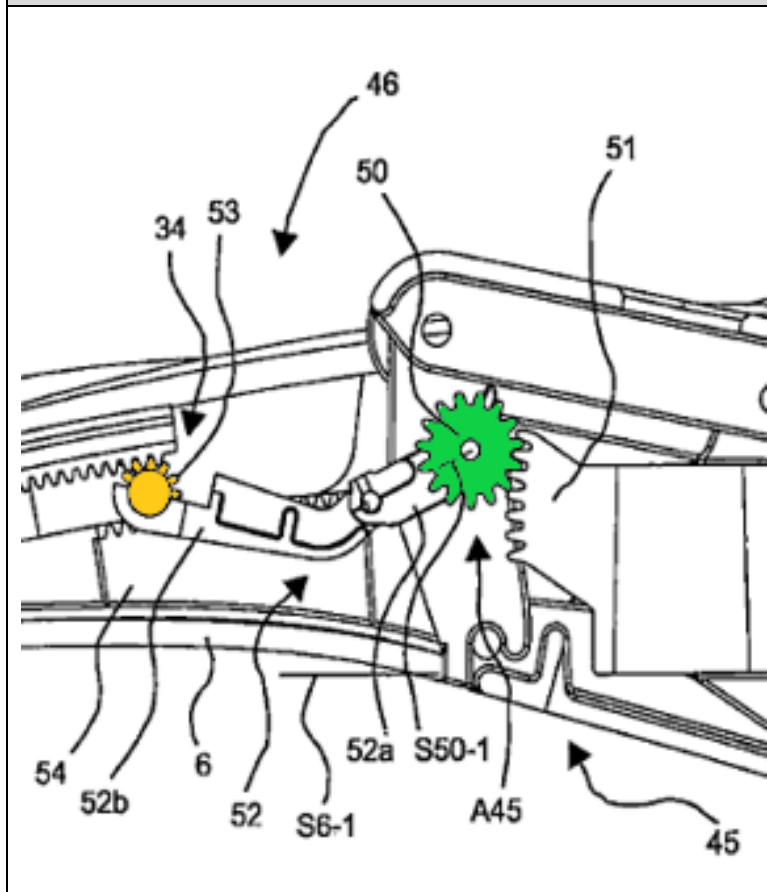


3. Dependent Claim 16

The reconfigurable apparatus for seating a user according to claim 15 wherein the first and second gears turn around different axes.

As shown in Figure 12, gear wheel 50 (green below) and second gear wheel 53 (yellow) turn around different axes. Ex. 1008, Fig. 12; Ex. 1012, ¶¶341-343.

Ex. 1008, Fig. 12



VII. CONCLUSION

For these reasons, Claims 1-22 of U.S. Patent No. 10,893,753 should be canceled.

BANNER & WITCOFF, LTD.

Dated: September 20, 2023

By: /Erik Maurer/

Erik Maurer

Reg. No. 48,648

Attorney for Petitioner,
MillerKnoll, Inc.

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), I certify that this paper includes 13,990 words. In accordance with 37 C.F.R. § 42.24(a)(1), this word count does not include a count of the words in a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Furthermore, in accordance with 37 C.F.R. § 42.24(d), this word count is the word count of the word-processing system used to prepare the paper.

BANNER & WITCOFF, LTD.

Dated: September 20, 2023

By: /Erik Maurer/

Erik Maurer

Reg. No. 48,648

Banner & Witcoff, LTD.

71 S. Wacker Dr. Ste. 3600

Chicago, IL 60606

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.105, I hereby certify that I caused a true and correct copy of the Petition for *Inter Partes* Review in connection with U.S. Patent No. 10,893,753 and supporting evidence to be served via FedEx Priority Overnight on September 20, 2023, on the following:

Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

BANNER & WITCOFF, LTD.

Dated: September 20, 2023

By: /Erik Maurer/

Erik Maurer
Reg. No. 48,648
Banner & Witcoff, LTD.
71 S. Wacker Dr. Ste. 3600
Chicago, IL 60606

CLAIM LISTING APPENDIX
U.S. Pat. No. 10,893,753

Designation	Claim Language
Claim 1	
1	1. A reconfigurable apparatus for seating a user, the reconfigurable apparatus comprising
[1.a]	a frame,
[1.b]	a seat mounted on the frame and movable relative to the frame between: a) a first position in which the seat resides with no user sitting on the seat; and b) a loaded position into which the seat moves from the first position as an incident of a user sitting on the seat,
[1.c]	a back rest against which a user sitting on the seat can bear his/her back to produce a leaning force that changes an angular orientation of the back rest relative to the frame
[1.d]	the apparatus configured so that a first leaning force is required to be applied to the back rest to change the angular orientation of the back rest from a starting angular position relative to the frame with no user sitting in the seat;
[1.e]	and an adjusting assembly comprising a plurality of gears that cooperate and move relative to each other as an incident of the seat moving from the first position into the loaded position and configured to thereby increase a resistance to changing of the angular orientation of the back rest from the starting angular position,
[1.f]	whereby as an incident of a user sitting on the seat a leaning force greater than the first leaning force is required to change the angular position of the back rest from the starting angular position.
Claim 2	
2	2. The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises a first rack gear and first pinion gear, the first rack gear and first pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position.

Designation	Claim Language
Claim 3	
3	3. The reconfigurable apparatus for seating a user according to claim 2 wherein the plurality of gears comprises a second rack gear and a second pinion gear, the second rack gear and second pinion gear cooperating with, and movable relative to, each other as an incident of the seat moving from the first position into the loaded position.
Claim 4	
4	4. The reconfigurable apparatus according to claim 1 wherein the reconfigurable apparatus comprises an elongate spring bar having a length and that resists changing of the angular orientation of the back rest from the starting position by bending against a fulcrum part.
Claim 5	
5	5. The reconfigurable apparatus for seating a user according to claim 4 wherein as an incident of the seat being changed from the first position into the loaded position the fulcrum part is caused to move along the length of the elongate spring bar so as to thereby increase a force required to bend the elongate spring bar about the fulcrum part and as an incident thereof increase the leaning force required to change the angular orientation of the back rest.
Claim 6	
6	6. The reconfigurable apparatus for seating a user according to claim 5 wherein the plurality of gears are configured so that the seat moves a first distance between the first and loaded positions and the fulcrum part moves greater than the first distance along the length of the fulcrum bar in response to a same movement of the seat relative to the frame.
Claim 7	
7	7. The reconfigurable apparatus for seating a user according to claim 1 wherein the back rest is mounted directly to the frame.
Claim 8	
8	8. The reconfigurable apparatus for seating a user according to claim 1 wherein the back rest is mounted directly to the seat.

Designation	Claim Language
Claim 9	
9	9. The reconfigurable apparatus for seating a user according to claim 8 wherein the back rest follows movement of the seat as the seat is changed from the first position into the loaded position.
Claim 10	
10	10. The reconfigurable apparatus for seating a user according to claim 8 wherein the back rest is attached to and movable relative to the seat.
Claim 11	
11	11. The reconfigurable apparatus for seating a user according to claim 1 wherein the sitting apparatus comprises a chair.
Claim 12	
12	12. The reconfigurable apparatus for seating a user according to claim 11 wherein the frame comprises wheels that support the chair on a subjacent surface.
Claim 13	
13	13. The reconfigurable apparatus for seating a user according to claim 11 wherein the chair comprises a pair of armrests.
Claim 14	
14	14. The reconfigurable apparatus for seating a user according to claim 11 wherein the chair is a task chair.
Claim 15	
15	15. The reconfigurable apparatus for seating a user according to claim 1 wherein the plurality of gears comprises first and second gears that each turns around an axis and the first and second gears have different diameters.
Claim 16	
16	16. The reconfigurable apparatus for seating a user according to claim 15 wherein the first and second gears turn around different axes.
Claim 17	
17	17. The reconfigurable apparatus for seating a user according to claim 15 wherein the first and second gears turn around a same axis.

Designation	Claim Language
Claim 18	
18	18. The reconfigurable apparatus for seating a user according to claim 1 wherein the reconfigurable apparatus comprises at least one spring bar that is bent under forces applied by a user to the reconfigurable apparatus to resist reconfiguration of a part of the reconfigurable apparatus.
Claim 19	
19	19. The reconfigurable apparatus for seating a user according to claim 18 wherein the at least one spring bar comprises a plurality of spring bars.
Claim 20	
20	20. The reconfigurable apparatus for seating a user according to claim 19 wherein at least one of the spring bars comprises an elongate spring bar with a length and the elongate spring bar resists reconfiguration of the reconfigurable apparatus by being bent transversely to the length of the elongate spring bar.
Claim 21	
21	21. The reconfigurable apparatus for seating a user according to claim 3 wherein the reconfigurable apparatus comprises an elongate spring bar having a length and that resists changing of the angular orientation of the back, rest from the starting position by bending against a fulcrum part, the seat moves a first distance between the first and loaded positions, and the first and second rack and pinion gears are configured so that as an incident of the seat moving from the first position into the loaded position there is relative movement of the elongate spring bar and fulcrum along the length of the elongate spring bar a distance different than the first distance.
Claim 22	
22	22. The reconfigurable apparatus for seating a user according to claim 4 wherein the seat moves a first distance between the first and loaded positions and the plurality of gears comprises first and second gear pairs configured so that as an incident of the seat moving from the first position into the loaded position there is relative movement of the elongate spring bar and fulcrum along the length of the elongate spring bar a distance different than the first distance.