UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LUMENIS LTD.,
Petitioner,

v.

BTL HEALTHCARE TECHNOLOGIES A.S.,
Patent Owner.

_____

Case IPR2021-01280
Patent No. 10,478,634

_____

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

Exhibit (Ex-)	Description
1001	U.S. Patent No. 10,478,634 ("'634")
1002	Declaration of Dr. Marom Bikson ("Bikson")
1003	Prosecution history of U.S. Application No. 16/034,793, which led to the issuance of the '634 (excerpts) (the "'793 Application")
1004	U.S. Patent Application Publication No. 2015/0165226 ("Simon")
1005	U.S. Patent Application Publication No. 2014/0148870 ("Burnett-'870")
1006	Chris Hovey et al., *The Guide To Magnetic Stimulation*, Magstim, July 21, 2006, Affidavit ("Magstim")[1]
1007	U.S. Patent Application Publication No. US20050216062 ("Herbst")
1008	U.S. Pat. No. 7,396,326 ("Ghiron")
1009	U.S. Pat. No. 10,675,819 ("Li")
1010	U.S. Pat. Pub. No. 2014/0277219A1 ("Nanda")
1011	Alain-Yvan Belanger, *Therapeutic Electrophysical Agents*, 3d Edition, Wolters Kluwer (2015), Declaration ("Belanger")
1012	U.S. Pat. Pub. No. 2012/0245483 ("Lundqvist")
1013	U.S. Patent Application Publication No. 2010/0168501 from Application No. 12/508,529 ("Burnett-'529")

[1] All pinpoint citations to Magstim, throughout this document and the corresponding expert declaration, refer to the page number originally in Magstim itself (*i.e.*, in the bottom middle portion of Magstim).

Exhibit (Ex-)	Description
1014	Gorgey et al., *Effects of Electrical Stimulation Parameters on Fatigue in Skeletal Muscle*, J. Orthop. & Sports Phys. Therapy Vol. 39: 9 (2009) ("Gorgey")
1015	Stevens et al., *Neuromuscular Electrical Stimulation for Quadriceps Muscle Strengthening After Bilateral Total Knee Arthroplasty: A Case Series*, Journal of Orthopaedic & Sports Physical Therapy, 34(1):21-29 (2004) ("Stevens")
1016	Doucet et al., *Neuromuscular Electrical Stimulation for Skeletal Muscle Function*, Yale Journal of Biology & Medicine 85:201-215 (2012) ("Doucet")
1017	Abulhasan et al., *Peripheral Electrical and Magnetic Stimulation to Augment Resistance Training*, Journal of Functional Morphology and Kinesiology, 1(3):328-342 (2016) ("Abulhasan")
1018	Remed, Salus Talent Brochure (2010) ("Salus")
1019	Iskra Medical, TESLA Stym Website (2013) ("TESLA Stym")
1020	510(k) Summary, No. K163165, AM-100 (2017) ("AM-100")
1021	510(k) Summary, No. K160992, HPM-6000 (2016) ("HPM-6000")
1022	U.S. Pat. Pub. No. 2003/0158585 ("Burnett '585")
1023	U.S. Provisional Patent Application Ser. No. 60/848,720 ("Burnett-Provisional-'720")
1024	U.S. Pat. No. 6,701,185 ("Burnett-'185")
1025	U.S. Pat. Pub. No. 2008/0306325 ("Burnett-'325")
1026	U.S. Pat. No. 6,155,966 ("Parker")
1027	U.S. Pat. No. 5,344,384 ("Ostrow")
1028	Andrey Gennadievich Belyaev, *Effect of Magnetic Stimulation on the Strength Capacity of Skeletal Muscle* (2015) (Ph.D. dissertation,

Exhibit (Ex-)	Description
	Federal State Budgetary Educational Institution of Higher Professional Education "Velikiye Luki State Academy of Physical Culture and Sport") (English translation) ("Belyaev")
1029	Andrey Gennadievich Belyaev, *Effect of Magnetic Stimulation on the Strength Capacity of Skeletal Muscle* (2015) (Ph.D. dissertation, Federal State Budgetary Educational Institution of Higher Professional Education "Velikiye Luki State Academy of Physical Culture and Sport") (Russian)
1030	U.S. Pat. No. 7,024,239 ("George")
1031	U.S. Pat. No. 5,181,902 ("Erickson")
1032	U.S. Pat. Pub. No. 2006/0199992 ("Eisenberg")
1033	U.S. Pat. No. 5,718,662 ("Jalinous")
1034	U.S. Pat. No. 5,061,234 ("Chaney")
1035	U.S. Pat. No. 10,271,900 ("Marchitto-'900")
1036	U.S. Pat. Pub. No. 2016/0184601 ("Gleich")
1037	Judith Woehrle et al., *Dry Needling and its Use in Health Care – A Treatment Modality and Adjunct for Pain Management*, J. Pain & Relief, 4(5):1-3 (2015) ("Woehrle")
1038	U.S. Patent Publication No. 2015/0157873 ("Sokolowski")
1039	U.S. Patent No. 7,744,523 ("Epstein")
1040	U.S. Pat. No. 6,738,667 ("Deno")
1041	U.S. Pat. No. 6,871,099 ("Whitehurst")
1042	U.S. Patent Application Publication No. US20050075701 ("Shafer-'701")

Exhibit (Ex-)	Description
1043	U.S. Patent Application Publication No. US20050075702 ("Shafer-'702")
1044	D. Suarez-Bagnasco et al., *The Excitation Functional for Magnetic Stimulation of Fibers*, 32nd Ann. Int'l Conf. of the IEEE EMBS, 4829–33 (2010) ("Suarez-Bagnasco")
1045	Zhi-De Deng et al., *Electric field depth-focality tradeoff in transcranial magnetic stimulation: simulation comparison of 50 coil designs*, Brain Stimulation, 6(1):1-13 (2013) ("Zhi-De-Deng-Electric")
1046	Zhi-De Deng, *Electromagnetic Field Modeling of Transcranial Electric and Magnetic Stimulation: Targeting, Individualization, and Safety of Convulsive and Subconvulsive Applications*, (2013) (Ph.D. dissertation, Columbia University) ("Zhi-De-Deng-Electromagnetic")
1047	U.S. Patent Application Publication No. 2011/0190569 ("Simon-'569")
1048	U.S. Patent Application Publication No. 2011/0152967 ("Simon-'967")
1049	U.S. Patent Application Publication No. 2011/0125203 ("Simon-'203")
1050	U.S. Patent Application Publication No. 2011/0046432 ("Simon-'432")
1051	U.S. Patent No. 9,089,719 ("Simon-'719")
1052	U.S. Patent No. 9,037,247 ("Simon-'247")
1053	U.S. Patent No. 8,868,177 ("Simon-'177")
1054	File History of U.S. Patent Application No. 12/859,568 (excerpts) ("File-history-'568")

Exhibit (Ex-)	Description
1055	File History of U.S. Patent Application No. 12/964,050 (excerpts) ("File-history-'050")
1056	File History of U.S. Patent Application No. 13/005,005 (excerpts) ("File-history-'005")
1057	File History of U.S. Patent Application No. 13/024,727 (excerpts) ("File-history-'727")
1058	*Allergan, Inc. et al v. BTL Medical Technologies SRO et al*, PGR2021-00017, Paper 16 (Institution Denial Decision on §112(f)) ("PGR2021-00017-ID")
1059	*Allergan, Inc. et al v. BTL Medical Technologies SRO et al*, PGR2021-00020 (PTAB, Filed Dec. 14, 2020), Paper 16 (Institution Denial Decision on §112(f)) ("PGR2021-00020-ID")
1060	*Reserved*
1061	U.S. Patent Application Publication No. 2015/0025299 ("Edoute")
1062	International Application Publication No. WO 2015/179571 ("Errico")
1063	U.S. Patent Application Publication No. 2011/0172735 ("Johari")
1064	U.S. Patent Application Publication No. 2013/0123765 ("Zarsky")
1065	U.S. Patent No. 6,200,259 ("March")
1066	U.S. Patent Application Publication No. 2020/0155221 ("Marchitto-'221")
1067	U.S. Patent Application Publication No. 2006/0187607 ("Mo")
1068	Declaration of Jonathan Bradford

I. INTRODUCTION

Lumenis Ltd. ("Petitioner") respectfully requests IPR of Claims 9-22 ("Claims") of U.S. 10,478,634 ("'634") pursuant to §§311-319 and §42.100.

'634 is directed to electrical stimulation of body tissues using magnetic field. '634, 3:13–16, 3:33–37, 3:51–60. Its exemplary device includes two applicators placed on a patient's body causing tissues to contract, thereby "toning' them. '634, '634, 5:18–25; *see also id.*, 10:31–34, 15:56–58, Figs. 15-16. Figure 12 (annotated) shows each applicator has a circuit that contains a capacitor to discharge energy to a magnetic field generating coil. '634, 7:28–31. Bikson, ¶¶98-105.

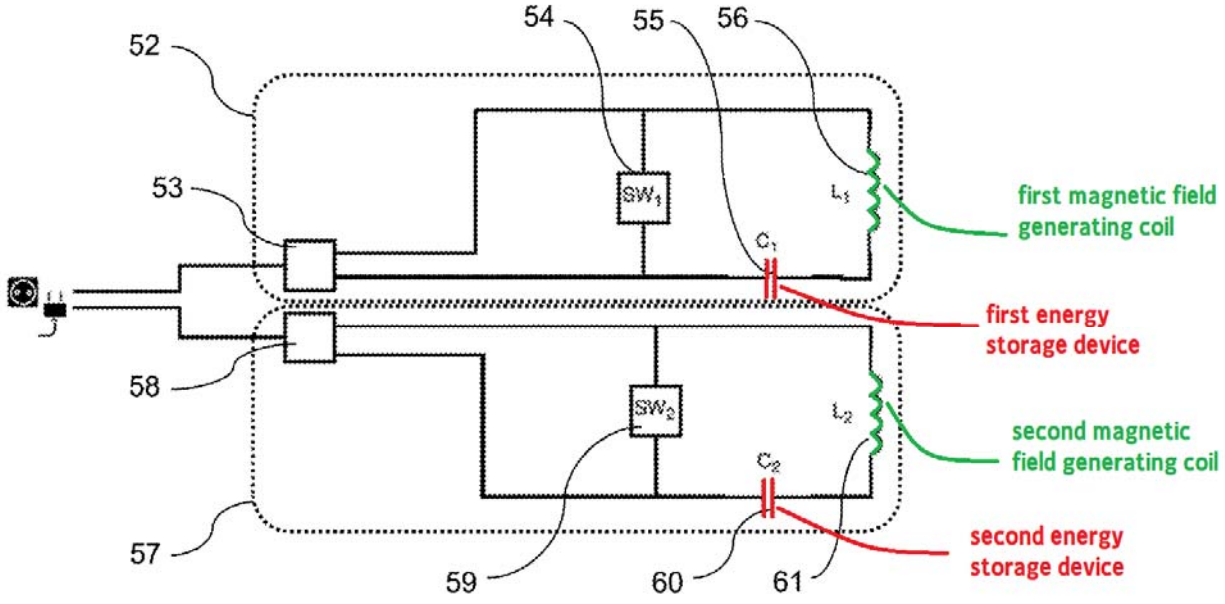

Figure 12

'634 explains that "magnetic methods" were already in use. '634, 2:32–35;

see also id., 2:44–47. Its purported novelty is to combine technologies of "magnetic field with radiofrequency, light, mechanical or pressure source." '634, 2:53–61; *see also id.*, 3:33–34. However, all Claims are directed to merely using magnetic fields for toning muscles. Bikson, ¶¶43-44.

Although the Claims are lengthy, reciting parameters and components, these elements are conventional features well known in the art. Bikson, ¶¶74-97. **Simon** discloses a magnetic device with two applicators for stimulating muscles during rehabilitation. Simon, *Abstract,* [0053]-[0054], [0197]. Bikson, ¶¶111-121, 203. **Burnett-'870** discloses a device with multiple applicators comprising coils to generate magnetic field to stimulate muscle. Burnett-'870, *Abstract*, Fig. 9B, [0114]. Bikson, ¶¶204-215, **Magstim** discloses fundamentals of magnetic field, including the parameters and components recited in the Claims. Magstim, 1, 3-4. Bikson, ¶¶216-222, 357.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Party-in-Interest

Lumenis Ltd. is the real party-in-interest. No other party had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

B. Related Matters

Petitioner is concurrently filing another petition (IPR2021-01273) challenging claims 1-8, 23-30 of the '634 patent. Due to word-count constraints and the large number of claims, requiring 10,933 words in IPR2021-01273 and 11,106 words in IPR2021-01280, claims 9-22 are presented separately herein. *See* PTAB Consolidated Trial Practice Guide, November 2019, 59-61 (permitting parallel petitions in certain circumstances, such as a large number of claims).

The '634 patent is not the subject of any other co-pending litigation. However, the '634 patent was the subject of the following litigations that were stayed or resolved and did not involve or relate to the Petitioner:

- *Certain Non-Invasive Aesthetic Body Contouring Devices, Components Thereof, and Methods of Using the Same*, Inv. No. 337-TA-1219 (ITC, Filed Aug. 5, 2020) (the "ITC Case") (settled);
- *BTL Industries, Inc. v. Allergan Ltd. et al*, No. 1-19-cv-02356 (D. Del., Filed Dec. 26, 2019) (settled);
- *Allergan, Inc. et al v. BTL Medical Technologies SRO et al*, IPR2021-00312 (PTAB, Filed Dec. 14, 2020) ("Allergan's IPR") (Presented a different set of §103 grounds than those presented in this Petition; settled prior to institution decision);

C. Lead and Back-Up Counsel

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Petitioner consents to electronic service of documents to the email addresses of the counsel identified above.

III. PAYMENT OF FEES

The undersigned authorizes the Office to charge the fee required by §42.15(a) for this Petition for review to Deposit Account No. 18-1945, under Order No. 116610-0002-652. Any additional fees that might be due are also authorized.

IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

Pursuant to §42.104(a), Petitioner certifies '634 is available for IPR.

Petitioner is not barred or estopped from requesting IPR challenging the Claims on the grounds herein.

B. Identification of Challenge

Pursuant to §§42.104(b), Petitioner requests the Board cancel the Claims as unpatentable.[2]

1. Specific Art on Which the Challenge is Based

Name	Exhibit	Filed	Published	Prior art
Simon	1004	3/3/2015	6/18/2015	§102(a)(1)-(2)
Burnett-'870	1005	11/20/2013	5/29/2014	§102(a)(1)-(2)
Magstim	1006	--	7/21/2006	§102(a)(1)

a. §§314(a) and 325(d) are inapplicable

Simon and **Magstim**[3] were not before Examiner; **Burnett-'870** was cited in an IDS among hundreds of references, but not otherwise identified or applied to reject claims during prosecution. Examiner never considered the testimony of Dr. Bikson (Ex-1002) regarding these documents. Ex-1003.

Although '634 was previously litigated in the ITC, Petitioner had no

[2] The art predates '634's earliest priority date; Petitioner takes no position as to the priority claims.
[3] Although **Magstim** (not previously cited or considered) and the operating manuals (cited but not applied to reject claims) are from the same company, the respective disclosures are substantially different—**Magstim** is a guide that teaches stimulation principles, techniques, and applications claimed in '634, while the manuals describe product operations.

involvement or input to those proceedings, nor any relationship to any party challenging the patent therein; '634 invalidity was not decided before the matter was settled. This petition presents unique grounds not presented in IPR2021-00312—neither **Simon** nor **Burnett-'870** was asserted; and **Magstim**[4] is not applied the same way as in any prior ground, which prevent application of §§314(a) and 325(d) denial.

2. Statutory Grounds on Which the Challenge is based

Ground	Statute	Claim(s)	Prior Art
1	§103	9-22	Simon
2	§103	9-22	Burnett-'870 in view of Magstim
3	§103	9-22	Simon in view of Burnett-'870

See §VIII.

V. BACKGROUND

A. '634 Patent

'634 is directed to producing a time-varying magnetic field to remodel or improve muscles. '634, 3:13–16, 3:33–37, 3:51–60. It describes a device with applicators positioned on a patient's target body regions using an "adjustable belt." '634, 10:31–34, 15:56–58, Figs. 15-16.

[4] **Magstim** served as a primary reference in the PGR for disclosing two applicators; in contrast, **Magstim** is asserted here as a secondary reference for disclosing basic magnetic field parameters and applications.

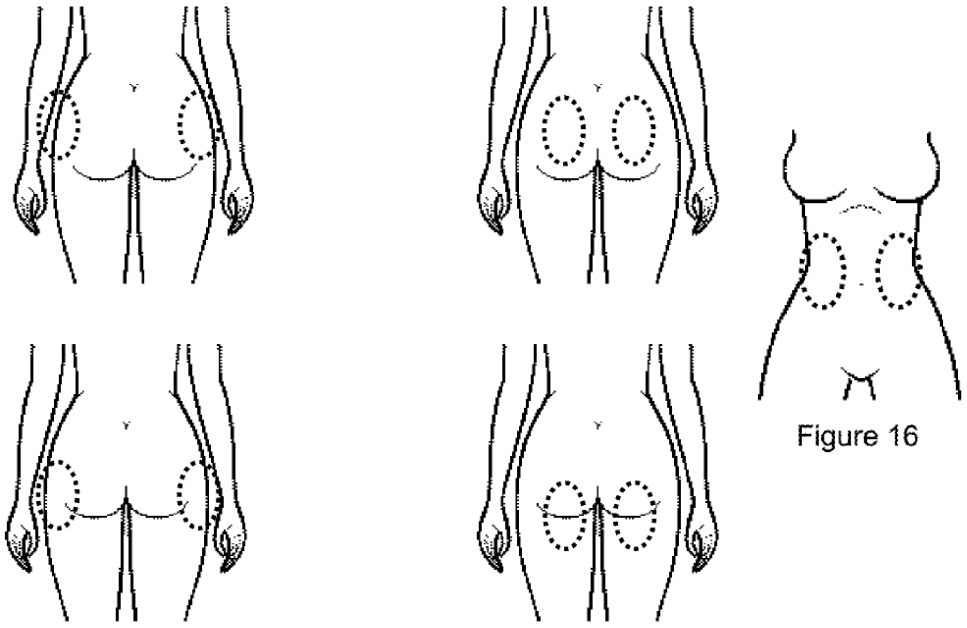


Figure 15

Figure 16

The device includes a "control unit" to regulate magnetic field parameters, and a "casing" with a "cooling media" for the applicators. '634, 2:22–25, 10:19–23, 12:30–34. The device's circuits include energy storage devices (*i.e.*, capacitors) for discharging energy to coils. '634, 7:28–31. Bikson, ¶¶98-101

The coils generate "impulses" (*i.e.*, "magnetic stimulus") to cause muscle contractions. '634, 3:55–65, 5:42. Figure 8 illustrates the impulses are biphasic and are sinusoidal:

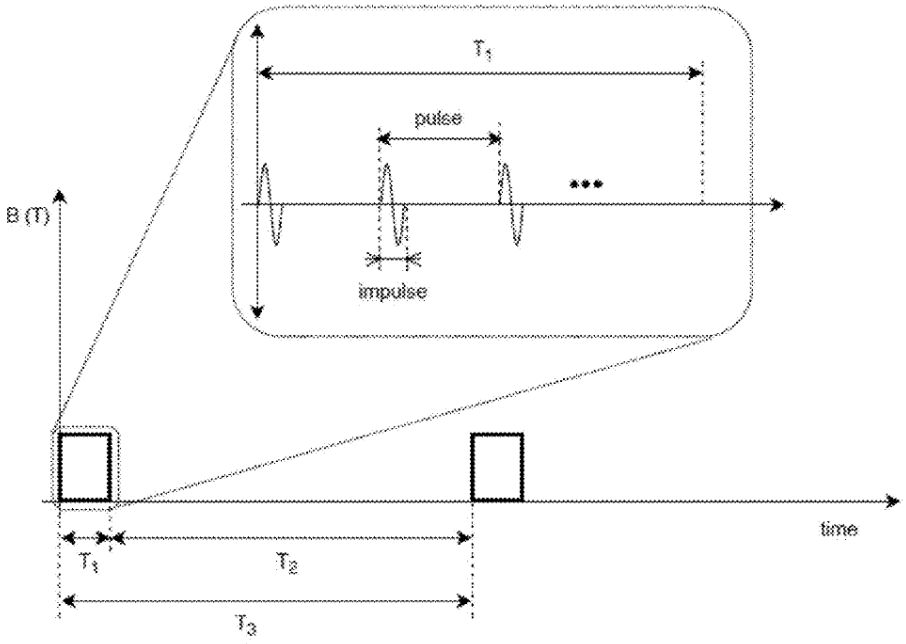


Figure 8

'634, Fig. 8, 5:42, 93:52–55. A "pulse" is defined as the period of treatment between the beginning of a first impulse and the beginning of a second impulse. '634, 5:43–46. Bikson, ¶¶102-105

B. Prosecution History

'634 issued from U.S. Application No. 16/034,793, filed 7/13/2018. Ex-1003, 1–115. USPTO granted Track 1, prioritized status on 9/19/2018. Ex-1003, 160–162. Bikson, ¶106

Appellant canceled claims 1–30, and submitted 30 new claims in an Amendment filed 1/2/2019, and then rewrote the claims in Amendments filed 2/6/2019 and 2/12/2019 not in response to any action taken by the Examiner. Ex-1003, 200–220, 221–234, 235–246. The Examiner issued no art-based rejections

against the claims, before allowing them on 4/1/2019, without any reasons for allowance. Ex-1003, 253–259. Bikson, ¶¶107-108.

VI. LEVEL OF ORDINARY SKILL IN THE ART

On or before 7/1/2015, a POSITA would have had a bachelor's degree in biomedical engineering, electrical engineering, physics, or related field, and two or more years of professional experience working with the design, development, and/or use of devices that apply electromagnetic energy to stimulate biological tissue. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. Bikson, ¶¶1-42.

VII. CLAIM CONSTRUCTION

Claim terms subject to IPR are to be construed according to the *Phillips* standard applied in district court. §42.100(b). Petitioner applies the plain and ordinary meanings of terms. Only terms necessary to resolve the controversy must be construed. *Nidec Motor v. Zhongshan Broad Ocean Motor*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Bikson, ¶¶109-110.

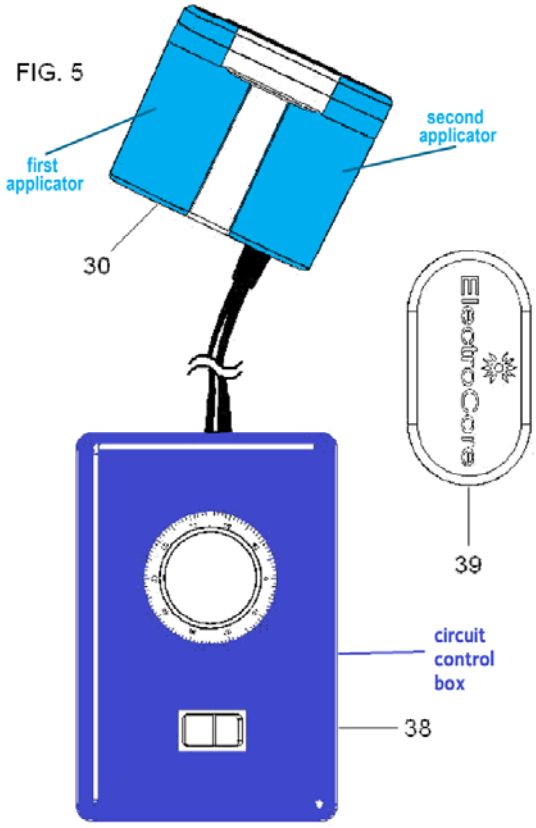
VIII. GROUNDS OF UNPATENTABILITY

A. Ground 1: Claims 9-22 are rendered obvious by Simon

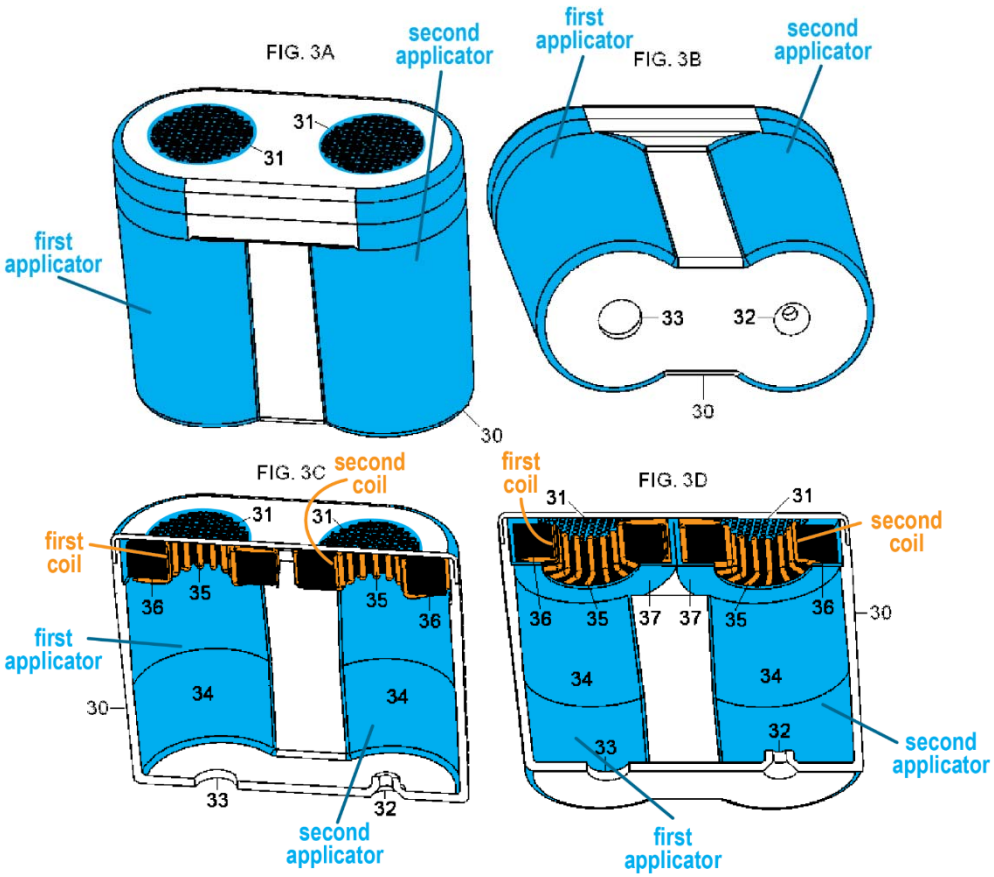
1. Simon Overview

Simon discloses a magnetic stimulator for muscle "[r]ehabilitation." Simon,

title, [0002], [0197].



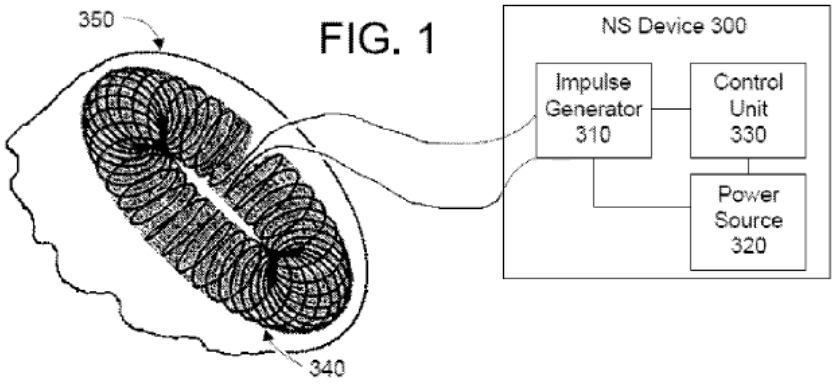
Simon, Fig. 5, [0103]. Figures 3A-3D (annotated) show **Simon's** stimulator with two **applicators** situated within a "housing," each **applicator** containing a "**coil**" that generates a time-varying magnetic field when a capacitor is "discharged." Simon, [0012], [0045], [0047], [0098]. Bikson, ¶¶111-113.



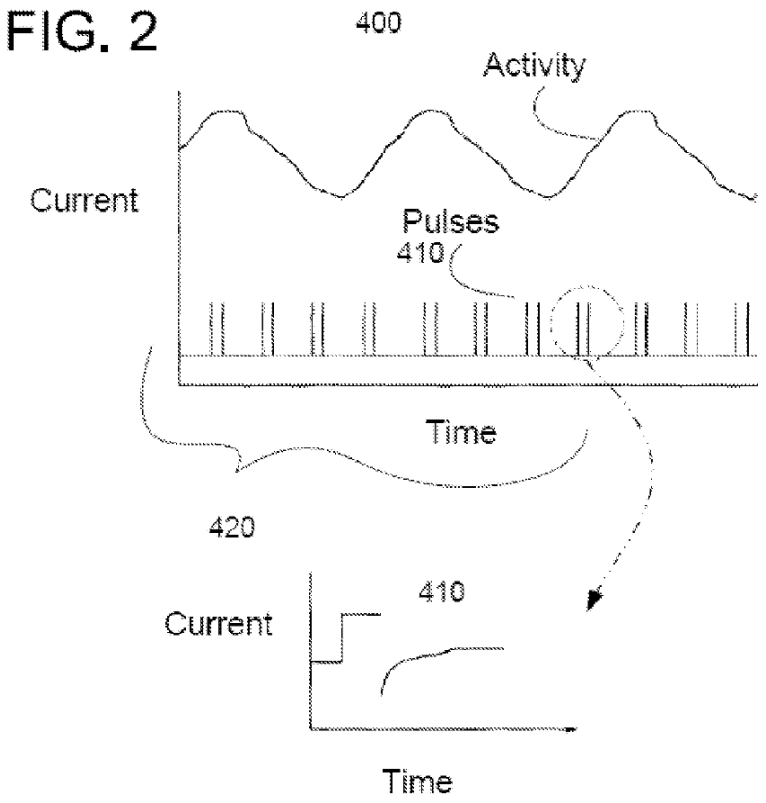
Each **coil** "induces an electromagnetic field" to apply "electrical impulses" to muscles within target body regions (*e.g.*, abdomen). Simon, [0024], [0027]-[0028], [0035], [0053]. Simon's stimulator may contain more than two **applicators**, with varying shapes and configurations for different applications based on the "anatomical location of the stimulation and determining the appropriate pulse configuration." Simon, [0031], [0100]-[0102], Fig. 4C-4D. Bikson, ¶114.

Simon's device has an "impulse generator," containing a capacitor and connected to a "control unit" causing the impulse generator to generate a signal for

each **coil**. Simon, [0019], [0057], Fig. 1. The control unit controls the capacitor via switching. Simon, [0019]. The impulse generator may contain a "bank of capacitors" discharged to coils at different times such that multiple, and serial pulses may be generated. Simon, [0019], [0063]. Bikson, ¶¶115-116.



Simon's coils generate consecutive "energy impulses" to stimulate tissue:



Simon, Fig. 2, [0002], [0029], [0035]. **Simon** teaches adjustable parameters for the stimulation signal including frequency, pulse amplitude, and repetition rate. Simon, [0059], [0063]-[0064], [0104]. Bikson, ¶¶117.

Simon aims to "significantly less[en] pain or discomfort" during treatment. Simon, [0016], [0123]. Applied current may be "increased gradually, first to a level wherein the patient feels sensation," then "set to a level." Simon, [0123]. **Simon** recognizes magnetic stimulator coils "overheat" during "extended" use, so it discloses solutions such as "cool[ing] the coils" with flowing water, air, or "ferrofluids." Simon, [0020]. Bikson, ¶¶118-119

To the extent argued **Simon** lacks explicit disclosure of a length-adjustable positioning member in its preferred embodiment, a POSITA would have found it obvious to modify **Simon** to use a length-adjustable positioning member (*e.g.*, adjustable "belt," "strap," "harness"; Simon [0147], [0154], [0168], [0182]) because **Simon** teaches applicators with varying shapes and configurations for different applications, *e.g.*, based on the "anatomical location of the stimulation and determining the appropriate pulse configuration." Simon, [0031], [0100]-[0102] ("general" "geometrical configuration"; device design is shaped by "anatomical location of the stimulation"); Fig. 4C-4D. Simon leaves the exact configuration and placement of the applicators to a POSITA, who would have been motivated to adjust the positioning of applicators for muscle "rehabilitation" on

muscle groups such as the "abdomen." Simon, [0035], [0197]. Such a routine change in configuration of applicators would predictably work and provide the expected functionality. Bikson, ¶120.

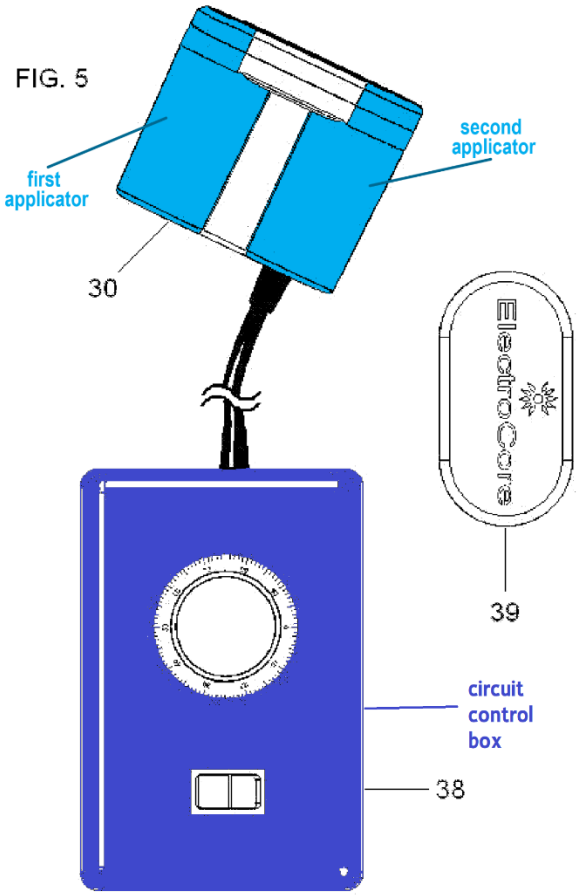
To the extent argued **Simon** lacks disclosure of connecting tubes for flowing oil to applicators, a POSITA would have found it obvious to modify **Simon** to use connecting tubes in order to cool applicators to avoid coils "overheat[ing]" when used over an extended period of time, such as for muscle "rehabilitation." Simon, [0020], [0197]. **Simon** leaves the exact cooling details to a POSITA, who would have been motivated to use connecting tubes for oil to flow from a source to the applicator and provide cooling. Such a routine change in device cooling would predictably work and provide the expected functionality. Bikson, ¶121.

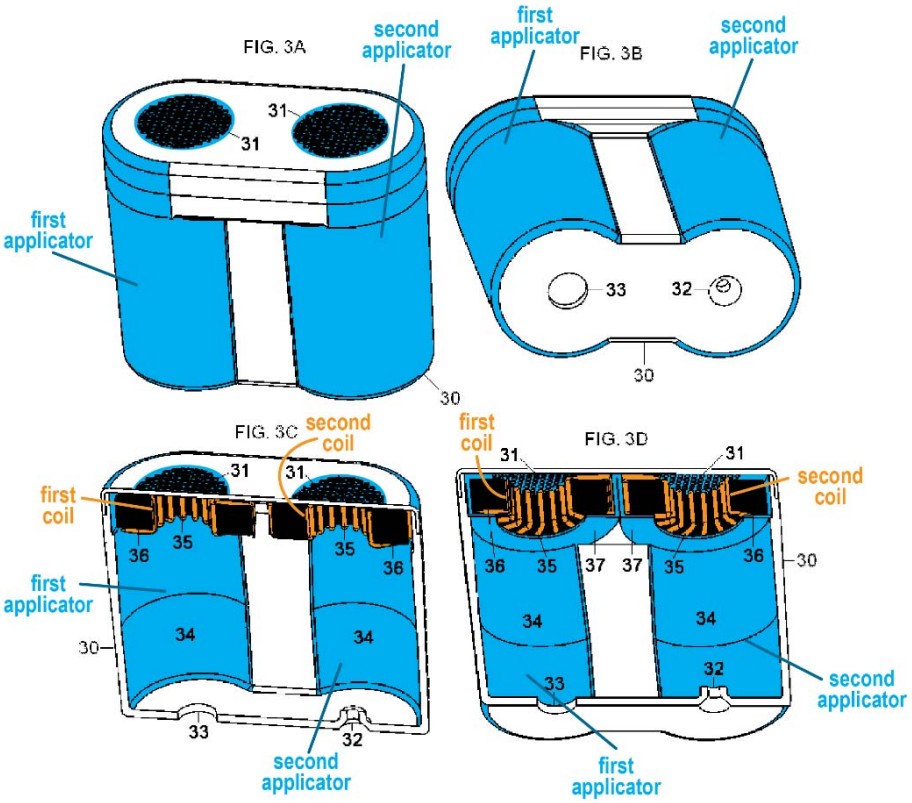
2. Claim Charts

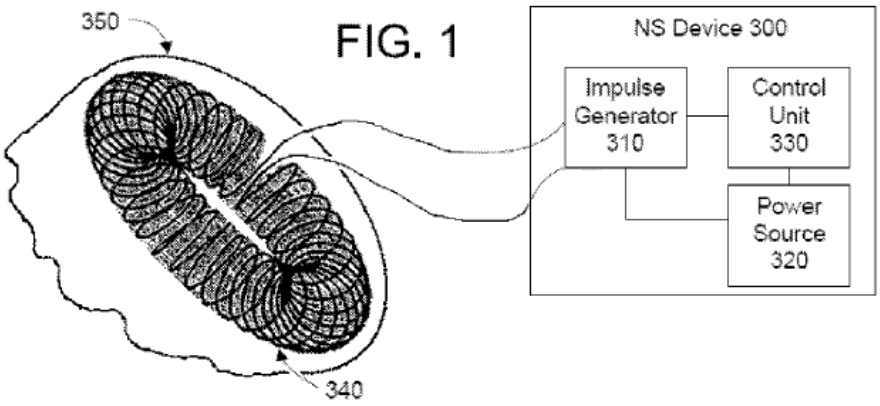
a. Independent Claims 9 and 16

Claim Elements	Simon
[9.pre] A method for toning muscles or muscle shaping of a patient using time-varying magnetic fields, the method comprising:	**Simon discloses a method for toning muscles or muscle shaping of a patient using time-varying magnetic fields.** **Simon** discloses "[m]agnetic stimulation devices and methods of therapy" for muscle "rehabilitation," which POSITAs would have recognized as muscle toning. Simon, title, Abstract, [0197]; AM-100, 3, 5 (device for "muscle toning"); HPM-6000, 3 (same device used for "muscle...rehabilitative purposes"); Bikson ¶¶45-73. **Simon** discloses an "apparatus" that induces a "time-varying magnetic field" to apply "energy" to a target region within a "patient." Simon, Abstract, [0015], [0023]-[0024], [0053].

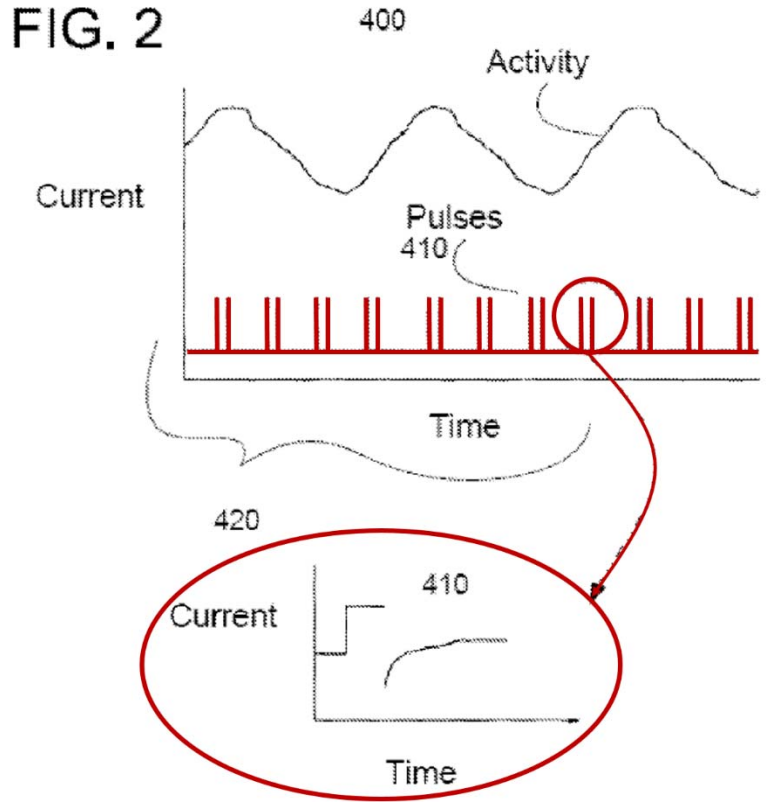
Claim Elements	Simon
	The apparatus are placed on "abdomen" in order to produce an "intended beneficial physiological effect." Simon, [0035]-[0036]. It was known that muscle contraction from applied time-varying magnetic fields leads to a reduction in adipose tissue proximate the muscles, leading to body shaping as was known in the art. *See, e.g.*, Sokolowaski, [0003]-[0005] ("stimulation leads to a breakdown of fatty tissue"). Bikson, ¶¶122-124, 67-73
[9.a] placing a first applicator comprising a first magnetic field generating coil in contact with the patient's skin or clothing at a body region including a first muscle; placing a second applicator comprising a second magnetic field generating coil in contact with the patient's skin or clothing at the body region including a second muscle, wherein the first and second muscles are a first buttock and a second buttock or a right side of an	**Simon teaches placing a first applicator** (*e.g.*, first applicator of "stimulator 30") **comprising a magnetic field generating coil** (*e.g.*, "coil") **in contact with a patient's skin or clothing at a body region of the patient, wherein the body region is an abdomen or a buttock; placing a second applicator** (*e.g.*, second applicator of "stimulator 30") **comprising a second magnetic field generating coil** (*e.g.*, "coil") **in contact with the patient's skin or clothing at the body region including a second muscle, wherein the first and second muscles are a right side of an abdomen and a left side of the abdomen.** **Simon** discloses a "stimulator 30" containing **applicators** and connected to "a **circuit control box** 38":

Claim Elements	Simon
abdomen and a left side of the abdomen,	 Simon, Fig. 5 (annotated); [0103]. The stimulator 30 may have two **applicators** "that lie side-by-side," each containing a "**coil[]** 35" disposed in "its own housing 37":

Claim Elements	Simon
	 Simon, Fig. 3A-D (annotated), [0031], [0098]. **Simon** is not limited to two **applicators**; the shapes and configurations may vary based on, *e.g.*, "the anatomical location of the stimulation." Simon, [0031], [0100]-[0102], Fig. 4C-4D. **Simon** discloses a two-applicator stimulator "positioned…on…abdomen…" and cites prior art "abdomen" treatment. Simon, [0035], [0105], [0175]. Simon discloses coupling applicator to a "target skin surface" and recognizes prior-art treatments "attaching electrodes to the surface of the skin". Simon, [0056], [0014], [0022], [0032]. It was known to position applicators on different sides of a body region such as left and right sides of abdomen. *See*, *e.g.*, Belanger, 246 (position applicators on "two different muscle groups, or two muscle parts[] within a muscle

Claim Elements	Simon
	group"); Burnett-'870, Fig. 9B, [0114]. Bikson ¶¶125-129, 75-77, 97.
[9.b] providing energy to the first and the second magnetic field generating coils each having an inductance in a range of 1 nH to 50 mH and each configured to generate a time-varying magnetic field with an impulse duration in a range of 3 μs to 3000 μs; and	**Simon teaches providing energy to the first and the second magnetic field generating coils** (*e.g.*, "coils") **each having an inductance in a range of 1 nH to 50 mH and each configured to generate a time-varying magnetic field with an impulse duration in a range of 3 μs to 3000 μs** (*e.g.*, 50-1000 microseconds)**.** **Simon** discloses a "source of power supplies a pulse of electric charge to [a] coil, such that the coil induces an…electric field." Simon, Abstract. **Simon's** device has "an impulse generator" coupled to a "power source" and "control unit":  Simon, Fig. 1, [0054]. The "impulse generator" contains "a capacitor," which stores energy when "[charged]…under the control of a control unit." Simon, [0019]. Capacitors are then "discharged," providing energy to each coil when a user wishes to "apply [a] stimulus." Simon, [0019], [0025]. **Simon's** "apparatus" induces a "time-varying magnetic field" to apply "energy" to a target region within a "patient." Simon, *Abstract*, [0015], [0023]-[0024], [0035]-[0036], [0053]. **Simon** discloses a "pulse duration"/"impulse[]…duration" of each electrical impulse, *e.g.*, "about 50…to about 1000

Claim Elements	Simon
	microseconds" or "50…to about 400 microseconds." Simon, cls. 9-10; [0030], [0033], [0104]. **Simon** leaves it to POSITAs to choose the "desired coil inductance," and using a coil with the broad range of inductance was known in the art. Simon, [0099]; *see*, e.g., Magstim, Table 1 (describing coils with, *e.g.*, 13.5μH/16μH). Bikson, ¶¶130-136, 82-83.
[9.c] applying the time-varying magnetic fields to the first and second muscles, respectively, in the body region of the patient in two trains, wherein a first train causes a contraction of the patient's muscles and a relaxation of the patient's muscles following the contraction of the patient's muscles.	**Simon teaches applying the time-varying magnetic fields to the first and second muscles, respectively, in the body region of the patient in two trains** (*e.g.* "pulse train[s] 420")**, wherein a first train causes a contraction of the patient's muscles and a relaxation of the patient's muscles following the contraction of the patient's muscles.** *See* [9.a]—**Simon** illustrates a plurality of consecutive "impulse[s] 410" to produce a "pulse train 420 to the stimulator coil(s)" to deliver a "stimulating, blocking and/or modulating impulse," resulting in biological activity such as tissue stimulation in a patient:

Claim Elements	Simon
	 Simon, Fig. 2, [0060]-[0061]. **Simon** recognizes it was known to apply stimulation on a "10 seconds on, 10 seconds off" cycle (*i.e.*, train followed by period of no stimulation) for "20 minutes duration" which includes more than two trains. Simon, [0111]. **Simon** teaches—as was well-known—that muscles "contract" while stimulated. Simon, [0158], [0194]-[0195]. It was well-known that muscles relax in between contractions such as during **Simon's** "10 seconds off." Simon, [0111]; Belanger, 239 (disclosing a train to mimic the "gradual build up and relaxation phases" during a "voluntary muscle contraction" for a "smooth" contraction). For example, it was known that muscle "relaxation (OFF time) between successive evoked contractions (ON time) [would] prevent muscle fatigue." Belanger, 244. Bikson, ¶¶137-140, 45-73, 89-93.

Claim Elements	Simon
[16.pre] A method for body shaping using time-varying magnetic fields applied to a patient's muscle, the method comprising:	**Simon discloses a method for toning muscles in a patient using time-varying magnetic fields.** *See* [9.pre]. Bikson, ¶¶141-142, 45-73.
[16.a] placing an applicator including a magnetic field generating coil in contact with a body region of a patient, wherein the coil is oil-cooled;	**Simon discloses placing an applicator** (*e.g.*, first applicator of "stimulator 30") **including a magnetic field generating coil** (*e.g.*, "coil") **in contact with a body region** (*e.g.*, abdomen) **of a patient, wherein the coil is oil-cooled.** See [9.a]—**Simon** recognizes that "coils…overheat…over an extended period of time" and needed cooling. Simon, [0020]. **Simon** discloses that known cooling solutions existed, *e.g.*, "cool[ing] the coils with flowing water or air" or with "ferrofluids," which are known to be oil-based—and oil was also known as a coolant. Simon, [0020] (citing Ghiron); Li, 6:13-14 ("oil-based ferrofluid"); *See* Nanda, [0071] (*e.g.*, "circulating coolant include… oil"). To the extent argued that oil cooling is disclosed only in **Simon's** background discussion, POSITAs would have known based upon Simon's teachings that cooling is highly desirable to prevent overheating, particularly for coils in close contact with skin, the particular cooling technique is left to the POSITA. As such, POSITAs would have been motivated and found it obvious to apply known oil-cooling techniques to **Simon's** stimulator for heat-sensitive body regions or lengthy treatment (*e.g.*, in rehabilitating muscles; Simon, [0197])—it was known that training muscles requires repetitive stimulation. *See* Magstim, 39, 8 (heat dissipation allows stimulator coil to be used for longer periods). Bikson, ¶¶143-146, 84-88.

Claim Elements	Simon
[16.b] attaching the applicator to the patient by a length adjustable positioning member;	**Simon teaches attaching the applicator** (*e.g.*, first applicator of "stimulator 30") **to the patient by a length adjustable positioning member** (*e.g.*, "[s]traps, harnesses")**.** *See* [9.a]—**Simon** discloses "[s]traps, harnesses, or frames are used to maintain the stimulator in position," which a POSITA would have understood may be length-adjustable, *e.g.*, to treat different body parts with vastly different dimensions (including "neck, ankle, abdomen, or scalp") or accommodate different-sized patients. Simon, [0035], [0123]. A POSITA would have known that belts including straps, harnesses, or frames are length-adjustable to fit the patient's anatomy, and moreover, an "adjustable belt" was well-known in the art. *See, e.g.,* Burnett-'870, [0007], [0114]-[0115], Fig. 9B. Moreover, **Simon** discloses it was known to have independently positioned applicators, such as one placed on "forearm" and another placed on "abdomen." Simon, [0175]. POSITAs would have understood and found it obvious that **Simon's** applicators may be independently positioned—*see* §VIII.A.1. It was known in the art to position applicators independently. *See, e.g.*, Belanger, Fig. 13-16, 241-42, 246; Burnett-'870, [0087], [0114], [0209]. Bikson, ¶¶147-149, 75-81.
[16.c] charging an energy storage device;	**Simon discloses charging an energy storage device** (*e.g.*, "capacitor")**.** *See* [9.b]. Bikson, ¶¶150-151, 82-83.
[16.d] switching a switching device;	**Simon discloses switching a switching device** (*e.g.*, "electronic switch")**.** *See* [9.b]—**Simon** discloses discharging a capacitor "through the coil via an electronic switch." Simon, [0019]; [0103] (using an "on/off switch" for "circuit control").

Claim Elements	Simon
	Bikson, ¶¶152-153.
[16.e] discharging the energy storage device to the magnetic field generating coil in order to generate the time-varying magnetic field;	**Simon discloses discharging the energy storage device** (*e.g.*, "capacitor") **to the magnetic field generating coil** (*e.g.*, "coil") **in order to generate the time-varying magnetic field** (*e.g.*, "time-varying magnetic field")**.** *See* [9.b], [16.d]—**Simon's** capacitor is discharged "through the coil via an electronic switch" when a user wishes to "apply the stimulus." Simon, [0019]; [0103]. Bikson, ¶¶154-155.
[16.f] causing the magnetic field generating coil to generate the time-varying magnetic field with a magnetic flux density in a range of 0.1 Tesla to 7 Tesla;	**Simon discloses causing the magnetic field generating coil to generate the time-varying magnetic field with a magnetic flux density in a range of 0.1 Tesla to 7 Tesla** (*e.g.*, "0.1 to 2 Tesla")**.** *See* [9.b], [16.d]-[16.e]—**Simon** discloses that "current passing through the coil produces a magnetic field within the core of about 0.1 to 2 Tesla." Simon, [0030], [0104]. Bikson, ¶¶156-157.
[16.g] applying the time-varying magnetic field with a magnetic flux density sufficient to cause a contraction of the patient's muscle within the body region in order to cause a repetitive contraction of the	**Simon teaches applying the time-varying magnetic field** (*e.g.*, "time-varying magnetic field") **with a magnetic flux density sufficient to cause a contraction of the patient's muscle within the body region in order to cause a repetitive contraction of the patient's muscle.** *See* [9.pre]-[9.a], [9.c], [16.f]—consecutive impulses cause repetitive muscle contractions. Bikson, ¶¶158-159, 45-73.

Claim Elements	Simon
patient's muscle; and	
[16.h] assembling a plurality of magnetic pulses into a train lasting a first time period lasting between 1 second and 30 seconds; wherein the train is followed by a second time period in which no time-varying magnetic field is applied to the patient's muscle.	**Simon teaches assembling a plurality of magnetic pulses into a train** (*e.g.*, "pulse train 420") **lasting a first time period lasting between 1 second and 30 seconds** (*e.g.*, "10 seconds on")**; wherein the train is followed by a second time period in which no time-varying magnetic field is applied to the patient's muscle** (*e.g.*, "10 seconds off")**.** *See* [9.c]—**Simon** discloses "adjustable" parameters including "train duration" but leaves the choice of duration to a POSITA. Simon, [0059]. **Simon** discloses an adjustable "duty cycle," *i.e.* stimulation on/off ratio indicating the presence of a time period in which no time-varying field is applied to muscle, and acknowledges a "10 seconds on, 10 seconds off" treatment cycle where the train lasts 10 seconds. Simon, [0062], [0064], [0111]. Bikson, ¶¶160-161, 47-55.

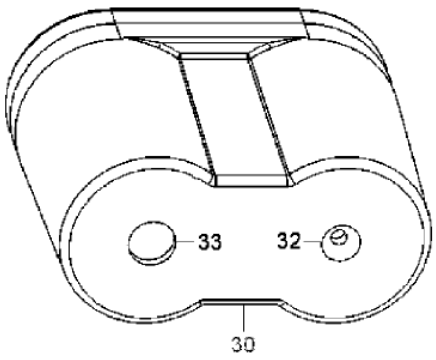
b. Dependent Claims 10-15 and 17-22

Claim Elements	Simon
[10] The method of claim 9, wherein a repetition rate of magnetic pulses of the first train of the two trains differs from a repetition rate of magnetic pulses of a second train.	**Simon teaches a repetition rate** (*e.g.*, "repetition rate") **of magnetic pulses of the first train** (*e.g.*, "pulse train 420") **of the two trains differs from a repetition rate** (*e.g.*, "repetition rate") **of magnetic pulses of a second train** (*e.g.*, "pulse train 420")**.** *See* [9.c]—**Simon** discloses an "adjustable" "repetition rate." Simon, [0062]-[0063]. **Simon** discloses "[c]ontrol of the system may be based upon feedback." Simon, [0058]. Accordingly, applicator repetition rates may be increased or decreased through this system control, including setting different rates for different trains. Herbst additionally discloses independently-set repetition rates for a "two…output" system. Herbst, [0037].

Claim Elements	Simon
	To the extent argued that **Simon** does not explicitly disclose that repetition rates differ from one another, **Simon** teaches that the system and its parameters may be "based upon feedback" so that each applicator generates bursts of different repetition rates over multiple time periods. It was well-understood by a POSITA that supra-maximal muscular stimulation at a continuously high repetition rate will quickly cause fatigue, and thus it would have been obvious to a POSITA to program **Simon**'s system to generate successive pulse trains by using a high repetition rate to cause a strong contraction and a lower repetition rate in a different pulse train to prevent muscle fatigue. Bikson, ¶¶162-164, 89-96.
[11] The method of claim 10, further comprising: assembling each of the first train and the second train into a first burst and a second burst, respectively; and applying between 150 bursts and 1,500 bursts to the patient during a treatment.	**Simon teaches assembling each of the first train** (*e.g.*, "pulse train 420") **and the second train** (*e.g.*, "pulse train 420") **into a first burst and a second burst, respectively; and applying between 150 bursts and 1,500 bursts** (*e.g.*, 300 bursts) **to the patient during a treatment.** *See* [9.pre], [9.c], [16.g]-[16.h], [10]—**Simon** recognizes treatment for "10 seconds on, 10 seconds off for 20 minutes duration…for 5 cycles in each subject" *i.e.*, 300 bursts, which is within the claimed range. Simon, [0111]. **Simon** further recognizes stimulation "may be performed for 1 to 200 minutes," leaving it to POSITAs to choose the number of bursts applied to the patient during such treatment, and applying the number of bursts within the very broad claimed range was known in the art. *See, e.g.*, Johari, [0033]-[0034], [0047] (teaching 360 bursts in a 60 minutes treatment). Bikson, ¶¶165-168, 89-96.
[12] The method of claim 9, further comprising applying the time-varying magnetic fields to the patient and	**Simon teaches applying the time-varying magnetic fields to the patient and causing incomplete or complete tetanus contraction of at least one of the first muscle and the second muscle.** *See* [9.c], [16.g]-[16.h], [13]—It was well-known that "full tetanic muscle contraction," *i.e.*, complete tetanus occurs at a

Claim Elements	Simon
causing incomplete or complete tetanus contraction of at least one of the first muscle and the second muscle.	stimulation pulse/burst frequency of about "50 Hz" (Belanger, 233, 238) and **Simon** discloses a burst frequency of 1-5000 Hz, "preferably…15-50 Hz." Simon, [0030]. *See also, e.g.,* Burnett-'870, [0227] ("maximal stimulation…sufficient to cause contraction of muscle fibers."). Bikson, ¶¶169-170, 45-73.
[13] The method of claim 9, further comprising relaxing the first and second muscles after the contraction for a period lasting in a range of 1 to 15 seconds.	**Simon teaches relaxing the first and second muscles after the contraction for a period lasting in a range of 1 to 15 seconds.** *See* [9.c], [16.h]—**Simon** discloses an adjustable "duty cycle," *i.e.* stimulation on/off ratio indication period of no stimulation/muscle relaxation, and acknowledges a "10 seconds on, 10 seconds off" treatment cycle where muscles relax during "off" period of 10 seconds, within the claimed range. Simon, [0062], [0064], [0111]. Moreover**,** "wait times" without stimulation, allowing muscle relaxation, were known. For example, Magstim's Figure 21 shows configurable wait times. Magstim, 13 (depicting "25s" wait time); *see also* Johari, [0038], [0043] (disclosing a 4-5 seconds muscle relaxation period). POSITAs would have been motivated and found it obvious to configure relaxation periods in this range in view of this disclosure in order to allow time for the muscle to relax between pulse train to reduce muscle fatigue. Bikson, ¶¶171-175.
[14] The method of claim 9, further comprising: assembling the first train into a first burst; and assembling the second train into a second burst, wherein between	**Simon teaches assembling the first train** (*e.g.*, "pulse train 420") **into a first burst; and assembling the second train** (*e.g.*, "pulse train 420") **into a second burst, wherein between 150 and 1,500 bursts** (*e.g.*, 300 bursts) **are applied to the patient during a treatment.** *See* [11]. Bikson ¶¶176-177.

Claim Elements	Simon
150 and 1,500 bursts are applied to the patient during a treatment.	
[15] The method of claim 9, wherein each of the magnetic field generating coils includes a core area in a range of 10% to 40% of a total magnetic field generating coil surface.	**Simon teaches each of the magnetic field generating coils** (*e.g.*, "coil") **includes a core area in a range of 10% to 40%** (*e.g.*, 33%) **of a total magnetic field generating coil surface.** **Simon** discloses different outer and inner diameters of toroidal coils "for different applications," *e.g.*, for "desired coil inductance." Simon, [0099]-[0101]. For example, **Simon** discloses a core with outer diameter of 5cm and inner diameter 2.5cm, which has 33% core area, within the claimed range. Bikson, ¶¶178-179.
[17] The method of claim 16, further comprising applying 150 to 1,500 bursts to the patient during one treatment.	**Simon teaches applying 150 to 1,500 bursts** (*e.g.*, 300 bursts) **to the patient during one treatment**. *See* [11]. Bikson, ¶¶180-181.
[18] The method of claim 16, further comprising applying a plurality of trains to the patient wherein at least two of the plurality of trains differ in a repetition rate, wherein the applicator is connected to a connecting tube,	**Simon teaches applying a plurality of trains** (*e.g.*, "pulse train[s] 420") **to the patient wherein at least two of the plurality of trains differ in a repetition rate, wherein the applicator is connected to a connecting tube, and wherein the connecting tube is connected to a source of oil** (*e.g.*, "ferrofluid") **cooling the magnetic field generating coil.** *See* [10], [9.c], [16.a]—**Simon** references Ghiron as a "solution" of "[f]errofluid cooling" to overheating problem. Simon, [0020]. Ghiron teaches using "channel 40" to "convey ferrofluid 30" to a stimulator's coil. Ghiron, 5:47-54, 9:1-10. POSITAs would have been motivated and found it obvious to apply prior art teachings to direct cooling media (*e.g.*, ferrofluid) to the coil of the stimulator as taught in **Simon**.

Claim Elements	Simon
and wherein the connecting tube is connected to a source of oil cooling the magnetic field generating coil.	*E.g.*, Marchitto, 5:34-43 ("center copper tube" serves as an "input for refrigerant" to the coil at "distal end of…applicator"); Burnett-'870, [0210] ("coil power line" directs "fluid cooling" from "logic controller 364" to "coils…in the applicator"). To the extent argued that **Simon** does not expressly disclose a source of oil, a POSITA would have been motivated and found it obvious to use a source for the cooling fluid when cooling with oil, such that the cooling fluid may be provided to the coils/applicators. Bikson, ¶¶182-185, 84-91.
[19] The method of claim 16, wherein the applicator comprises a casing and a handle located on an upper side of the casing.	**Simon teaches the applicator comprises a casing** (*e.g.*, "housing") **and a handle located on an upper side of the casing.** **Simon** discloses each applicator has "its own housing 37" for a "coil[] 35"; and that the "housing" provides "mechanical support to the coil and core," and "electrical[] insulat[ion]" from a "neighboring coil." Simon, [0098], Figs. 3A-D. Figure 3B shows an enclosure shaped in a way to be handled with the inward indent designed to support holding such that a POSITA would understand it to be a handle located on the upper side of the casing. FIG. 3B  POSITAs would have been motivated and found it obvious to include a handle on the upper side of the casing of the

Claim Elements	Simon
	appliance to assist the user in holding the applicator into position. For example, **Simon** cites Parker's magnetic field-generating device designed with "ergonomic considerations" to facilitate "gripping" of the apparatus," *e.g.*, "indented portion…to receive a finger." Parker, 3:9-28. Bikson, ¶¶186-188, 75-81.
[20] The method of claim 19, further comprising generating the time-varying magnetic field with a maximal value of a magnetic flux density derivative of 5 kT/s to 150 kT/s.	**Simon teaches generating the time-varying magnetic field with a maximal value of a magnetic flux density derivative of 5 kT/s to 150 kT/s** (*e.g.*, 0.63-251 kT/s)**.** **Simon** discloses that "current passing through the coil produces a magnetic field within the core of about 0.1 to 2 Tesla." Simon, [0030], [0104]. **Simon** discloses a "pulse duration"/"impulse[]…duration" of each electrical impulse, *e.g.*, "about 50…to about 1000 microseconds" or "50…to about 400 microseconds." Simon, cls. 9-10; [0030], [0033], [0104]. Because magnetic field flux density derivative is calculated using flux density and impulse duration, this yields a range of 0.63-251 kT/s, falling within the claimed range as was well-known in the art. *See, e.g.*, Magstim 3-4 (4T; 100μs-1ms ranges yield flux derivative range of 25.12-251.2 kT/s). Bikson, ¶¶189-197, 49-51.
[21] The method of claim 16, further comprising applying a thermal treatment to the body region of the patient.	**Simon teaches applying a thermal treatment to the body region of the patient.** *See* [16.a], [18], [22]—The cooling feature of **Simon**'s device provides thermal treatment on target body regions. Bikson, ¶¶198-199.
[22] The method of claim 21 further comprising applying the thermal treatment comprising cooling the body	**Simon teaches applying the thermal treatment comprising cooling the body region of the patient using a cooling element having a temperature of between 20° C. and −20° C.** *See* [16.a], [18], [21]—**Simon** discloses "a measuring stage" which measures and displays "outputs of various sensors"

Claim Elements	Simon
region of the patient using a cooling element having a temperature of between 20° C. and −20° C.	such that the system's user may adjust the "electrical stimulation signal" manually or automatically based on "feedback" and the "user can then observe the effect of this signal on a substance being treated." Simon, [0063]. Simon leaves it to POSITAs to decide the operation temperature such that the device is not overheated (Simon, [0020]), and it was known to cool the adipose tissues or epidermis (in contact with coils of the device) in the range of "-20°C to 20°C". *See, e.g.*, Nanda, [0053], [0066], [0106]. Bikson, ¶¶200-202.

B. Ground 2: Claims 9-22 are rendered obvious by Burnett-'870 in view of Magstim

1. Burnett-'870 Overview

Burnett-'870 discloses applying time-varying magnetic fields sufficient to "cause contraction of muscle fibers," and thereby "toning" it. Burnett-'870, *Title, Abstract*, [0003], [0011], [0227]. **Burnett-'870**'s device has multiple applicators comprising coils to generate magnetic fields on target muscles, as shown in Figure 9B where "coils 106" are disposed in an "abdominal garment". Burnett-'870, *Abstract*, [0070], [0114].

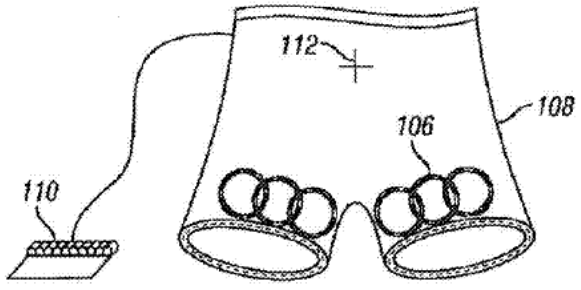


FIG. 9B

Burnett-'870 discloses attaching coils to a body region via a "belt," a "wrap" (Fig. 9A), a "band" (Fig. 9C), or a "strap" (Fig. 9D) that are "adjustable" allowing the coils to be independently positioned. Burnett-'870, [0007], [0114], [0209]. Bikson, ¶¶204-209.

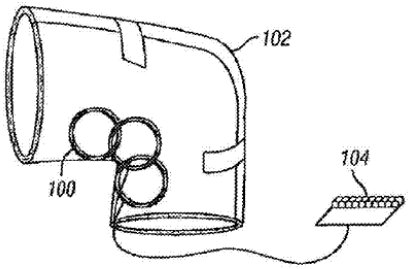


FIG. 9A

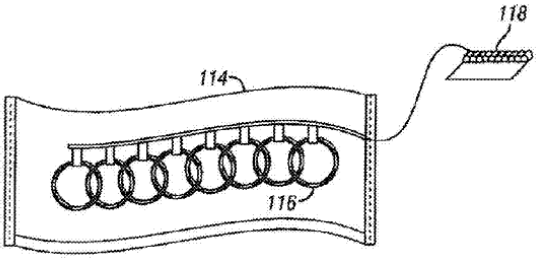


FIG. 9C

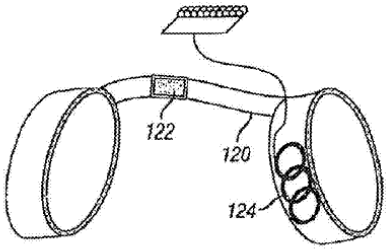


FIG. 9D

Burnett-'870 discloses cooling the coil by direct contact with a liquid coolant. Burnett-'870, [0210], [0215], [0235], Fig. 35. Bikson, ¶210.

Burnett-'870 uses a "logic controller" to adjust the parameters of the magnetic fields based on feedback from a patient via a "display screen". Burnett-'870, *Abstract,* [0196]. **Burnett-'870** discloses it was known to include a "capacitor" in the device, and uses a "switch" to control the connection between

the controller and the applicators. Burnett-'870, [0013]–[0014], [0085], [0111]. **Burnett-'870** leaves the powering of coils to a POSITA. Burnett-'870, [0130]. Bikson, ¶¶211-213.

Burnett-'870 also discloses that impulses of the magnetic fields may occur "simultaneously or differentially." Burnett-'870, [0087]. The treatment parameters, *e.g.*, "amplitude and/or firing sequence of coils 26," "position of coils 26," and "frequency of stimulation," are adjustable. Burnett-'870, [0070], [0085], [0087], [0117], [0129]. Because **Burnett-'870** explains that the magnetic fields may occur "differentially," this implies that **Burnett-'870** contemplates separate capacitors—one for each coil. Bikson, ¶¶214-215.

2. Magstim Overview

Magstim is a "[g]uide" to magnetic stimulation techniques and clinical applications, such as "rehabilitation" and "sports medicine" for "training muscle and… improving its fatigue resistance." Magstim, 1, 3, 39. Bikson, ¶216.

Figure 2 shows a "block diagram of a typical stimulator." Magstim, 3–4.

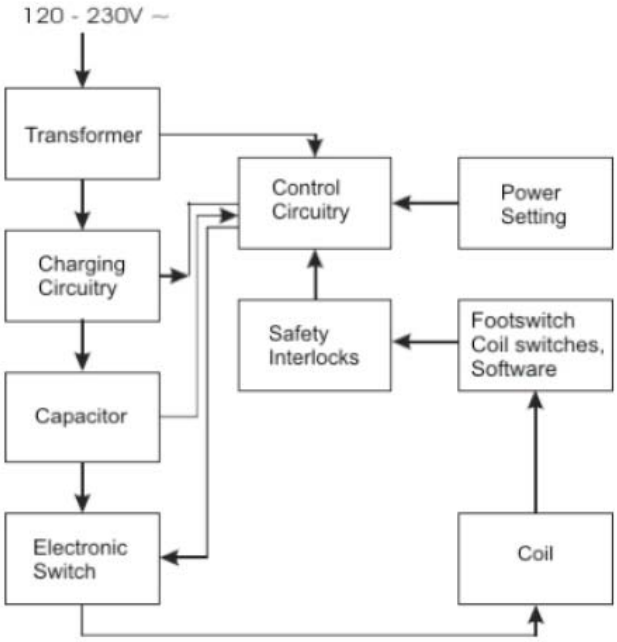


Figure 2: Block diagram of the Magstim 200[2] monophasic stimulator

Figure 2 illustrates "charg[ing] a capacitor under the control of a microprocessor," and connecting the capacitor to "the coil via an electronic switch" to generate a magnetic field, as shown in Figure 3. Magstim, 4. **Magstim** also illustrates the impulses as biphasic and sinusoidal. Magstim, 9, Fig. 14. Bikson, ¶¶217-220.

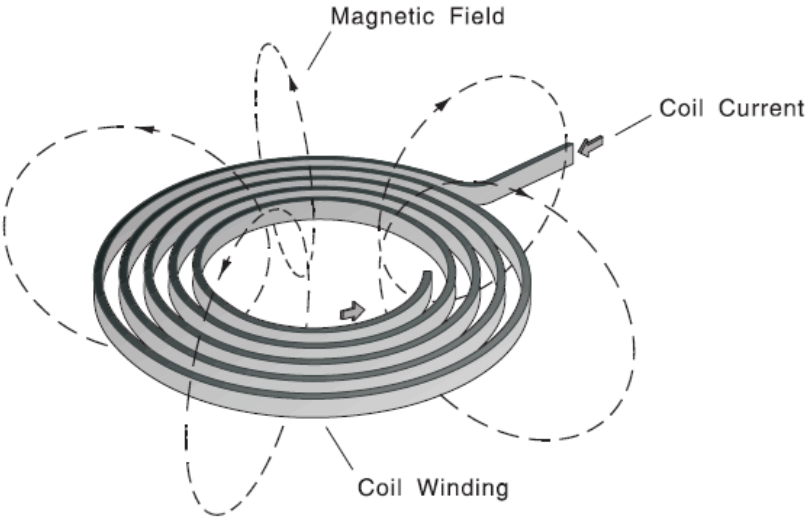


Figure 3: a circular coil showing the lines of force generated when current flows through the winding

Magstim discloses a controller for controlling generation of the magnetic fields using a "touch sensitive" "setup screen" that allows various parameters (*e.g.*, "Start Time, Power, Frequency Duration and Wait Time" over "trains of pulses") to be adjusted, as illustrated in Figure 21. Bikson, ¶221.

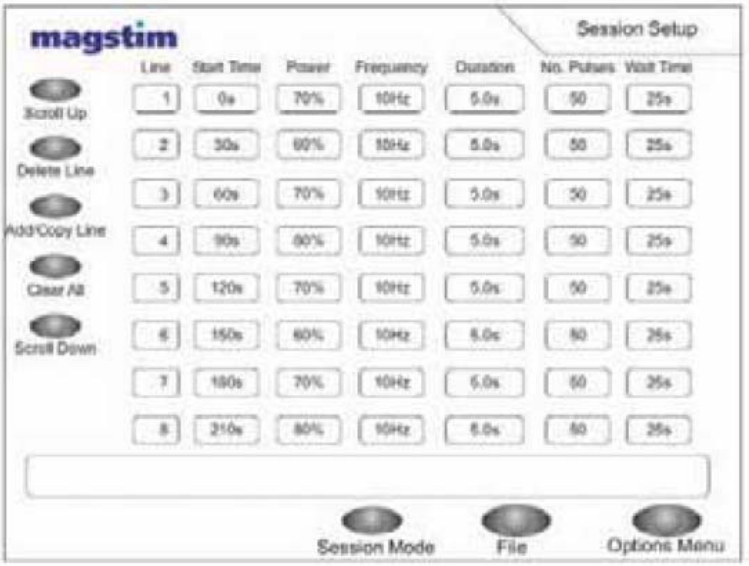


Figure 21: the Session software screen showing the parameters which can be controlled by the program

Magstim was publicly accessible and available to the POSITA as early as 2010. Suarez-Bagnasco, 4833 (reference [11]). **Magstim** was published for "world-wide readership," with copies distributed freely. Magstim, 1, 44. The Wayback Machine shows **Magstim** was disseminated via UC Irvine website by 2012. Magstim, Affidavit. Public documents cited **Magstim** and its URL. Zhi-De-Deng-Electric, 18 (reference [146]); Zhi-De-Deng-Electromagnetic, 276 (reference [161]; Simon-'569, ¶¶0036-0037; Simon-'967, ¶¶0051-0052; Simon-'203, ¶¶0017-0018, 0190; Simon-'432, ¶¶0090, 0094; Simon-'719, 7:48-8:1; Simon-'247, 20:29-43; Simon-'177, 11:19-39; File-history-'568, 10; File-history-'050, 11; File-history-'005, 3; File-history-'727, 4. Bikson, ¶222.

3. Motivation to Combine

Burnett-'870 discloses a device with multiple applicators with coils to generate magnetic fields on target tissues. Burnett-'870, *Abstract*. To the extent argued that **Burnett-'870** does not explicitly disclose details of a typical magnetic stimulation device, **Magstim** describes the details and operations of such device and its applications. Magstim, 1. Bikson, ¶223.

Burnett-'870 discloses that incorporating a "capacitor" in a magnetic stimulator was known. Burnett-'870, [0013]–[0014]. **Burnett-'870** also discloses using a "switch" to control the connection between the controller and the applicators. Burnett-'870, [0085], [0111]. **Burnett-'870** leaves the powering of coils to POSITA, **Magstim** teaches a known implementation of incorporating capacitors and switches in circuitry of a "typical stimulator" to control charging and discharging of a capacitor, using an electronic switch, to power a connected stimulation coil. Magstim, 4; Fig. 2. Because **Burnett-'870** discloses using activating two coils "differentially," and in view of known teachings to use a capacitor for storing energy for a coil, a POSITA would have recognized **Burnett-'870** as teaching separate energy storage per coil that would allow for independent control of separate coils to provide programmable discharge patterns of pulse channels. It would have been an obvious, "typical," implementation to double the capacitor and switch for a two-coiled design such that each coil has its own

circuitry. A POSITA would have been motivated and found it obvious to apply **Magstim's** teaching in implementing **Burnett-'870**'s stimulation device to charge and discharge the capacitors using switches such that energy would be stored in the capacitors and that the discharge of the capacitors would be controlled to provide power to the coils to generate the time-varying magnetic fields. Bikson, ¶¶224-226

Although **Burnett-'870** does not explicitly disclose that the impulses of the magnetic fields are biphasic and sinusoidal, **Magstim** discloses it. Magstim, 9; Fig. 14. A POSITA would have been motivated and found it obvious to look to **Magstim's** teaching of "standard stimulator" biphasic and sinusoidal impulses in implementing **Burnett-'870**'s device. As explained in **Burnett'-870**, these signals had known benefits for therapeutic applications. Bikson, ¶¶227-228.

Both **Burnett-'870** and **Magstim** are in the same field of endeavor—electromagnetic stimulation of the body and are analogous art to '634. **Burnett-'870** discloses using magnetic field to stimulate muscles. Burnett-'870, *Abstract*. **Magstim** discloses using magnetic field to induce electrical current to stimulate muscles. Magstim, 1, 12. Bikson, ¶229.

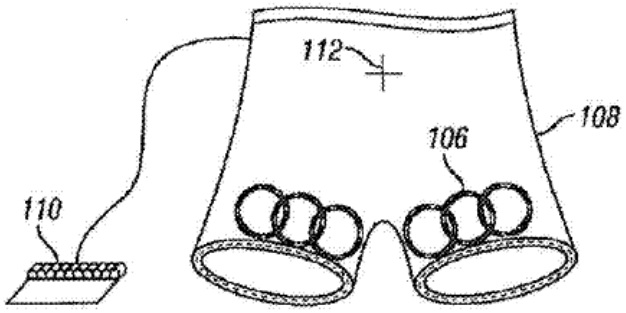
A POSITA would have found it routine, straightforward and advantageous to apply **Magstim's** known teachings of using capacitors to store energy and switches to control their discharge to power stimulation coils to generate magnetic fields, and other known basics of magnetic fields, in implementing **Burnett-'870's**

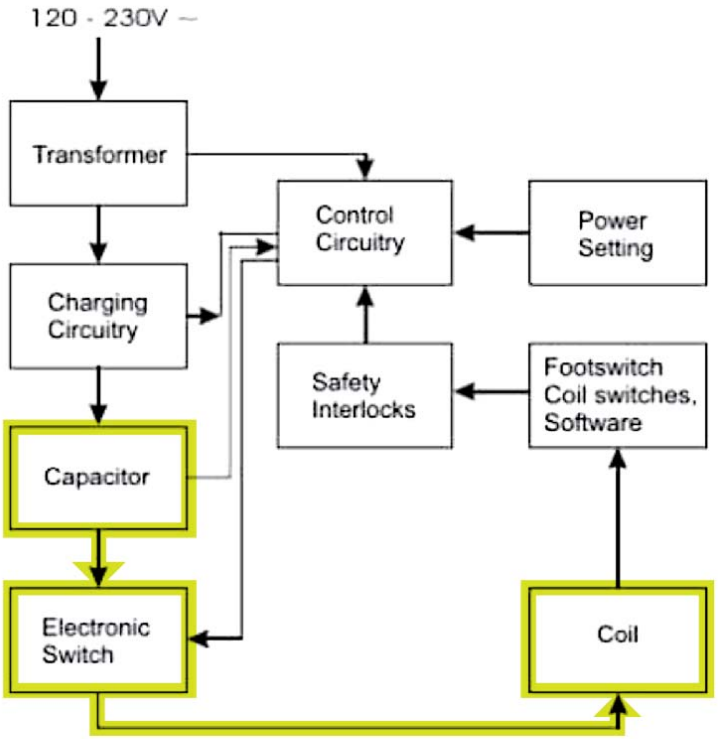
stimulation device, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. *See KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007). Bikson, ¶230.

4. Claim Charts

a. Independent Claims 9 and 16

Claim Elements	Burnett-'870 in view of Magstim
[9.pre] A method for toning muscles or muscle shaping of a patient using time-varying magnetic fields, the method comprising:	**Burnett-'870 discloses a method for toning muscles or muscle shaping of a patient using time-varying magnetic fields.** Burnett-'870 discloses "methods for electromagnetic induction therapy" using "body contoured applicators" that include "coils configured to generate an electromagnetic or magnetic field focused on a target nerve, muscle or other body tissues"; and the magnetic fields are "time varying" and "pulsed." Burnett-'870, *Abstract*, [0003]. Burnett-'870 discloses "toning tissue with focused, coherent EMF [electromagnetic field]." Burnett-'870 [0011], [0225]–[0226]. Bikson, ¶¶231-234, 45-73.
[9.a] placing a first applicator comprising a first magnetic field generating coil in contact with the patient's skin or clothing at a body region including a first muscle; placing a second applicator	**Burnett-'870 discloses placing a first applicator** (*e.g.*, "applicator") **comprising a magnetic field generating coil** (*e.g.*, "coil") **in contact with a patient's skin or clothing at a body region of the patient, wherein the body region is an abdomen or a buttock; placing a second applicator** (*e.g.*, "applicator") **comprising a second magnetic field generating coil** (*e.g.*, "coil") **in contact with the patient's skin or clothing at the body region including a second muscle, wherein the first and second muscles are a first buttock and a second buttock or a right side of an abdomen and a left side of the abdomen.**

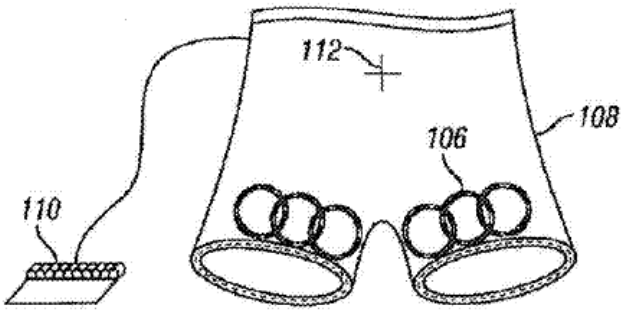
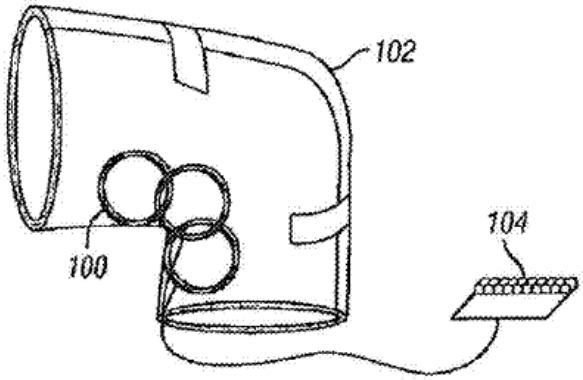
Claim Elements	Burnett-'870 in view of Magstim
comprising a second magnetic field generating coil in contact with the patient's skin or clothing at the body region including a second muscle, wherein the first and second muscles are a first buttock and a second buttock or a right side of an abdomen and a left side of the abdomen,	**Burnett-'870** discloses multiple applicators comprising coils to generate magnetic fields on target muscles. Burnett-'870, *Abstract*. Figure 9B illustrates two applicators, each with a set of coils 106, disposed within an "abdominal garment" covering and treating left and right sides of a patient's buttocks/abdomen. Burnett-'870, [0114].  FIG. 9B A POSITA would understand that when a patient wears the abdominal garment, the coils contact the patient's skin or clothing. Bikson, ¶¶235-238.
[9.b] providing energy to the first and the second magnetic field generating coils each having an inductance in a range of 1 nH to 50 mH and each configured to generate a time-varying magnetic field with an impulse duration in a range of 3 μs to 3000 μs; and	**Burnett-'870 in view of Magstim teaches providing energy to the first and the second magnetic field generating coils** (*e.g.*, "coils") **each having an inductance in a range of 1 nH to 50 mH and each configured to generate a time-varying magnetic field with an impulse duration in a range of 3 μs to 3000 μs.** **Burnett-'870** discloses it was known to use capacitors as energy storage devices in a magnetic stimulator. Burnett-'870, [0013]–[0014]. Indeed, its provisional application discloses using in its invention a LoFIT system described in Burnett-'185. Burnett-Provisional-'720, [0001]–[0002], [0020]. Burnett-'185 discloses incorporating a capacitor in the circuitry of the device, allowing it to be charged, and using a switch to discharge it to the coil. Burnett-'185, 6:66-7:2, 7:27-8:26. POSITAs would have been motivated and found it obvious to incorporate capacitors in **Burnett-'870's** system based on

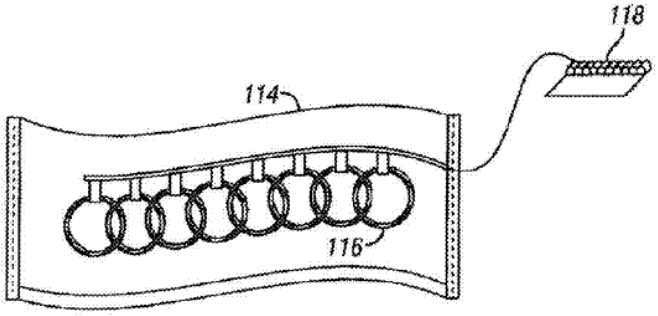
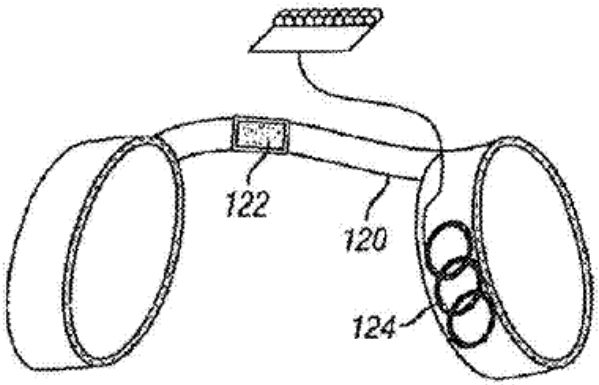
Claim Elements	Burnett-'870 in view of Magstim
	Burnett-'870's reference to the LoFIT system, and **Burnett-'870's** guidance to store energy for the coils, and a POSITA would have understood to charge the capacitors such that they would be discharged to the coils as was known in the art. *See, e.g., id.*; Magstim, 3-4 ("charg[ing] a capacitor under the control of a microprocessor"), Fig. 2. *See* VIII.B.3.  *Figure 2: Block diagram of the Magstim 200[2] monophasic stimulator* Because a capacitor stores energy to be discharged, and a coil uses energy to generate a magnetic field, POSITAs would have understood that the capacitor is charged by an energy source, such that the energy is discharged to the coil to generate the magnetic field, as was known in the art. *See, e.g.*, Magstim, 3–4, Fig. 2 ("a transformer charges a capacitor … and the capacitor is then connected to the coil via an electronic switch when the user wishes to apply the stimulus").

Claim Elements	Burnett-'870 in view of Magstim
	Burnett-'870 leaves it to POSITAs to choose the coils, and using coils with the very broad claimed range of inductance in a stimulator device was known in the art. *See, e.g.*, Magstim, 4, Table 1 (all coils have an inductance between 2,550nH and 0.0235mH). **Burnett-'870** incorporates by reference Burnett-'325. Burnett-'870, [0002]. Burnett-'325 discloses that it was known to use a magnetic field having an impulse of "a 50 μs duration." Burnett-'325, [0010]. **Burnett-'870** leaves it to POSITAs to choose an impulse duration, the range of 3 μs to 3000 μs was known and conventional. *E.g.,* Magstim, 3 ("a pulse duration from 100μs to 1ms, dependent on stimulator type"). Bikson, ¶¶239-249, 82-83.
[9.c] applying the time-varying magnetic fields to the first and second muscles, respectively, in the body region of the patient in two trains, wherein a first train causes a contraction of the patient's muscles and a relaxation of the patient's muscles following the contraction of the patient's muscles.	**Burnett-'870 teaches applying the time-varying magnetic fields to the first and second muscles, respectively, in the body region of the patient in two trains, wherein a first train causes a contraction of the patient's muscles and a relaxation of the patient's muscles following the contraction of the patient's muscles.** *See* [9.a]. **Burnett-'870** discloses that the magnetic fields are "time varying," "pulsed," and "intermittently applied"; the coils operate at a frequency; and that target regions are "exposed to the *impulses*" of the magnetic fields—indicating that each field generates multiple trains of impulses. Burnett-'870, *Abstract*, [0003], [0195], [0226]. It was also known in the art to use consecutive impulses of "fixed frequency" (*i.e.,* each impulse in a train has the same interstimulus interval) because such treatment is "useful" in therapeutic applications, such as rehabilitating muscles. *See, e.g.,* Magstim 3, 6, 11–12. Bikson, ¶¶89-91. **Burnett-'870**'s device "may stimulate regions of the body to treat conditions requiring [] maximal stimulation (i.e., sufficient to cause contraction of muscle fibers and firing of

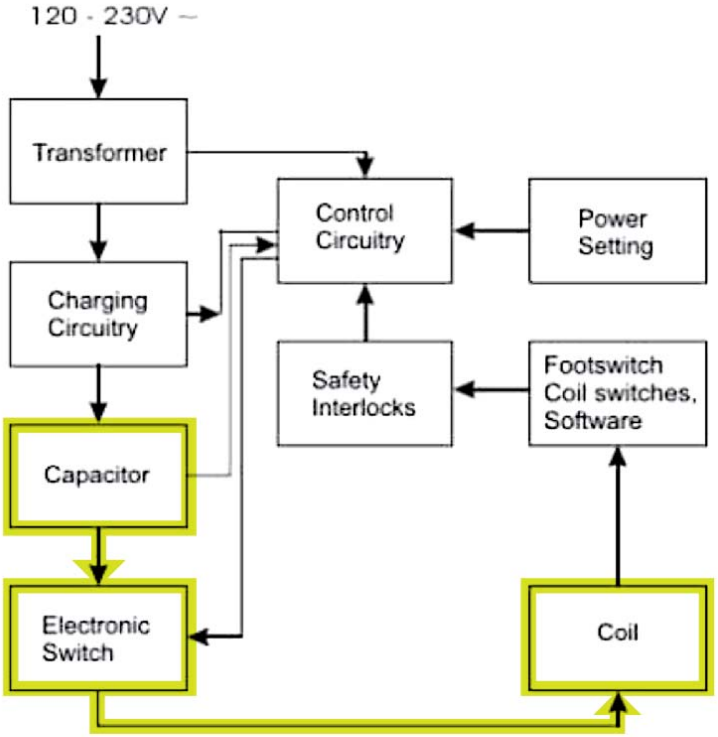
Claim Elements	Burnett-'870 in view of Magstim
	nerves)." Burnett-'870, [0227]. Thus, **Burnett-'870** applies stimulation from two magnetic fields causing muscles of buttocks or abdomen to contract. **Burnett-'870** further discloses using "intermittent pulsed magnetic fields" to include "periods during which the nerve is not subject to stimulatory signal." Burnett-'870, [0233]–[0234], [0252]–[0253]. It was also known in the art that there is a time period between pulses. *See, e.g.,* Magstim, 10, 11 (discussing interpulse spacing and independent pulses) **Burnett-'870** thus teaches a train that causes muscle contraction, followed by a period of no stimulation allowing muscle relaxation, as was known in the art. *See, e.g.,* Belanger, 239 (disclosing to a train to mimic the "gradual build up and relaxation phases" during a "voluntary muscle contraction" for a "smooth" contraction). Bikson, ¶¶250-257, 52, 89-96.

Claim Elements	Burnett-'870 in view of Magstim
[16.pre] A method for body shaping using time-varying magnetic fields applied to a patient's muscle, the method comprising:	**Burnett-'870 discloses a method for toning muscles in a patient using time-varying magnetic fields.** *See* [9.pre]. Bikson, ¶¶258-259, 45-73.
[16.a] placing an applicator including a magnetic field generating coil in contact with a body region of a patient, wherein the coil is oil-cooled;	**Burnett-'870 discloses placing an applicator** (*e.g.*, "applicator") **including a magnetic field generating coil** (*e.g.*, "coil") **in contact with a body region** (*e.g.*, buttocks/abdomen, back) **of a patient, wherein the coil is oil-cooled.** See [9.a]. **Burnett-'870** discloses it was known to cool the coils by direct contact with a liquid coolant to prevent overheating. Burnett-'870, [0235], [0210], [0215]. **Burnett-'870** leaves it to POSITAs to choose the liquid coolant, and oil was known in the art for cooling. *See* Nanda, [0071] ("circulating coolant include… oil"), Ghiron, 3:14–16 (cooling a magnetic device with "ferrofluid," an oil-based coolant). Bikson, ¶¶260-269, 84-88.
[16.b] attaching the applicator to the patient by a length adjustable positioning member;	**Burnett-'870 teaches attaching the applicator** (*e.g.*, "applicator") **to the patient by a length adjustable positioning member** (*e.g.*, "abdominal garment," "belt")**.** *See* [9.a]. **Burnett-'870** explains that "incorporat[ing] an adjustable belt" was known in the art. Burnett-'870, [0007]. Figure 9B discloses a flexible belt (*e.g.*, the portion of the "abdominal garment" which circles the patient's waist)

Claim Elements	Burnett-'870 in view of Magstim
	coupling the applicators to left and rights sides of the patient's buttocks/abdomen, so that the time-varying magnetic field may be applied through the coils. Burnett-'870, [0114].  FIG. 9B Figures 9A-D show fixing the applicators to a body region (*e.g.*, "knee"/"arm"/"head"/"neck"/"lower back") with a belt (*e.g.*, "wrap"/"strap"/"band"/"buckle"). Burnett-'870, [0114]–[0115].  FIG. 9A

Claim Elements	Burnett-'870 in view of Magstim
	 FIG. 9C  FIG. 9D **Burnett-'870's** applicators are not fixed in positioning to each other. **Burnett-'870** discloses, "[t]he direction and location of ***each of coils 26*** may be reversibly or irreversibly adjusted…***customizing the location of the applied stimulation to the anatomy and therapy needs of each patient***." Burnett-'870, [0087]; *see also id.,* [0104]. **Burnett-'870** discloses applicator coils are attached to a belt. The coils are repositioned relative to each other by tilting/stretching/tightening/loosening the belt, such that one applicator's coil moves relative to the other coil. Burnett-'870, [0007] ("adjustable belt"), [0071] ("coils may be… movable"), [0209] ("coils… slidable, adjustable, or moveable"); *see also id.,* [0080], [0087]–[0088], [0090], [0093], [0099], [0102], [0104], [0106], [0110], [0114], [0120]–[0121], [0127], [0180], [0186], [0191], [0204]–[0205], Fig. 31A-B.

Claim Elements	Burnett-'870 in view of Magstim
	To the extent argued that **Burnett-'870**'s abdominal garment does not explicitly include a length-adjustable positioning member, a POSITA would have been motivated and found it obvious to modify **Burnett-'870's** abdominal garment, which fixes both applicators to a body portion, to be an adjustable belt because such would allow more flexibility in applications as a belt is adjustable and may be used on different-sized patients, and easier to maintain than an undergarment that may be unsanitary, or require washing after each use. Bikson, ¶¶270-276, 75-81.
[16.c] charging an energy storage device;	**Burnett-'870 in view of Magstim teaches charging an energy storage device** (*e.g.*, "capacitor")**.** *See* [9.b]. Bikson, ¶¶277-278, 82-83.
[16.d] switching a switching device;	**Burnett-'870 in view of Magstim teaches switching a switching device.** *See* [9.b]. **Burnett-'870** discloses using a "switch" to control stimulation. Burnett-'870, [0085], [0111] (disclosing "direct switching of the current circuit" between logic controller and sensor). POSITAS would have understood that the capacitors would be discharged to the applicators' coils, *e.g.*, via switches as was known in the art. *See, e.g.,* Burnett-'185, 6:66-7:2, 7:27-8:26; Magstim, 4, Fig. 2. *See* VIII.B.3.

Claim Elements	Burnett-'870 in view of Magstim
	 *Figure 2: Block diagram of the Magstim 200[2] monophasic stimulator* **Burnett-'870** leaves it to POSITAs to choose the coils, and using coils with the very broad claimed range of inductance in a stimulator device was known in the art. *See, e.g.*, Magstim, 4, Table 1 (all coils have an inductance between 2,550nH and 0.0235mH). Bikson, ¶¶279-283.
[16.e] discharging the energy storage device to the magnetic field generating coil in order to generate the time-varying magnetic field;	**Burnett-'870 in view of Magstim teaches discharging the energy storage device to the magnetic field generating coil in order to generate the time-varying magnetic field.** *See* [9.b], [16.d]. Bikson, ¶¶284-285.
[16.f] causing the magnetic field generating coil to generate the time-	**Burnett-'870 discloses causing the magnetic field generating coil to generate the time-varying magnetic field with a magnetic flux density in a range of 0.1 Tesla to 7 Tesla** (*e.g.*, "0.25 to 1.5 tesla")**.**

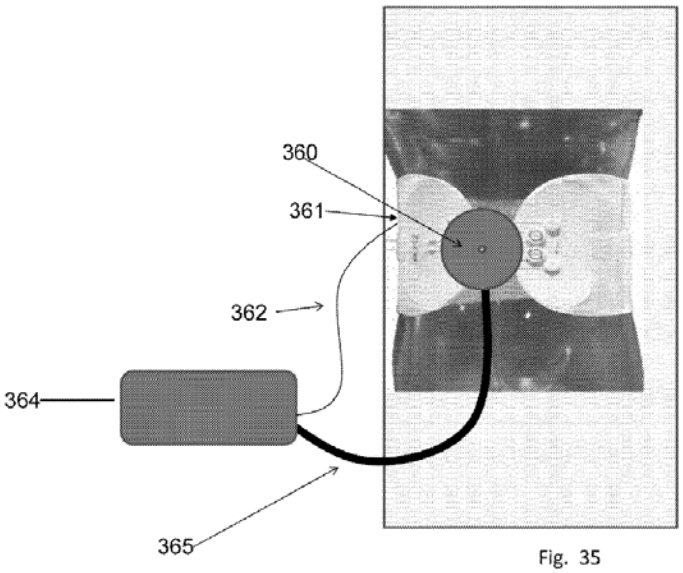
Claim Elements	Burnett-'870 in view of Magstim
varying magnetic field with a magnetic flux density in a range of 0.1 Tesla to 7 Tesla;	*See* [9.b], [16.d]—**Burnett-'870** discloses "[o]peration of a conductive coil at about 10 to 20 hertz generating a magnetic field of about 0.25 to 1.5 tesla." Burnett-'870, [0195]. Bikson, ¶¶286-288, 50-53.
[16.g] applying the time-varying magnetic field with a magnetic flux density sufficient to cause a contraction of the patient's muscle within the body region in order to cause a repetitive contraction of the patient's muscle; and	**Burnett-'870 discloses applying the time-varying magnetic field with a magnetic flux density sufficient to cause a contraction of the patient's muscle within the body region in order to cause a repetitive contraction of the patient's muscle.** *See* [9.pre]–[9.a], [9.c], [16.f]—consecutive impulses cause repetitive muscle contraction. Bikson, ¶¶289-291, 45-73.
[16.h] assembling a plurality of magnetic pulses into a train lasting a first time period lasting between 1 second and 30 seconds; wherein the train is followed by a second time period in which no time-varying magnetic field is applied to the patient's muscle.	**Burnett-'870 in view of Magstim teaches assembling a plurality of magnetic pulses into a train lasting a first time period lasting between 1 second and 30 seconds; wherein the train is followed by a second time period in which no time-varying magnetic field is applied to the patient's muscle.** *See* [9.c]—**Burnett-'870** discloses generating a train of pulses, but leaves it to POSITAs to choose the duration of train, and a train duration of 1–30 seconds was known and conventional in the art. *See, e.g.*, Magstim, Fig. 21 (showing "5.0s" for "Duration…for each train."). A POSITA would have been motivated and found it obvious to choose this train duration for patient comfort and to mimic muscle contraction and relaxation. Bikson, ¶¶292-296, 49.

b. Dependent Claims 10-15 and 17-22

Claim Elements	Burnett-'870 in view of Magstim
[10] The method of claim 9, wherein a repetition rate of magnetic pulses of the first train of the two trains differs from a repetition rate of magnetic pulses of a second train.	**Burnett-'870 teaches a repetition rate of magnetic pulses of the first train of the two trains differs from a repetition rate of magnetic pulses of a second train.** **Burnett-'870** discloses "the amplitude and/or firing sequence of coils 26 may be ramped up progressively." Burnett-'870, [0085]. **Burnett-'870** further discloses "adjust[ing] one or more of firing sequence, firing strength or position of coils 26 within coil wrap 20 during the initial setup and also during successive therapy sessions." Burnett-'870, [0087]; *see also id.*, [0023], [0069]–[0070], [0123], [0183], [0188]–[0189], [0193]–[0194], [0196]. **Burnett-'870** further discloses "[a]n apparatus according to the variations described herein may deliver any frequency of stimulation, including low frequencies, high frequencies, and frequencies and ultrahigh frequencies…" Burnett-'870, [0117]. Thus, **Burnett-'870** discloses repetition rates may be adjusted such that they are either higher or lower than the prior repetition rates. To the extent argued that **Burnett-'870** does not explicitly disclose that repetition rates differ from one another, **Burnett-'870** teaches that repetition rates may increase/decrease in response to control so that each applicator generates pulses of different repetition rates over multiple time periods. It was well-understood by a POSITA that supra-maximal muscular stimulation at a continuously high repetition rate will quickly cause fatigue, and thus it would have been obvious to a POSITA to program **Burnett-'870**'s system to generate successive pulse trains by using a high repetition rate to cause a strong contraction and a lower repetition rate in a different pulse train to prevent muscle fatigue. Bikson, ¶¶297-302, 89-93.
[11] The method of claim 10,	**Burnett-'870 teaches assembling each of the first train and the second train into a first burst and a second burst,**

Claim Elements	Burnett-'870 in view of Magstim
further comprising: assembling each of the first train and the second train into a first burst and a second burst, respectively; and applying between 150 bursts and 1,500 bursts to the patient during a treatment.	**respectively; and applying between 150 bursts and 1,500 bursts to the patient during a treatment.** *See* [9.pre], [9.c], [16.g]–[16.h]; [10]—**Burnett-'870** discloses a treatment typically lasts between 15 minutes to 2 hours. Burnett-'870, [0130], [0195]. **Burnett-'870** leaves it to POSITAs to choose the number of bursts applied to the patient during treatment, and applying the number of bursts within the very broad claimed range was known in the art. *See, e.g.*, Johari, [0033]-[0034], [0047] (teaching 360 bursts in a 60 minutes treatment). Bikson, ¶¶303-307, 89-93.
[12] The method of claim 9, further comprising applying the time-varying magnetic fields to the patient and causing incomplete or complete tetanus contraction of at least one of the first muscle and the second muscle.	**Burnett-'870 discloses applying the time-varying magnetic fields to the patient and causing incomplete or complete tetanus contraction of at least one of the first muscle and the second muscle.** *See* [9.c], [16.g]–[16.h], [13]—**Burnett-'870** describes maximal stimulation "maximal stimulation…sufficient to cause contraction of muscle fibers." Burnett-'870, [0227]. A POSITA would have understood that the described maximal stimulation is a type of complete tetanus contraction. Bikson, ¶¶308-312.
[13] The method of claim 9, further comprising relaxing the first and second muscles after the contraction for a period lasting in a	**Burnett-'870 in view of Magstim teaches relaxing the first and second muscles after the contraction for a period lasting in a range of 1 to 15 seconds.** *See* [9.c], [16.h]—**Burnett-'870** discloses a period of no stimulation to allow for relaxation ([0235] and leaves it to POSITAs to determination the relaxation period. Relaxation period between 1 to 15 seconds was well-known and convention. The muscles relax during the wait time following

Claim Elements	Burnett-'870 in view of Magstim
range of 1 to 15 seconds.	the pulses. For example, Magstim's Figure 21 shows configurable wait times. Magstim, 13 (depicting "25s" wait time); *see also* Johari, [0038], [0043] (disclosing a 4 to 5 seconds muscle relaxation period). POSITAs would have been motivated and found it obvious to configure relaxation period in this range in view of this disclosure in order to allow time for the muscle to relax between pulse train to reduce muscle fatigue. Bikson, ¶¶313-319.
[14] The method of claim 9, further comprising: assembling the first train into a first burst; and assembling the second train into a second burst, wherein between 150 and 1,500 bursts are applied to the patient during a treatment.	**Burnett-'870 teaches assembling the first train into a first burst; and assembling the second train into a second burst, wherein between 150 and 1,500 bursts are applied to the patient during a treatment.** *See* [11]. Bikson, ¶¶320-321.
[15] The method of claim 9, wherein each of the magnetic field generating coils includes a core area in a range of 10% to 40% of a total magnetic field generating coil surface.	**Burnett-'870 teaches each of the magnetic field generating coils** (*e.g.*, "coil") **includes a core area in a range of 10% to 40%** (*e.g.*, 12.5%) **of a total magnetic field generating coil surface.** **Burnett-'870** discloses a coil with an inner diameter of 1 inch, and an outer diameter of 3 inches, provides a core area of 12.5% of the total magnetic field generating coil surface projected area. Burnett-'870, [0201]. Bikson, ¶¶322-324.
[17] The method of claim 16, further comprising	**Burnett-'870 teaches** applying 150 to 1,500 bursts to the patient during one treatment.

Claim Elements	Burnett-'870 in view of Magstim
applying 150 to 1,500 bursts to the patient during one treatment.	*See* [11]. Bikson, ¶¶325-326.
[18] The method of claim 16, further comprising applying a plurality of trains to the patient wherein at least two of the plurality of trains differ in a repetition rate, wherein the applicator is connected to a connecting tube, and wherein the connecting tube is connected to a source of oil cooling the magnetic field generating coil.	**Burnett-'870 teaches applying a plurality of trains to the patient wherein at least two of the plurality of trains differ in a repetition rate, wherein the applicator is connected to a connecting tube** (*e.g.*, "coil power line")**, and wherein the connecting tube is connected to a source of oil** (*e.g.*, source of "liquid") **cooling the magnetic field generating coil.** *See* [10]; [9.c], [16.a]**—Burnett-'870** discloses in Figure 35 a path through the "coil power line 365" that directs "fluid cooling" from "logic controller 364" to "coils positioned in the applicator 360" Burnett-'870, [0210]; *see also id.*, [0010], [0215]; [0235]. To the extent argued that **Burnett-'870** does not expressly disclose a source, a POSITA would have been motivated and found it obvious to use a source for the fluid, such that the cooling fluid may be provided. Bikson, ¶¶327-330, 84-88.  Fig. 35
[19] The method of claim 16, wherein the	**Burnett-'870 teaches the applicator comprises a casing** (*e.g.*, "housing") **and a handle located on an upper side of the casing.**

Claim Elements	Burnett-'870 in view of Magstim
applicator comprises a casing and a handle located on an upper side of the casing.	**Burnett-'870** discloses "one or more conductive coils disposed in an ergonomic housing," *e.g.*, "wrap"/"cradle"/"garment." Burnett-'870, [0070], [0074]. **Burnett-'870** further discloses "holding…applicator…in the optimal position." Burnett-'870, [0210]. POSITAs would have been motivated and found it obvious to include a handle on the upper side of the casing of the appliance to assist the user in holding the applicator into position, as was known in the art. *See, e.g.*, Magstim, 5, 20 (disclosing a "coil handle"), Fig. 13 (depicting a shaft as handle for the applicators):  Bikson, ¶¶331-334, 75-77.
[20] The method of claim 19, further comprising generating the time-varying magnetic field with a maximal value of a magnetic flux density derivative of 5 kT/s to 150 kT/s.	**Burnett-'870 teaches generating the time-varying magnetic field with a maximal value of a magnetic flux density derivative of 5 kT/s to 150 kT/s** (*e.g.*, 31.4 to 188 kT/s)**.** **Burnett-'870** discloses "[o]peration of a conductive coil at about 10 to 20 hertz generating a magnetic field of about 0.25 to 1.5 tesla." Burnett-'870, [0195]. **Burnett-'870** incorporates by reference Burnett-'325. Burnett-'870, [0002]. Burnett-'325 discloses that it was known to use a magnetic field having an impulse of "a 50 μs duration." Burnett-'325, [0010]. Because magnetic flux density derivative is calculated based on flux density and impulse duration, this yields a range of 31.4 to 188 kT/s, falling within the claimed range as was well known in the art. *See, e.g.*, Magstim 3-4

Claim Elements	Burnett-'870 in view of Magstim
	(disclosing 4 Tesla and 100μs to 1ms, which yields a flux derivative range of 25.12 to 251.2 kT/s). Bikson, ¶¶335-349, 50-51.
[21] The method of claim 16, further comprising applying a thermal treatment to the body region of the patient.	**Burnett-'870 teaches applying a thermal treatment to the body region of the patient.** *See* [16.a], [18], [22]—the cooling feature of **Burnett-'870**'s device provides thermal treatment on target body region. Bikson, ¶¶350-352.
[22] The method of claim 21 further comprising applying the thermal treatment comprising cooling the body region of the patient using a cooling element having a temperature of between 20° C. and −20° C.	**Burnett-'870 teaches applying the thermal treatment comprising cooling the body region of the patient using a cooling element having a temperature of between 20° C. and −20° C.** *See* [16.a], [18], [21]—**Burnett-'870** leaves it to POSITAs to decide the operation temperature such that the device is not overheated (Burnett-'870, [0215], [0235]), and it was known to cool the adipose tissues or epidermis (in contact with coils of the device) in the range of "-20°C to 20°C". *See, e.g.*, Nanda, [0053], [0066], [0106]. Bikson, ¶¶353-356.

A. Ground 3: Claims 9-22 Are Rendered Obvious by Simon in View of Burnett-'870

Claims 9-22 are rendered obvious by **Simon**—*see* Ground 1. To the extent argued that a length-adjustable positioning member (*e.g.* [16.b]) and connecting tubes for fluid cooling (*e.g.*, [18]) were not well-known or obvious to a POSITA, claims 16, 18 (and dependents) are rendered obvious by **Simon** in view of **Burnett-'870**. Bikson, ¶358.

Simon discloses a magnetic stimulator with two applicators for different applications (*e.g.*, muscle "rehabilitation,"), including on different muscle groups like "ulnar edge of the forearm" for one applicator and "abdomen" for another. Simon, [0031], [0100]-[0102], [0175], [0197], Fig. 4C-4D. These applicators are located within a "housing" in the preferred embodiment such that device "position" is "adjusted" as a whole. Simon, Figs. 3A-3D, 5, [0103], [0123]. To the extent argued that **Simon** is limited to its preferred embodiment, and that the device lacks a length-adjustable positioning member, **Burnett-'870** discloses coils that may be "reversibly or irreversibly adjusted…customizing the location of the applied stimulation to the anatomy and therapy needs of each patient." Burnett-'870, [0071] ("coils may be…movable"); [0087], [0105], §VIII.B.1, Ground-2-[16.b]. For example, **Burnett-'870's** applicators may be attached to a length-adjustable belt where they are "slidable, adjustable, or moveable." Burnett-'870, [0209], [0007]. Bikson, ¶359.

Simon additionally discloses coils may "overheat when used over an extended period of time" such that it was known to use "coil-cooling" mechanisms such as "flowing water or air" or "ferrofluids" (generally oil-based). Simon, [0020]. **Simon** discloses treatments including muscle "[r]ehabilitation" or for "[m]uscle injury," each of which involves an extended treatment period and would be prone to overheating. Simon, [0197]. While **Simon** leaves it to a POSITA to

determine the precise cooling mechanism, to the extent argued **Simon** does not disclose flowing oil from the source through a first/second connecting tube to the first/second applicators, **Burnett-'870** discloses connecting tubes: "coil power line[s]" to direct "fluid cooling" from a "logic controller" to "coils positioned in the applicator." Burnett-'870, [0210]; [0010], [0215]; [0235]; Ground-2-[18]. Bikson, ¶360.

Both **Simon** and **Burnett-'870** are in the same field of endeavor—electromagnetic stimulation of the body—also analogous art to the '634. **Simon** is directed to a "magnetic stimulation device" for muscles; **Burnett-'870** is also directed to a device for muscle "toning" with "coils configured to generate…[a] magnetic field." Simon, title, [0029]-[0030]; Burnett-'870, Abstract, [0003], [0011], [0225]-[0226]. Bikson, ¶361.

A POSITA would have been motivated to apply **Burnett-'870's** teachings of a length-adjustable positioning member in implementing **Simon's** stimulation device. **Simon's** device is suitable for various "body surfaces having…arbitrary orientation" for a "diverse" range of applications including "neck, abdomen, ankle, and head" stimulation and muscle "rehabilitation." Simon, [0036], [0040], [0105], [0197]. In using a length-adjustable positioning member, **Burnett-'870's** device advantageously increases the flexibility of its applicators which may be used in a variety of configurations or "geometrie[s]" based on, *e.g.*, "anatomical location."

E.g., Simon, [0031], [0100]-[0102], [0197]. A POSITA would have had a reasonable expectation of success in applying **Burnett-'870's** teachings of length-adjustable positioning member for muscle rehabilitation, providing greater flexibility of position of **Simon's** applicators to allow use of **Simon's** device for "diverse" applications, *e.g.*, on larger muscle groups like "abdomen" or for symmetrical treatment on muscles on both sides of the body such as buttocks (Simon, [0040], [0100], [0105], Burnett-'870, [0114], Fig. 9A). Bikson, ¶362.

A POSITA would also have been motivated to apply **Burnett-'870's** cooling connecting tube teachings in implementing **Simon's** stimulator to prevent overheating during treatment. **Simon** teaches avoiding patient "discomfort," and further teaches that coil-cooling mechanisms may be used. Simon, [0020], [0123]. **Burnett-'870** similarly discloses "cooling features" in its applicators, e.g., using "liquid cooling" to "cool the coils or applicator." Burnett-'870, [0210], [0215]. **Simon's** device contains a housing that holds electronics and conducting gel (Simon, [0094]), so **Burnett-'870's** connecting tubes would be introduced to **Simon's** device by simply including them within the housing. A POSITA would have been motivated to do so, and had a reasonable expectation of success in implementing **Simon's** system as taught with **Burnett-'870's** liquid-cooling connecting tubes to avoid patient discomfort from overheating, especially for prolonged muscle treatments like "rehabilitation." Simon, [0020], [0197]; Bikson,

¶363.

Thus, a POSITA would have found it routine, straightforward and advantageous to apply **Burnett-'870's** known teachings of independently positioning applicators and a length-adjustable positioning member in implementing **Simon's** magnetic stimulator, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. *See KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007). Bikson, ¶364.

While **Simon** contains embodiments in which coils' electric fields have a synergistic effect (*e.g.*, Simon, [0077]), to the extent "length-adjustable" requires separation of the applicators, a POSITA would nonetheless have been motivated to apply **Burnett-'870's** teachings of a length-adjustable positioning member. **Simon** already discloses "connect[ing] the toroids individually to [a] patient's skin," including with an "insulating gap" between applicators. Simon, [0079]. And **Simon** discloses stimulation of target areas with different geometries, *e.g.*, neck, abdomen, ankle, and head. Simon, [0105]. The underlying principles in **Simon's** are based on "a [single] current-carrying coil" and do not require a synergistic effect from two coils. *E.g.*, Simon, [0068]-[0072]. Accordingly, a POSITA would have understood **Simon's** applicators to be suited for a length-adjustable positioning member and would have been motivated to apply **Burnett-'870's**

teachings to **Simon**. Bikson, ¶¶358-364.

IX. SECONDARY CONSIDERATIONS

'634 Claims are overwhelmingly demonstrated as obvious by the grounds presented herein that cannot be overcome by any alleged objective indicia. Petitioner is aware that Patent Owner presented purported evidence of secondary considerations of non-obviousness in the ITC Case. Because the purported evidence was presented in confidential expert reports, Petitioner does not have access to such evidence. Petitioner reserves the right to respond to any secondary considerations Patent Owner may assert in this proceeding. Bikson, ¶¶365.

X. CONCLUSION

Petitioner respectfully requests IPR of Claims 9-22 of the '634. Bikson, ¶¶366-368.

Dated: August 13, 2021

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(a) and (d), the undersigned hereby certify that the Petition For *Inter Partes* Review complies with the type-volume limitation of 37 C.F.R. §42.24(a)(i) because, exclusive of the exempted portions, it contains 11,106 words as counted by the word processing program used to prepare the paper.

Dated: August 13, 2021

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CERTIFICATE OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. §§42.6(e) and 42.105(b) on the Patent Owner by FedEx of a copy of this Petition for Inter Partes Review and supporting materials at the correspondence address of record for the '634 patent:

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