

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 16/21607

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A61B 5/00 (2016.01) CPC - A61B 5/0002; G06F 19/3418; G06F 19/322 According to International Patent Classification (IPC) or to both national classification and IPC																																		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) CPC: A61B5/0002; G06F19/3418; G06F19/322; A61N1/36003; A61N1/326; A61N1/36014; A61N1/0452; A61N1/0456; A61N1/0476 IPC(8): A61B 5/00 (2016.01)																																		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 600/300; 600/301; 602/2; 607/48; 607/2; 514/907; 702/19; 600/559; 424/134.1; 606/21; 601/1; 607/46; 700/91																																		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Pat Base (AU BE BR CA CH CN DE DK EP ES FI FR GB IN JP KR SE TH TW US WO), Google Patent, Google Scholar; Search terms: target muscle movement pattern group stress stimulate treatment hierarchy set-point biologic first second left right contractile efficiency trunk rotation hip extension injury human body remedy cure therapy order ranking medicine																																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT																																		
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-1300 PCT OSP: 571-272-7774																																	

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-5 and 10-11 directed a method for identifying whether a muscle is in need of treatment within a muscle pattern, and treating a target muscle

Group II: Claims 6-9, directed to a method of increasing a subject's overall muscle efficiency comprising enhancing the overall muscle efficiency by activating the subject's muscles in a macro-pattern hierarchy and kit for reinforcing a target muscle

Group III: Claims 12-15, directed to a method for increasing a subject's muscle contractile capabilities by treating the subject with a predetermined series of treatments based on a hierarchy of 43 movement patterns

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1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-5 and 10-11

- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
 - The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
 - No protest accompanied the payment of additional search fees.

****continuation of Box III (Lack of Unity)****

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special technical features:

Group I does not require a method and kit for reinforcing a target muscle group's contractile efficiency and hence the subject's overall muscle efficiency; instructions for reinforcing a target muscle group's contractile efficiency based on a hierarchical macro-pattern for that target muscle group and a hierarchical micro-pattern within that target muscle group; and exercise equipment/activation appropriate to reinforce the target muscle group's contractile efficiency and hence the overall muscle efficiency; wherein use of the exercise equipment is provided to be coordinated with the instructions specific for each target muscle group, as required by Group II.

Group II does not require a method for identifying whether a muscle is in need of treatment within a muscle pattern, and treating a target muscle; determining a movement pattern within which the target muscle belongs; applying a specific/appropriate stress to a first muscle/primary left muscle in the identified muscle group/ identified pattern within which the target muscle belongs, wherein the first muscle/primary left muscle has a highest priority in an established hierarchy of muscles within the muscle group; determining whether the first muscle/primary left muscle is in need of treatment based on the first muscle's/primary left muscle's response to the specific/appropriate stress; administering treatment to the first muscle/left primary muscle if the first muscle requires treatment and moving to a second muscle/right primary muscle in the established hierarchy/pattern of muscles within the muscle group; continuing to apply an appropriate/specific stress and treatment for the pattern to each muscle in the bilateral hierarchy predetermined for the pattern, determine if the target muscle requires treatment and if it does apply treatment, until the target muscle has an appropriate stress applied and receives treatment; wherein treatment to the target muscle results in an increase in the muscle's set point or requires an application of a biologic to the target muscle, as required by group I.

Group I does not require a method for increasing a subject's muscle contractile capabilities by treating the subject with a predetermined series of treatments based on a hierarchy of 43 movement patterns wherein the subject is treated in a bilateral ordered fashion from pattern 1 through pattern 43, as required by group III.

Group III does not require a method for identifying whether a muscle is in need of treatment within a muscle pattern, and treating a target muscle; determining a movement pattern within which the target muscle belongs; applying a specific/appropriate stress to a first muscle/primary left muscle in the identified muscle group/ identified pattern within which the target muscle belongs, wherein the first muscle/primary left muscle has a highest priority in an established hierarchy of muscles within the muscle group; determining whether the first muscle/primary left muscle is in need of treatment based on the first muscle's/primary left muscle's response to the specific/appropriate stress; administering treatment to the first muscle/left primary muscle if the first muscle requires treatment and moving to a second muscle/right primary muscle in the established hierarchy/pattern of muscles within the muscle group; continuing to apply an appropriate/specific stress and treatment for the pattern to each muscle in the bilateral hierarchy predetermined for the pattern, determine if the target muscle requires treatment and if it does apply treatment, until the target muscle has an appropriate stress applied and receives treatment; wherein treatment to the target muscle results in an increase in the muscle's set point or requires an application of a biologic to the target muscle, as required by group I.

Group II does not require a method for increasing a subject's muscle contractile capabilities by treating the subject with a predetermined series of treatments based on a hierarchy of 43 movement patterns wherein the subject is treated in a bilateral ordered fashion from pattern 1 through pattern 43, as required by group III.

Group III does not require a method and kit for reinforcing a target muscle group's contractile efficiency and hence the subject's overall muscle efficiency; instructions for reinforcing a target muscle group's contractile efficiency based on a hierarchical macro-pattern for that target muscle group and a hierarchical micro-pattern within that target muscle group; and exercise equipment/activation appropriate to reinforce the target muscle group's contractile efficiency and hence the overall muscle efficiency; wherein use of the exercise equipment is provided to be coordinated with the instructions specific for each target muscle group, as required by group II.

Common technical features:

Group I and II share the technical feature of hierarchical pattern within a muscle group; increase/reinforce the muscle's set point/efficiency. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is being obvious over US 5,434,142 A to Antoku et al. (hereinafter Antoku), in view of US 2004/0040183 A1 (Kerrigan).

Antoku teaches hierarchical pattern within a muscle group (col 4, ln 35 to col 5, ln 25; tables 1 and 2; The 18 muscle groups shown in Table 1 were evaluated for muscle strength according to the criteria shown in Table 2. The hierarchical pattern is hence shown in these tables). However, Antoku does not teach increase/reinforce the muscle's set point/efficiency. Kerrigan, on the other hand, teaches increase/reinforce the muscle's set point/efficiency (para [0010]; abstract; improve biomechanical muscle efficiency). Therefore, it would have been obvious to one ordinary skilled in the art to improve muscle efficiency, as taught by Kerrigan; with the hierarchical pattern within a muscle group that Antoku teaches; in order to reduce the tendency for musculoskeletal injury (Kerrigan; abstract).

Group I and III share the technical feature of an increase in the muscle's set point/capabilities; treating the subject with a predetermined series of treatments based on a hierarchy; and movement patterns.

However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is being obvious over US 2010/0174161 A1 (Lynn), in view of Kerrigan. Lynn teaches treating the subject with a predetermined series of treatments based on a hierarchy (para [0057], [0059]; The process proceeds by organizing the multiple data streams defining the input into a hierarchy of time series objects in an object based data structure, analyzing and comparing objects along and across time series, organizing and summarizing the output, animating and presenting the summarized output and taking action based on the output. Taking action can include treatment); and movement patterns (para [0173]; To recognize a negative pattern the program, iterates through the data and recognize events and then identifies event relationships to define the patterns. The system uses polarities (as defined by the direction of parameter movement in a positive or negative direction) to test for condition).

****please see the next page for continuation****

continuation of previous page (Box III (Lack of Unity))

However, Lynn does not teach an increase in the muscle's set point/capabilities. Kerrigan, on the other hand, teaches an increase in the muscle's set point/capabilities (para [0010]; abstract; improve biomechanical muscle efficiency). Therefore, it would have been obvious to one ordinary skilled in the art to improve muscle efficiency, as taught by Kerrigan; with treating the subject with a predetermined series of treatments based on a hierarchy that Lynn teaches; in order to reduce the tendency for musculoskeletal injury (Kerrigan; abstract).

Group II and III share the technical feature of increasing/reinforcing a subject's muscle contractile capabilities; hierarchical pattern. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is being obvious over Antoku, in view of WO 2013/177428 A1 to Valerion Therapeutics, Inc. (hereinafter Valerion).

Antoku teaches hierarchical pattern (col 4, ln 35 to col 5, ln 25; tables 1 and 2; The 18 muscle groups shown in Table 1 were evaluated for muscle strength according to the criteria shown in Table 2. The hierarchical pattern is hence shown in these tables). However, Antoku does not teach increasing/reinforcing a subject's muscle contractile capabilities. Valerion, on the other hand, teaches increasing/reinforcing a subject's muscle contractile capabilities (pg 3, ln 1-2; abstract; increasing muscle contractility in MTM patients). Therefore, it would have been obvious to one ordinary skilled in the art to increasing muscle contractility in patients, as taught by Valerion; with treating the subject with the hierarchical pattern that Antoku teaches; in order to treat myotubular myopathy (Valerion; pg 2, ln 27-29).

Groups I-III share the technical feature of increase muscles capabilities/efficiency; and pattern. However, these shared technical features do not represent a contribution over prior art, because the shared technical feature is being anticipated by Valerion. Valerion teaches increase muscles capabilities/efficiency (pg 3, ln 1-2; abstract; increasing muscle contractility in MTM patients); and pattern (pg 15, ln 5-15; pattern of glycosylation).

Groups I-III, therefore, lack unity under PCT Rule 13.2, because they do not share a same or corresponding special technical feature providing a contribution over the prior art.