

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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THERABODY, INC.  
Petitioner

v.

HYPERICE IP SUBCO, LLC  
Patent Owner.

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Case No. PGR2025-00013  
U.S. Patent No. 11,938,082

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**DECLARATION OF JOHN D. PRATT, PH.D.,  
IN SUPPORT OF PETITION FOR POST GRANT REVIEW  
OF U.S. PATENT NO. 11,938,082**

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## **I. INTRODUCTION**

1. I have been retained as an expert witness by the law firm of O'Melveny & Myers LLP, counsel for Petitioner Therabody, Inc. ("Therabody" or "Petitioner"), as an independent expert in this proceeding before the Patent Trial and Appeal Board ("PTAB" or "Board").

2. I understand that Therabody is requesting that the Board institute a post grant review ("PGR") proceeding of Claims 1-18 of U.S. Patent No. 11,938,082 ("the '082 Patent") (Ex-1001), currently assigned to Hyperice IP Subco, LLC ("PO").

3. I am not and have never been an employee of Therabody. WIT Legal, LLC is being compensated at my usual and customary rate of \$850 per hour. No part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding.

4. I have been asked to provide my independent analysis of Claims 1-18 of the '082 Patent and whether they satisfy the requirements of 35 U.S.C. §§ 112. I have also been asked to provide my independent analysis of Claims 1-4, 7, 9-11, 13, and 18 of the '082 Patent in light of the prior art publications cited below. I have also been asked to consider the state of the art and prior art available as of July 1, 2013. It is my opinion that Claims 1-18 of the '082 Patent are unpatentable for the reasons provided below.

**A. Qualifications and Experience**

5. I have a Bachelor's degree and a Master's degree in Mechanical Engineering from California State University, Fullerton, and a Ph.D. in Civil Engineering with a field of study in Structural Mechanics from the University of California, Irvine. My doctoral dissertation focused almost exclusively on the behavior of fasteners in flush-fastened joints. A copy of my CV is attached here as Exhibit 1003.

6. During my time in industry and in my subsequent consulting practice I have gained extensive experience with various manufacturing techniques, including metal forming and machining as well as molding and 3D printing of plastic parts. I have worked on the development of numerous structures, such as permanent and temporary fasteners, and their related tooling and equipment, for the aerospace, industrial and sporting goods markets from August 1969 through the present. I am the named inventor on 48 United States patents, six of which concern mechanisms for aircraft applications, and many more counterpart foreign patents. Devices made in accordance with my patents have been very successful, estimated to result in well over \$400 million in sales.

7. I served as the senior engineering executive for three medium-sized aerospace hardware companies from early 1979 through mid-2005. As an example, I served as Vice President for Research & Development at Cherry Textron from

about 1991-2000. While in that position, I had primary responsibility for research, new product development, existing product engineering, product testing, and product qualification to Industry and Government/Military specifications and agencies. The products for which I was responsible included consumer products (quick-change axles for in-line skates, threaded fasteners used to attach spikes to track and field shoes), machine screws and bolts for use in military aircraft, and a wide variety of other aerospace fasteners. I was also responsible for intellectual property matters related to the company's research and development efforts. Further, I was responsible for analyzing competitors' patents to avoid infringement and to determine the novelty of new engineering concepts.

8. During my time in the fastener industry, I served as an active member of several fastener standards organizations, including the Aero-Mechanical Fasteners Requirements Group AMFRG (U. S. Air Force MIL-STD-1515), National Aerospace Standards Committee NASC, International Standards Organization (as International Chairman of ISO/TC20/SC4/WG8 for rivets, blind fasteners, threaded and swage pin-collar fasteners), Fastener Testing and Development Group FTDG (U.S. Navy, MIL-STD-1312), Fastener Engineering for Optimum Performance Standards FEOPS (U.S. Navy), MIL-HDBK-5 (DoD), MMPDS (DoD/FAA), and Industrial Fasteners Institute IFI (as Chairman of its Aerospace Fastener Technical Committee). While with the IFI I helped lead the development of TSO-C148 at the

Federal Aviation Administration (“FAA”) for fasteners used in commercial transport aircraft.

9. Between 1972 and 1979 I worked on the design and development of, among other things, air-driven fastener installation tools. These included pneumatic tools such as the Olympic RV51G and air-over-hydraulic tools, such as the Olympic RV60G. These tools incorporate one or more shifting or rotatable valves used to direct the flow of fluids (air and/or hydraulic fluid) through channels in the tool’s housings and between chambers.

10. Between 1979 and mid-2000 I was focused on design and product engineering of aerospace fasteners and clamping mechanisms, as well as the air-driven tools needed to install them.

11. Between mid-2000 and late 2017, I worked on the development of mechanical and electro-mechanical latching and locking devices for aircraft, as well as development of fluid-driven tools for installation of aircraft assembly clamps. For example, in 2001, I co-invented and led the development of intrusion-resistant mechanical and electronic/electrical latches for flight deck doors and decompression panels. The mechanical versions of these latches have now been installed in half the world’s fleet of commercial transport aircraft after the events of September 11, 2001. During this period, I was also intimately involved in the design and development of permanent and temporary fasteners for new aircraft.

12. In summary, my entire professional career has been spent designing and overseeing the fabrication of mechanisms and components for mechanical devices. These parts involved kinematic and stress analysis using both conventional closed form mathematical methods and sophisticated linear and nonlinear finite element methods employing specialized codes from Lawrence Livermore National Laboratory (for whom I served as a collaborator on the software) as well as state-of-the-art commercial software. My engineering work also relied heavily on characterization of materials behavior including research and practical experience with various forming, machining, casting and compression/injection molding of various materials, including those used in the hinge components at issue in this investigation.

13. During my time with the Hartwell Corporation the mechanisms over which I had engineering responsibility were flight critical aerospace mechanisms requiring certification by aircraft government certification officials, and so were in effect life-safety devices. The flightdeck door and decompression panel latch mechanisms of which I was a named inventor and had responsibility for development, were implemented on half the world's fleet of commercial transport aircraft after extensive testing and certification by airworthiness authorities. These mechanisms comprised many dozens of precisely engineered components and after qualification and certification testing were implemented into the flightdeck doors of

Boeing, Embraer, Bombardier, Douglas and other manufacturer's aircraft in the years following 9/11.

14. Finally, my work on various industry and government standards and mechanism-related committees has provided above average insight into the workings of consensus standards committees.

15. I have also served as an expert in recent patent litigation concerning captive panel fasteners, reversible electric strike mechanisms, magnetic door locks, reversible mortise locks, pressure responsive electrical switches, bulk scrap metal loading apparatus, shear wall reinforcement panels, keyboard support mechanisms, hurricane abatement systems, outdoor lighting fixtures, mint and toothpick dispensers, storm drain covers, box spring stapling machines, hook and loop fasteners, corded and cordless window coverings, folding lawn chairs, electrically-locked gun safes, television consoles, threaded dental implants, combat helmets, and low profile aircraft engine nacelle latches, among other devices.

16. I am presently the Principal of Argos Forensic Engineering, a company I founded in June 2005 to provide product development support and litigation consulting. My focus since late 2017 has been litigation consulting on a part-time basis.

**B. MATERIALS CONSIDERED**

17. In forming my opinions, I reviewed the following documents, in addition to others I have cited in my declaration. I also relied on my own knowledge of and experience in the field of mechanical engineering and rotating or reciprocating mechanisms.

| Ex. No. | Description                                                                                                                                                                            |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex-1001 | U.S. Patent No. 11,938,082 (“the ’082 Patent”)                                                                                                                                         |
| Ex-1003 | Curriculum Vitae of Dr. John Pratt                                                                                                                                                     |
| Ex-1004 | Prosecution History of the ’082 Patent (Application No. 18/515,112)                                                                                                                    |
| Ex-1005 | U.S. Patent No. 4,513,737 (“Mabuchi”)                                                                                                                                                  |
| Ex-1006 | U.S. Patent No. 6,432,072 (“Harris”)                                                                                                                                                   |
| Ex-1007 | U.S. Patent No. 6,682,496 (“Pivaroff”)                                                                                                                                                 |
| Ex-1008 | U.S. Patent Application Publication No. 2003/0195443 (“Miller”)                                                                                                                        |
| Ex-1009 | U.S. Patent Application Publication No. 2007/0150004 (“Colloca”)                                                                                                                       |
| Ex-1010 | Taiwanese Patent Number 9,720,7752U (“Wang”)                                                                                                                                           |
| Ex-1011 | Certified English Translation of Wang                                                                                                                                                  |
| Ex-1012 | U.S. Patent No. 2,550,775 (“Clark ’775”)                                                                                                                                               |
| Ex-1013 | Prosecution History of U.S. Patent No. 11,857,482 (Application No. 17/681,367)                                                                                                         |
| Ex-1014 | U.S. Patent No. 3,007,504 (“Clark”)                                                                                                                                                    |
| Ex-1015 | Hyperice’s P.R. 4.2 Exchange of Claim Terms for Construction and Extrinsic Evidence, <i>Hyper Ice Inc. v. Joicom Corporation</i> , No. 8:24-cv-00098-JWH-DFM (C.D. Cal. Nov. 25, 2024) |

| Ex. No. | Description                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex-1016 | Defendant Therabody, Inc.’s First Amended P.R. 4-2 Identification of Preliminary Claim Constructions, <i>Hyper Ice, Inc. et al v. Therabody, Inc.</i> , No. 8:24-cv-00390-JWH-DFM (C.D. Cal Dec. 17, 2024) |
| Ex-1017 | Appendix B1 – Claim Mapping Chart                                                                                                                                                                          |
| Ex-1018 | Appendix B2 – Claim Mapping Chart                                                                                                                                                                          |

## II. RELEVANT LEGAL STANDARDS

18. In forming my opinions and considering the subject matter of the ’082 Patent and its claims, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

### A. Anticipation

19. I understand that earlier publications and patents may act to render a patent unpatentable for one of two reasons: (1) anticipation, and (2) obviousness.

20. It is my understanding that the claims of a patent are anticipated by a prior art reference if each and every element of the claim is found either explicitly or inherently in the reference. I understand that inherency requires a showing that the missing descriptive matter in the claim is necessarily present in the allegedly anticipating reference, and that it would have been so recognized by a person of ordinary skill in the art (“POSITA”).

21. I understand that when a challenged claim covers several structures, either generically or as alternatives, the claim is deemed anticipated if any of the structures within the scope of the claim is found in the prior art reference.

22. Although anticipation typically involves the analysis of a single prior art reference, I understand that additional references may be used to show that the prior art reference has enabling disclosure (i.e., allows a POSITA to make the invention without undue experimentation), to explain the meaning of a term used in the prior art reference, and/or to show that a characteristic is inherent in the prior art reference.

**B. Obviousness**

23. I understand that a claim is invalid as obvious if it would have been obvious to a person of ordinary skill in the art at the time the alleged invention was made. This means that even if all of the elements of the claim cannot be found in a single prior art reference that would anticipate the claim, a person of ordinary skill in the art who was aware of the prior art would have been able to come up with the claimed invention. This may be the case, for example, where the missing element represents only an insubstantial different over the prior art or a reconfiguration of a known system. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all material prior art.

24. I understand that an obviousness analysis requires an understanding of the scope and content of the prior art, any differences between the alleged invention and the prior art, and the level of ordinary skill in evaluating the pertinent art.

25. I understand that when a product is available, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique would have been obvious.

26. I understand that whether a prior art reference renders a patent claim unpatentable as obvious is determined from the perspective of a person of ordinary skill in the art at the time of the alleged invention. I have been told that there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, but a suggestion to combine known elements to achieve the claimed invention may come from the prior art, as filtered through the knowledge of one skilled in the art. In addition, I have been told that the inferences and creative steps a person of ordinary skill in the art would employ are relevant to the determination of obviousness.

27. I understand that one may consider, e.g., whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; (3) the claimed innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art; (5) the invention merely substituted one known element for another known element in order to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results; or (7) known work in one field of endeavor may have prompted variations of it for use in either the same field or a different one based on design incentives or other market forces that would have been predictable to a person of ordinary skill in the art.

28. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of the invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the

alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—that is, a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

29. I am not aware of any allegations by the named inventors of the '082 Patent or any assignee of the '082 Patent that any secondary considerations tend to rebut the obviousness of the '082 Patent.

30. Additionally, I understand that in considering obviousness, it is important not to use the benefit of hindsight derived from the patent under consideration.

### **C. Written Description**

31. I understand a patent claim is invalid if the patent fails to provide adequate description of the alleged inventions. I am informed that this standard is set forth in 35 U.S.C. § 112(a), which has been reproduced below:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

32. I am informed that to satisfy the written description requirement, the specification must convey with reasonable clarity to those skilled in the art that, as of the priority date sought, the inventor was in possession of the invention. I understand that the invention is, for purposes of the written description inquiry, whatever is claimed. I further understand that the description must do more than merely disclose that which would render the claimed invention obvious. I understand that an applicant shows possession of invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. A mere wish or plan for obtaining the claimed invention is not an adequate written description. I am informed that the subject matter of the claim need not be described using language identical to that in the claim in order for the disclosure to satisfy the description requirement.

**D. Indefiniteness**

33. I have been informed and understand that a patent claim is indefinite and therefore invalid if the claim, read in light of the patent specification and the prosecution history, fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. I understand that claims must particularly and distinctly set out what is claimed so that the public has fair notice of the claimed

invention. I also understand that each term in a claim must find clear support or antecedent basis in the specification

**E. Level of Ordinary Skill in the Art**

34. When interpreting a patent, I understand that it is important to identify the relevant art pertaining to that patent, as well as the level of ordinary skill in that art at the time of the claimed invention. The “art” is the field of technology to which the patent is related.

35. I am informed and understand that the POSITA is a hypothetical person who is presumed to know the relevant prior art. I understand that the actual inventor’s skill is not determinative of the level of ordinary skill. I further understand that factors that may be considered in determining level of skill include: (i) the types of problems encountered in the art; (ii) prior art solutions to those problems; (iii) the rapidity with which innovations are made; (iv) the sophistication of the technology; and (v) the educational level of active workers in the field. I understand that not all such factors may be present in every case, and one or more of them may predominate.

36. I understand that a POSITA is one who is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity.

37. A person of ordinary skill in the art at the relevant time, which I have been told to consider as July 1, 2013 (“POSITA”) would have had a bachelor’s degree in mechanical engineering, or a related field, and two-to-three years of experience in the research, design, development, or testing of rotating or reciprocating mechanisms. A higher level of education or skill might make up for less experience, and vice versa.

38. Based on my knowledge, skill, and experience, I have an understanding of the capabilities of a person of ordinary skill in the relevant art. For example, from my industry experience, I am familiar with what an engineer engaged in the design of connectors for percussive massage device would have known and found predictable in the art. Furthermore, I would have, at least, met the criteria for a POSITA on July 1, 2013, and I still exceed it today

#### **F. Claim Construction**

39. I understand that the United States Patent and Trademark Office interprets claim terms in a post grant review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of a POSITA at the time of the alleged invention.

40. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of

the specification and the prosecution history pertaining to the patent. I understand, however, that claims terms are generally not limited by the embodiments described in the specification.

41. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

42. I have reviewed both Petitioner's and Patent Owner's identification of preliminary claim constructions for the "quick-connect system" and "substantially cylindrical" limitations in the challenged claims. Ex-1015, 1016. The prior art discussed in Section VII of my declaration would render the claims obvious under any of the proposed constructions.

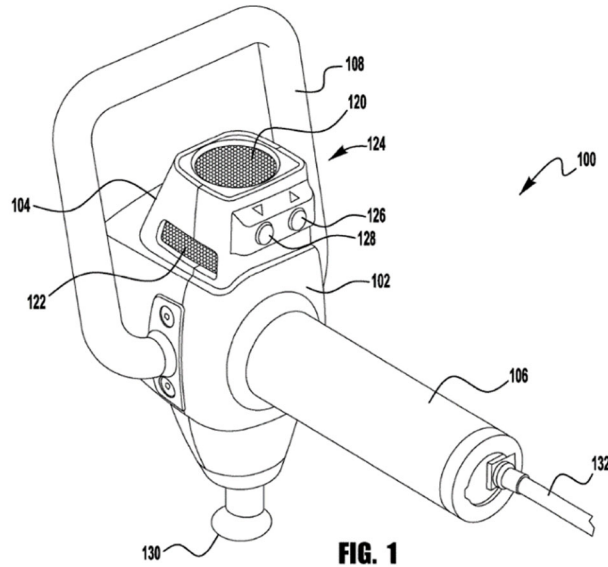
### III. SUMMARY OF GROUNDS

| Ground | Summary                                                                                                                                                                                                  |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Claims 1-18 are unpatentable under 35 U.S.C. § 112 based on lack of written description support.                                                                                                         |
| 2      | Claims 13-16 are unpatentable under 35 U.S.C. § 112 as indefinite.                                                                                                                                       |
| 3      | Claims 1, 7, 9-11, 13, and 18 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent No. 4,513,737 (“Mabuchi”) (Ex-1005) in view of U.S. Publication No. 2007/0150004 (“Colloca”) (Ex-1009). |
| 4      | Claims 2-4 are unpatentable under 35 U.S.C. § 103 as obvious over Mabuchi in view of Colloca, further in view of U.S. Patent No. 6,432,072 (“Harris”) (Ex-1006).                                         |
| 5      | Claims 1, 7, 9-11, 13, and 18 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent No. 6,682,496 (“Pivaroff”) (Ex-1007) in view of U.S. Patent No. 3,007,504 (“Clark”) (Ex-1014).          |
| 6      | Claims 2-4 are unpatentable under 35 U.S.C. § 103 as obvious over Pivaroff in view of Clark, further in view of Harris.                                                                                  |

### IV. THE '082 PATENT

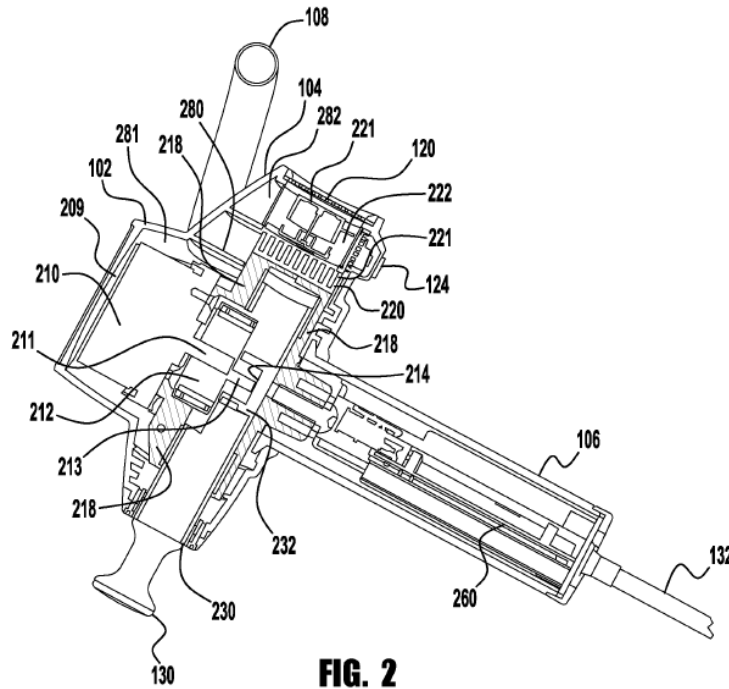
#### A. Overview of the '082 Patent

43. The '082 Patent describes a massaging device 100 with a housing that includes a main housing 102 and upper housing 104, first and second handles 106, 108, and a massaging head 130 attached to a piston, as shown below in Figure 1. Ex-1001, 3:34-41. A “control panel” 124 contains two pushbuttons 126, 128 that are described as adjusting between preset speeds and turning the device on and off. *Id.* at 3:45-4:3.



**Ex-1001, Fig. 1**

44. As shown in Figure 2 below, internally, massage device 100 includes a motor 210 connected to a flywheel 212 that drives the piston 230, which in turn drives the massaging head 130. *Id.* at 4:41-51; *see also* Fig. 4 (showing exploded view of piston 230 and flywheel 212). The rotation of flywheel 212 causes the piston 230 to move reciprocally in a longitudinal direction. *Id.* at 4:63-5:2.



**Ex-1001, Fig. 2**

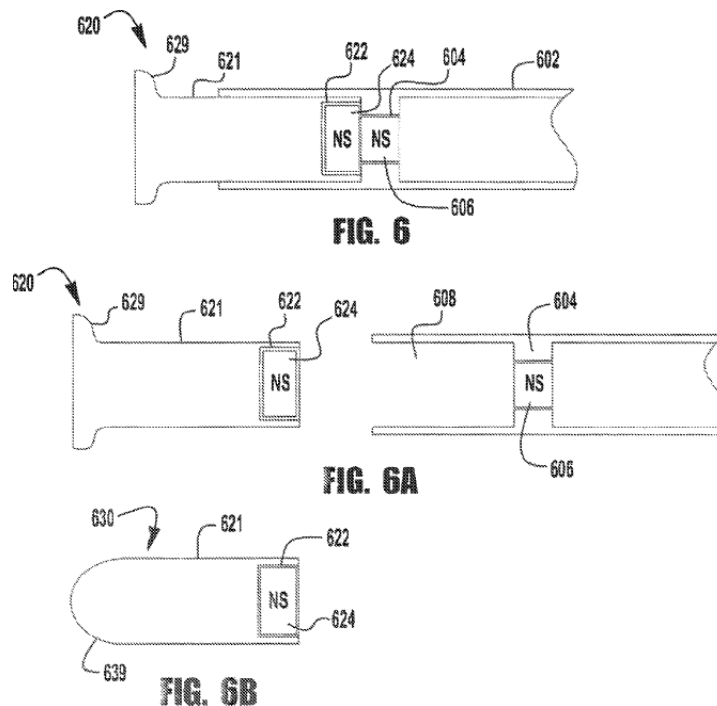
45. The '082 Patent also explains that “it may be desirable to switch massaging heads to work on different muscles or different portions of muscles during the massage.” *Id.* at 6:49-53. To this end, the '082 Patent discloses a “quick-connect system [that] allows a user to quickly switch massaging heads,” even “without turning off the massaging device.” *See id.*, 6:47-7:19, Figs. 6, 6A, 6B.

46. The '082 Patent’s “quick-connect system” uses magnets, as shown in Figures 6, 6A, and 6B, below.<sup>1</sup> In that quick-connect system, the piston 602 “has a

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<sup>1</sup> The massaging head embodiment 630 shown in Figure 6B is described as “substantially the same as massaging head 620 [in Figure 6A] except that the head portion 639 has a different shape than head portion 629 of massaging head 620.” *Id.* at 7:15-19.

hollow-end bore 608 for receiving the shaft 621 of a massaging head 620.” *Id.* at 6:57-59. A “cylindrical seat 604” located within piston 602 and a “cylindrical pocket 622” of the massaging head 620 each contain magnets (606, 624, respectively, labeled with “NS” to show polarity). *Id.* at 6:60-67. The ’082 Patent describes that, “when the shaft 621 of massaging head 620 is slid into opening in bore 608, the magnets 606 and 624 are attracted to one another and magnetically hold massaging head 620 firmly in place.” *Id.* at 6:67-7:3.



**Ex-1001, Figs. 6, 6A, 6B**

47. The ’082 Patent describes that, in this “quick-connect system,” the “strength of the magnets 606, 624 are sized to prevent the massaging head 620 from separating from the piston 602 during normal use, and yet allow a user to quickly

remove and replace the massaging head.” *Id.* at 7:6-9. Accordingly, to “remove massaging head 620, a user need only apply a sufficient amount of force to separate the two magnets 606, 624.” *Id.* at 7:4-6. Additionally, the end of the massaging head 620 may be “rounded, pointed or tapered . . . to allow it to easily slip into the opening 608 even while the piston 608 is moving.” *Id.* at 7:9-14.

**B. The Priority Date for the '082 Patent**

48. I understand that the application that issued as the '082 Patent was filed as Application No. 18/515,112 (“the '112 application”) on November 20, 2023. Ex-1001, Cover. The '112 application claims priority as a continuation of U.S. Patent Application No. 18/466,702, filed on September 13, 2023, which is a continuation of U.S. Patent Application No. 17/681,367, filed on February 25, 2022, which is a continuation of U.S. Patent Application No. 15/892,665, filed on February 9, 2018, which is a continuation of U.S. Patent Application No. 14/317,573, filed on Jun. 27, 2014. *Id.* It also claims priority to provisional patent application no. 61/841,693, filed on July 1, 2013. *Id.*

49. I have been asked to consider July 1, 2013, as the priority date for the '082 Patent.

**C. Prosecution History of the '082 Patent**

50. I have reviewed the prosecution history of the application that led to the '082 Patent. *See* Ex-1004.

51. In a January 19, 2024 Non-Final Office Action, the Examiner rejected Claims 1-8, 10-11, and 13-18 on the ground of nonstatutory double patenting over claims of U.S. Patent No. 11,857,482 (“the ’482 Patent”). Ex-1004 at 90-93. The Applicants filed a terminal disclaimer over the ’482 Patent to overcome this rejection. *Id.* at 121.

52. The Examiner also rejected Claim 18 as being indefinite, and the Applicants amended Claim 18 by adopting the language suggested by the Examiner. Ex-1004 at 90-91 (Jan. 19, 2024 Non-Final Office Action); 117-120 (Jan. 23, 2024 Amendment). No other claims were amended or added.

53. In a February 15, 2024 Notice of Allowance, the Examiner stated that the closest prior art of record are Pivaroff, Rhoades and Colloca. Ex-1004 at 1894. The Examiner also stated that Pivaroff, Rhoades, and Colloca did not disclose the claimed “quick-connect system” of Claim 1 because “Pivaroff does not disclose a quick-connect system configured to allow a massaging head to be secured or connected to the percussive massager while the piston reciprocates,” “[w]hile Rhoades discloses a quick-connect system that uses magnetic coupling that *might* allow for a massage head to attach to a piston while the piston reciprocates, Rhoades does not disclose the claimed structure of the quick release connection system – namely a bore at the distal end of a piston (claims 1 and 18), wherein a massaging head is configured to be inserted into or removed from the bore,” and “Colloca does

not disclose the bore as located at the distal end of a *piston* . . . [and] inserting or removing the impact head from the *bore while a piston reciprocates*.” *Id.* at 1894-1895 (emphases in original).

## **D. The State of the Art**

### **1. Connectors**

54. At the time the '082 Patent was filed, many different types of connectors not requiring a tool were known, including spring-biased ball detents (“Pip Pins”), magnets, threaded fasteners, bayonet connectors, quarter-turn mechanisms, over-toggle hook mechanisms and hook & loop fasteners.

55. Ball-type fasteners typically comprise a metal ball captured in a transverse hole at a distal end of a cylindrical shaft and generally come in two types—non-locking and locking. In the non-locking type, a spring biased ball typically extends beyond the outer periphery of the shaft until depressed when the shaft is inserted into a close fitting cylindrical pocket in the mating part. As insertion progresses the ball is eventually allowed to extend into a recess, securing the two parts together. In the locking-type connector the ball typically extends beyond the outer periphery of the shaft until a spring biased plunger is actuated to allow the ball to retract so the shaft can be inserted into a close fitting cylindrical pocket in the mating part. Once the ball exits the far side of the mating part the plunger is released

allowing the ball to expand, locking the parts together. Depressing the plunger allows the parts to be readily separated.

56. Magnetic connectors comprise a magnet on at least one of the two objects to be joined. These types of connectors are ubiquitous even today for driving threaded fasteners, such as screws, with patents dating to at least mid-1949<sup>2</sup> for a magnetic screw driver in which steel screwdriver bits are manually attachable to and removable from a bar magnet inside a tool holder.

57. Over-toggle connectors are also widely used on vehicles, and in particular aircraft. A Boeing B757 for example has well over a thousand manually-operated connectors used to secure everything from engine nacelle fan doors and thrust reversers, to overhead bins for carry-on luggage. Most of these connectors comprise over-toggle hook mechanisms that are actuated by a rotating lever handle or by pushing a release button.

58. Hook and loop fasteners are also widely used. First patented in 1955 and popularized under the brand Velcro™, hook and loop fasteners are used on everything from diapers to aircraft interiors to provide easy attachment and detachment of two or more items.

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<sup>2</sup> See Ex-1012 (U.S. Patent No. 2,550,775) (“Clark ’775”).

## **2. “Quick Connect System”**

59. The '082 Patent does not expressly define the term “quick-connect system” as recited in the claims and contained in the embodiment shown in Figure 6. Ex-1001, 6:47-49. As discussed further below, the '082 Patent's specification discloses only a single type of “quick-connect system”: one using magnets to secure the massaging head to the piston.

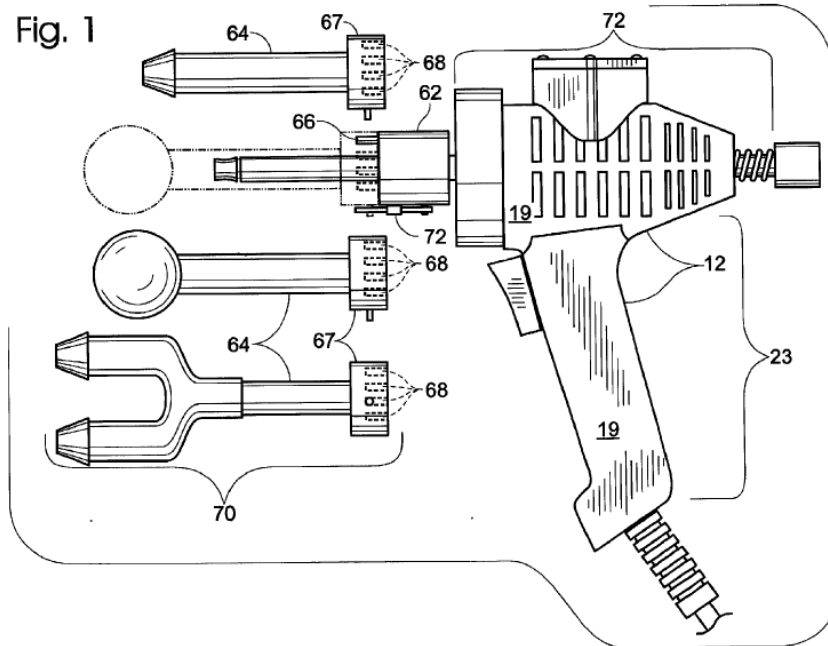
## **3. Connectors on Percussive Massage Devices**

60. A range of connectors have long been employed to attach massaging heads to percussive massage devices.

61. For example, as discussed further herein, Mabuchi (Ex-1005, U.S. Patent No. 4,513,737) discloses a pair of composite magnetic assemblies—one in a padder (massaging head) and one on the distal end of an actuator (reciprocating piston)—that are used to attach the padder to the actuator. The composite magnetic assemblies are comprised of radially oriented alternating polarity magnets—North/South/North/South (“NSNS”). The poles of the magnets on the massaging head, which become attracted and attached to the opposite polarity on the mating magnet on the shaft, are oriented such that rotating the massage head 90-degrees misaligns the oppositely oriented poles to cause separation. Ex-1005, 8:40-43 (“The changing of the padder assembly 6 can be easily accomplished since the actuator 4

and the patter assembly 6 are automatically disconnected merely by turning each other.”).

62. As another example, the Applicants amended claims of an earlier related patent, U.S. Patent No. 11,857,482 (“the ’482 Patent”), during prosecution to distinguish the prior art combination of U.S. Patent No. 5,134,777 to Meyer (“Meyer”) in view of a blog post to Instructables.com (“Instructables”), and further in view of U.S. Publication No. 2003/0195443 to Miller (“Miller”). Ex-1013 at 2350, 2353. Miller (Ex-1008), filed on April 12, 2002, describes a “chiropractic adjustment tool or tapper, which, generally, comprises a housing, with or without a handle and a motor or power source to drive an axially reciprocating rod.” Ex-1008 ¶6. One end of the reciprocating rod “extends from the housing” with an “impact head with a coupler for the mounting of one or more impact heads.” *Id.* The coupler 62, shown below in Figure 1, “is used for affixing impact heads 70 of varying shapes,” and “is formed so as to permit the impact head 70 to be removably affixed to the reciprocating rod 16 at a set, but adjustable angle.” *Id.* ¶26.



**Ex-1008, Fig. 1**

63. Another prior art reference, U.S. Publication No. 2007/0150004 to Colloca (“Colloca”) was filed on December 5, 2006. As discussed further herein, Colloca (Ex-1009) discloses a chiropractic adjusting instrument 10 with a “thrust nose piece 130” and an opening 20, as shown in Colloca’s Figure 2 below. Ex-1009 at ¶¶33-34. An impact head 70 includes an “impact coupler” that is “typically a soft material such as an o-ring to form a press fit with the thrust nose piece 130.” *Id.* at ¶56.

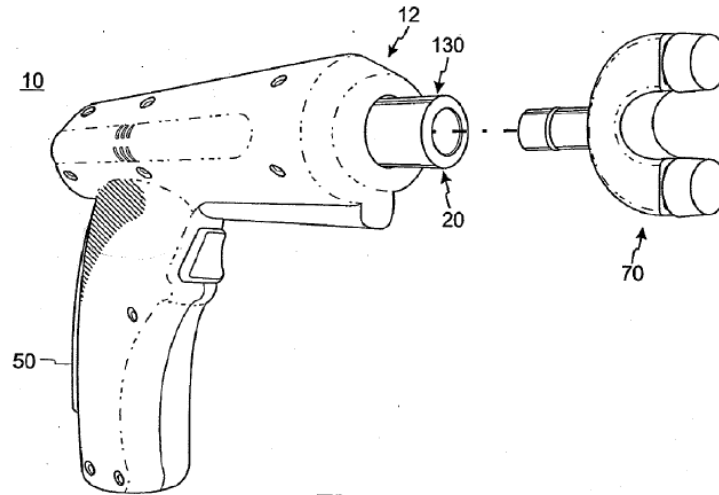
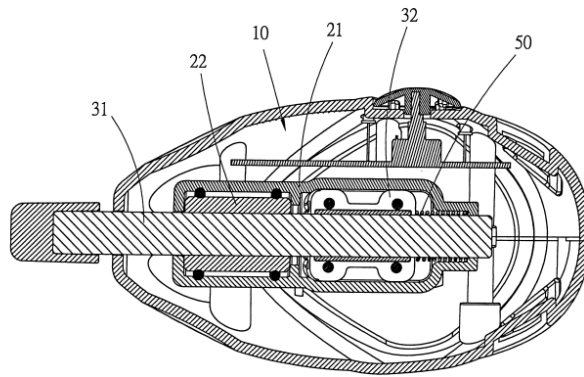


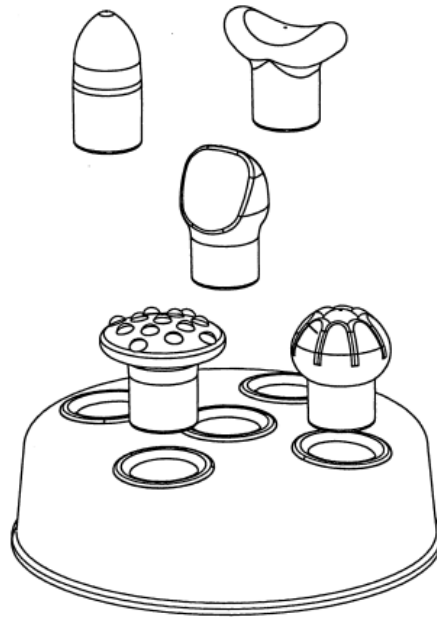
**Fig. 2**

**Ex-1009, Fig. 2**

64. Another example is found in Taiwanese Patent Number 9,720,7752U (“Wang”). Wang (Ex-1010, English Translation Ex-1011), filed on May 5, 2008, discloses a connector in the form of multiple massage heads having a cylindrical pocket attachable on the distal end of a reciprocating shaft. As shown in Figures 3 and 9 below, Wang discloses “the end of the shaft rod (31) extending out of the body (21) can be used to be connected to various models of massage heads, so that according to the characteristics of tissues of different parts of a human body.” Ex-1011 at 7.



**Ex-1011, Fig. 3**



**Ex-1011, Fig. 9**

65. U.S. Patent No. 6,682,496 to (“Pivaroff”) was filed on December 28, 1999. Pivaroff (Ex-1007). As described further below, Pivaroff discloses a “deep

muscle stimulation device” that “provides deep muscle tissue with kinetic forms of percussion.” Ex-1007, 1:31-33. Pivaroff’s Figure 1 shows the “hollow head 44,” which along with an optional protective cup 54 is connected to the outer end of the rod 38 by “connecting means,” such as screw threads shown on pin 42.

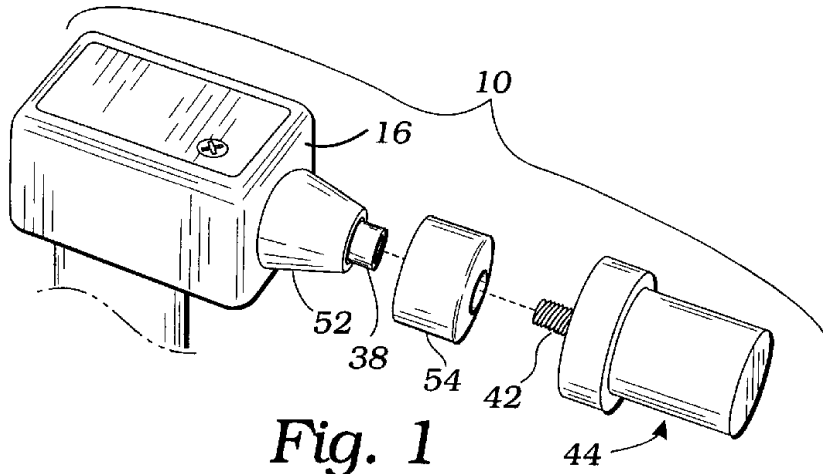


**Fig. 1**

**Ex-1007, Fig. 1**

**E. The Challenged Claims**

66. Claim 1 recites:

[pre] A percussive massager comprising:

[a] a housing;

[b] a piston in the housing having a proximal end and a distal end, the distal end of the piston having a bore;

[c] a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed;

[d] a drive mechanism that controls a predetermined stroke length of the piston; and

[e] a quick-connect system comprising the distal end of the piston and a first massaging head, wherein the quick-connect system is configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.

Ex-1001, 9:64-10:12. Challenged dependent Claim 2 recites that the motor is “configured to cause the piston to reciprocate at a second speed.” Dependent Claims 3 and 4 recite various aspects of a control panel for the percussive massager. Dependent Claims 5 through 12 relate to aspects of the motor and drive mechanism. And dependent Claims 13-17 recite aspects of the bore in the piston, including Claim 13’s requirement that “the bore comprises a substantially cylindrical bore.” *Id.*, 10:13-11:3. Independent Claim 18 recites a “method of assembling a percussive massager” that includes the motor, piston, and drive mechanism recited in Claim 1, along with a similar “quick-connect system” where “a proximal end of the first massaging head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.” *Id.* 11:4-17.

## **V. OVERVIEW OF PRIOR ART**

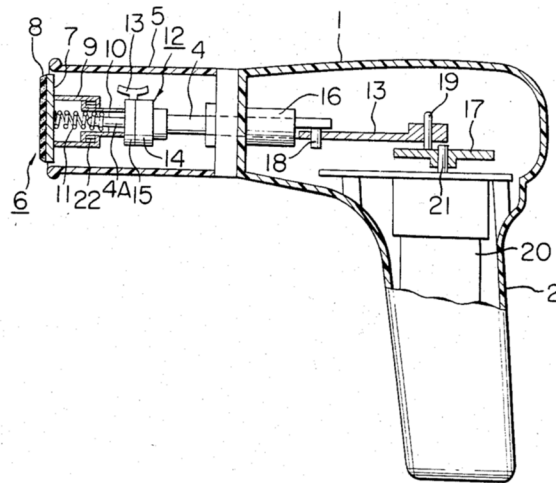
### **A. U.S. Patent No. 4,513,737 (“Mabuchi”) (Ex-1005)**

67. U.S. Patent No. 4,513,737 (“Mabuchi”) issued on April 30, 1985, and was filed on December 22, 1980. Ex-1005 at Cover.

68. The Applicants disclosed Mabuchi in an Information Disclosure Statement during the prosecution of the ’082 Patent. Ex-1004 at 40. However,

having reviewed the file history of the '082 Patent (Ex-1004), neither the Applicants nor the Examiner ever discussed Mabuchi or its disclosures.

69. Mabuchi discloses a “beauty treatment device” that “repeatedly pats the skin by causing a patter or patter assembly to hit the skin at a given rate to impact the skin surface.” Ex-1005, 1:31-34. Mabuchi’s Figure 1 (below) shows the device, including a motor 20 that drives a rotating disc 17, which in turn reciprocates a rod 3 connected to an actuator 4. *Id.* at 2:39-52. A “patter assembly 6” is connected to the actuator 4 by a patter connecting mechanism 12. *Id.* at 2:53-57.

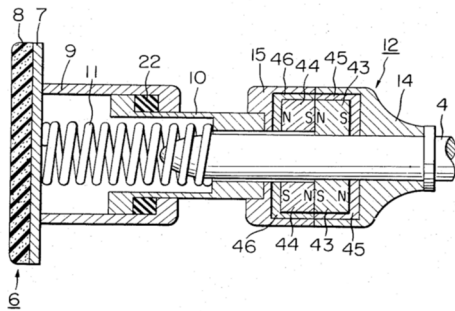


**Ex-1005, Fig. 1**

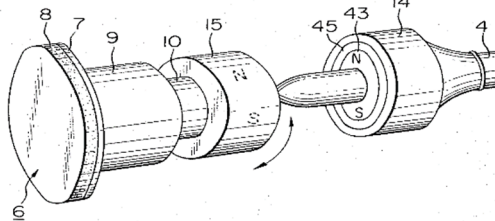
70. Mabuchi also discloses that the effects of the beauty treatment device “can be enhanced by changing the shape or patting intensity of the patter assembly 6 . . . in accordance with the portion being treated or the purpose of the treatment.” *Id.* at 5:52-60. Accordingly, “the patter assembly 6 requires to be interchangeable,”

while also being “securely connected to the actuator 4 to prevent unwanted disengagement.” *Id.*, 5:60-64.

71. Mabuchi discloses a number of “patter connecting mechanisms” to provide such functionality. The embodiments shown in Mabuchi’s Figures 18 and 19 (shown below) utilize magnets similar to those disclosed in the ’082 Patent’s Figures 6, 6A, and 6B. Specifically, a magnet 43 is implanted in the coupling 14 at the distal end of actuator 4, while a corresponding magnet 44 is located in the flange 15 at the proximal end of pattern assembly 6. Ex-1005, 7:67-8:10. Accordingly, “the magnet 43 implanted in the coupling 14 and the magnet 44 implanted in the flange 15 are connected to each other by attracting force caused by different polarities on the two magnets 43 and 44.” *Id.*, 8:11-15.



**Ex-1005, Fig. 18**



**Ex-1005, Fig. 19**

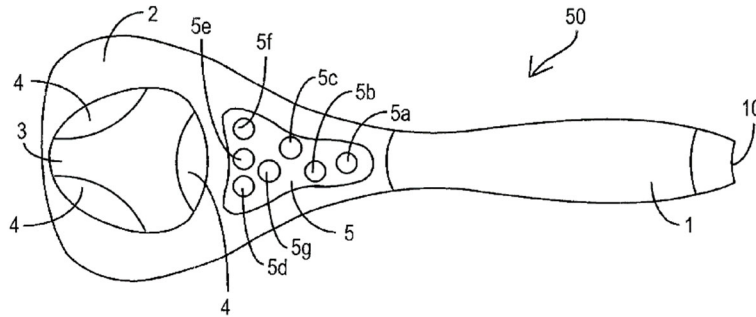
72. Mabuchi discloses that “[w]hen connecting the patter assembly 6 to the actuator 4, the end face of the actuator is brought in close contact with the end face of the flange 15. This causes the magnet 43 implanted in the coupling 14 and the magnet 44 implanted in the flange 15 to attract with each other, bringing the actuator

4 and the pattern assembly 6 in position.” *Id.*, 8:26-32. The magnets “ensure[] positive connection of the actuator 4 and the patter assembly 6,” and that positive connection “can be ensured without positioning the actuator 4 and the pattern assembly 6.” *Id.*, 8:33-39.

**B. U.S. Patent 6,432,072 (“Harris”) (Ex-1006)**

73. U.S. Patent No. 6,432,072 (“Harris”) was issued on August 13, 2002, and was filed on January 21, 2000. Ex-1006, Cover. During prosecution of the related ’482 Patent, Harris was cited by the Examiner as teaching the same “second speed” limitation in challenged Claim 2, and the control panel limitations found in challenged claims 3 and 4. Ex-1013 at 2241. The Applicants did not dispute that Harris taught these limitations. Ex-1013 at 2268-2275.

74. Harris discloses a “hand-held massager having both vibratory and percussive massage capabilities.” Ex-1006, 1:33-35. As shown in Harris’s Figure 1 (below), Harris’s massager 50 includes a control panel 5 that includes “a plurality of touch sensitive control buttons or switches, including power control button 5a, speed setting control button 5b, LED speed indicator 5c, and various massage program buttons 5d-g for setting massage sensation, intensity and frequency” of the massager’s percussive massage nodes and vibrating massage head.



**Ex-1006, Fig. 1**

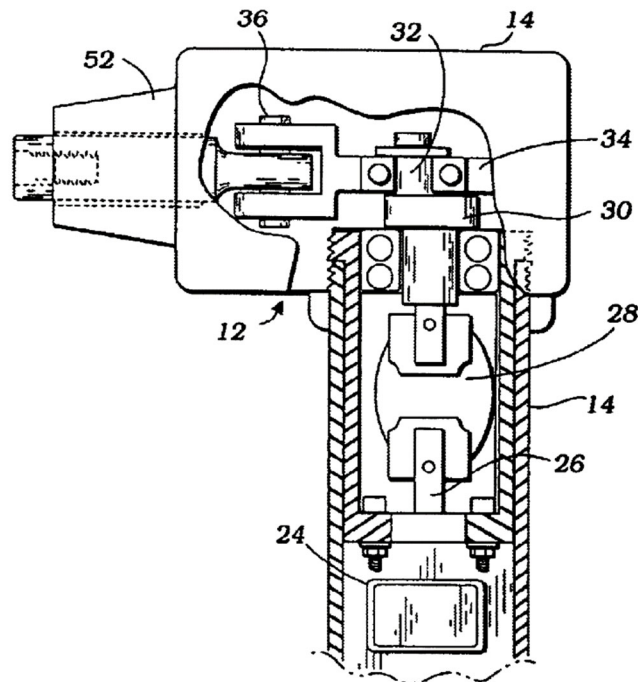
**C. U.S. Patent No. 6,682,496 (“Pivaroff”) (Ex-1007)**

75. U.S. Patent No. 6,682,496 (“Pivaroff”) was issued on January 27, 2004, and was filed on December 28, 1999. Ex-1007, Cover. During prosecution of the related ’482 Patent, Pivaroff was cited by the Examiner as disclosing all elements of challenged Claim 1 except for the recited “quick-connect system.” *Id.* at 2458-2459. The Applicants did not dispute that Pivaroff taught these non-“quick release connector” limitations. *Id.* at 2534-2536. Similarly, during prosecution of the ’082 Patent, the Examiner stated:

While Pivaroff discloses a percussive massager comprising a housing, a piston having a distal end with a threaded bore, a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed, a drive mechanism that controls a predetermined stroke length, and a quick-connect system comprising the distal end of the piston and a first massaging head, Pivaroff does not disclose a quick-connect system configured to allow a massaging head to be secured or connected to the percussive massager while the piston reciprocates as required by claims 1 and 18. The quick connect system of Pivaroff uses a threading system between its piston and its massaging head which would prevent the user from inserting or removing the massaging head while the piston reciprocates.

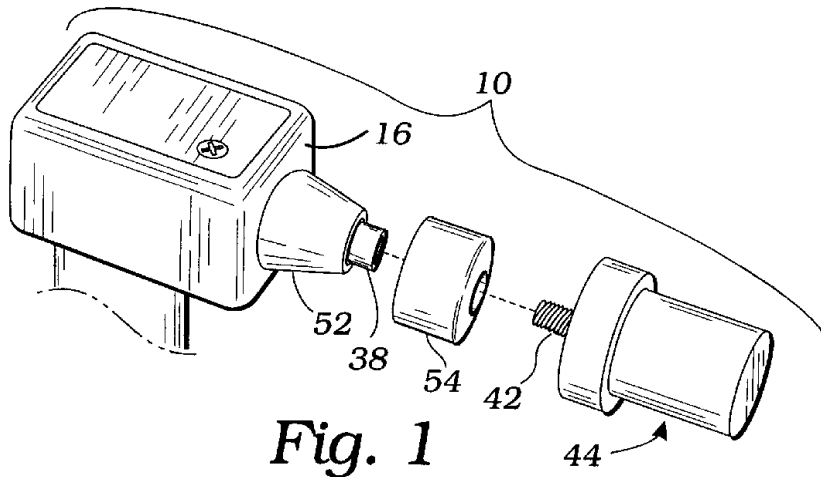
Ex-1004 at 1894.

76. Pivaroff discloses a “deep muscle stimulation device” that “provides deep muscle tissue with kinetic forms of percussion.” Ex-1007, 1:31-33. As shown in Pivaroff’s Figure 6 (below), Pivaroff’s device includes a motor 24 that rotates a coupling system 28 and offset cam element 30, which is coupled to a reciprocating link that converts the rotational motion to a reciprocating motion of rod 38 (not labeled in Figure 1). *Id.* at 2:37-54. Pivaroff discloses that “[p]referably, the electric motor operates at a speed of between about 2000 to 3600 RPM,” and that this “rotational speed is transferred to a reciprocating motion” of a hollow head 44 at the end of rod 38. *Id.*, 3:44-54.



**Ex-1007, Fig. 6**

77. Pivaroff's Figure 1 shows the "hollow head 44," which along with an optional protective cup 54 is connected to the outer end of the rod 38 by "connecting means," such as screw threads shown on pin 42.



Ex-1007, Fig. 1

**D. U.S. Published Patent App. No. 2007/0150004 ("Colloca") (Ex-1009)**

78. U.S. Published Patent Application No. 2007/0150004 ("Colloca") published on June 28, 2007, and was filed on December 5, 2006. Ex-1009 at Cover. During prosecution of the '082 Patent, the Examiner stated the following regarding Colloca:

Colloca discloses a chiropractic adjustment device comprising a thrust nose piece with a bore at its distal end configured to receive an impact head. However, Colloca does not disclose the bore as located at the distal end of a *piston*. Additionally, Colloca does not disclose inserting or removing the impact head from the **bore while a piston reciprocates**.

Ex-1004 at 1895 (emphasis in original).

79. Colloca discloses a chiropractic adjusting instrument 10 with a “thrust nose piece 130” for connecting an impact head 70, as shown in Colloca’s Figure 2 below. Ex-1009 at ¶¶33-34. Impact head 70 includes an “impact coupler” that is “typically a soft material such as an o-ring to form a press fit with the thrust nose piece 130.” *Id.* at ¶56.

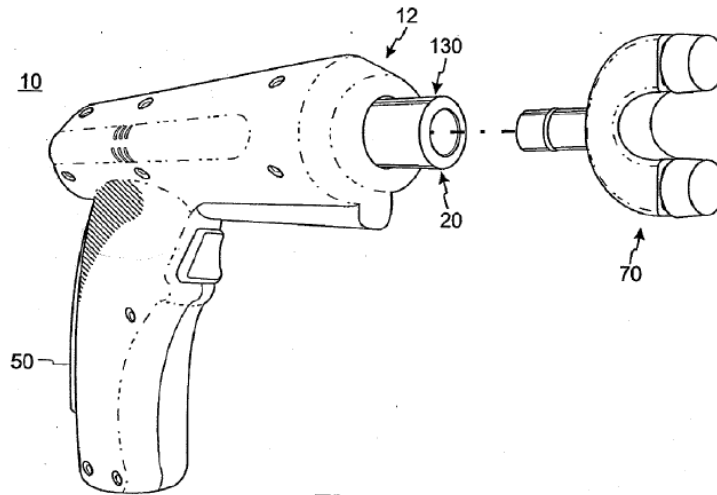


**Fig. 2**

**Ex-1009, Fig. 2**

80. As shown in Figures 9 and 10 below, the thrust nose piece 130 is located on an end of a preload switch plunger 150 comprising a plunger rod 151 and plunger cap 152, and can formed to “be integral with” the plunger 150. *Id.* at [0034], [0037]. The thrust nose piece 130 has a bore 139 that is “adapted to the at least one impact head 70.” *Id.* [0034].

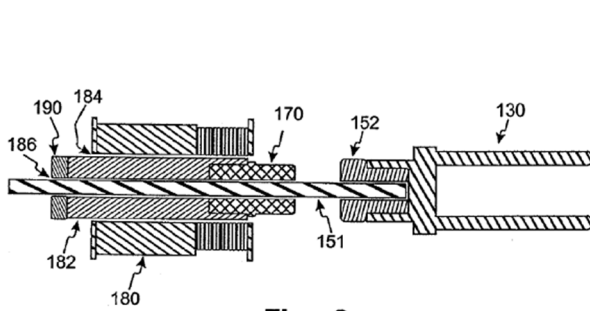


**Fig. 9**

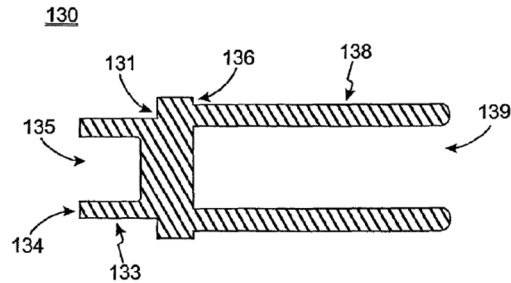


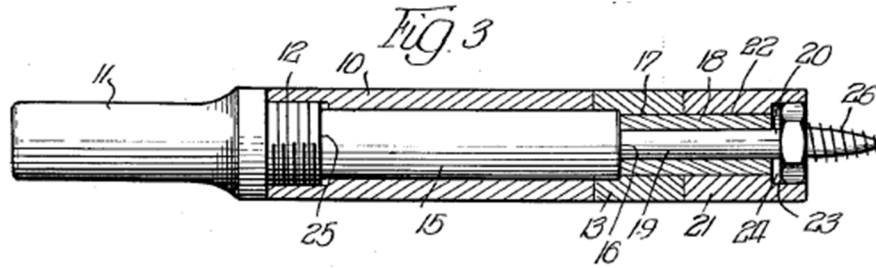
**Fig. 10**

**Ex-1009, Figs. 9-10**

**E. U.S. Patent No. 3,007,504 (“Clark”) (Ex-1014)**

81. U.S. Patent No. 3,007,504 (“Clark”) issued on November 7, 1961, and was filed on July 25, 1957. Ex-1014 at Cover. Clark was not cited by the Examiner or the Applicants during prosecution of the '082 Patent.

82. Clark discloses “magnetic tools . . . adapted to magnetically hold and drive a multiplicity of different types of screws or the like.” Ex-1014, 1:8-10. As shown in Clark’s Figure 3 (below), Clark’s tool includes a bar magnet 15 which “abuts at one end of the shank 11 and terminates at the other end near the joint between the shell 10 and the cylindrical member 13.” *Id.*, 3:2-4. Clark also discloses that “the magnetic forces which are transmitted through the magnetically permeable membrane 19 from the magnet 15 are utilized to hold the workpiece in driving position.” *Id.*, 3:45-48. Further, Clark discloses that the “magnetic tool [is] adapted to receive, interchangeably, a plurality of tool endings such as bits, sockets, and the like . . . while the same are magnetically held in contact with the tool.” *Id.*, 1:66-70.



**Ex-1014, Fig. 3**

**VI. INVALIDITY OF THE '082 PATENT CLAIMS UNDER 35 U.S.C. § 112**

**A. Ground 1: Claims 1-18 Are Unpatentable Under 35 U.S.C. § 112 For Lack of Written Description Support in the Specification.**

83. I am informed that to satisfy the written description requirement, the specification must convey with reasonable clarity to those skilled in the art that, as of the priority date sought, the inventor was in possession of the invention. I also understand that to claim an entire genus requires that the written description disclose a representative number of species falling within the scope of the genus so that one of skill in the art can recognize the members of the genus. As explained below, Element 1[e] of Claim 1 and the corresponding element in independent method Claim 18 are not supported by written description in the '082 Patent's specification.

84. Here, Claims 1 and 18 claim a broad genus of "quick-connect systems." Claim 1 recites "a quick-connect system ... configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed." Similarly, Claim 18 recites "a quick-connect system ... wherein a proximal end of the first massaging

head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”

85. Yet the '082 Patent discloses, at most, only a single working example: the “quick-connect system” with corresponding magnets in the shaft of a massaging head and within the bore of the piston. *See* Ex-1001 at 6:47-7:19. The '082 Patent describes the use of magnets as critical to the claimed ability of the “quick connect system” to “secure” the massaging head “while the piston reciprocates”:

To remove massaging head 620, a user need only apply a sufficient amount of force to separate the two magnets 606, 624. The strength of the magnets 606, 624 are sized to prevent the massaging head 620 from separating from the piston 602 during normal use, and yet allow a user to quickly remove and replace the massaging head 620.

*Id.* at 7:4-9.

86. Neither independent Claims 1 or 18, nor any of the challenged dependent claims, limit the broad functional claim language of the connector. Indeed, only dependent Claim 16 recites the presence of a magnet at all.

87. This disclosure of a single embodiment using magnets of certain (undisclosed) sizes and strengths to secure and remove the massaging head would not convey to one of skill in the art what other connectors fall within this genus of being “quick-connect systems” that are “configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”

88. For at least these reasons, Claims 1 and 18 are invalid for lack of written description support.

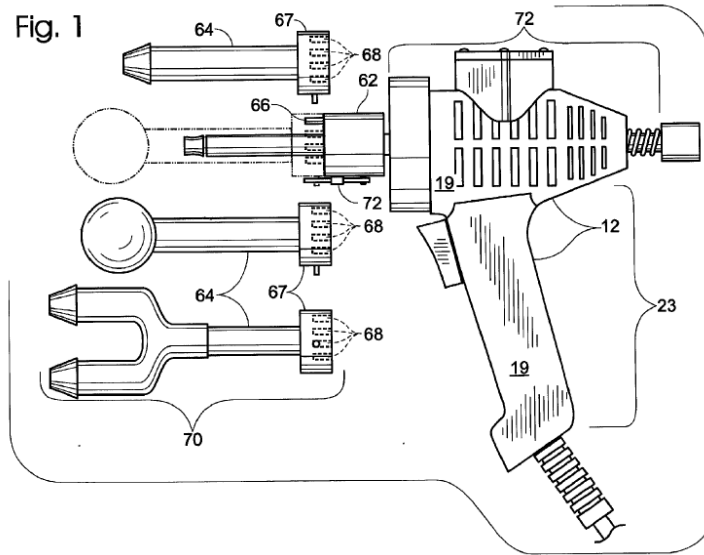
89. Dependent Claims 13 and 17 add further limitations that similarly lack written description support.

90. Dependent Claim 13 is also invalid for lack of written description support for the claimed bore comprising “a substantially cylindrical bore.” Ex-1001, 10:59-60. A POSITA would also understand that there is no disclosure in the ’082 Patent of a “*substantially cylindrical* bore,” as recited in Claim 13. The specification does not explicitly describe the shape of bore 608, in contrast to other aspects of the quick connect system. *See* Ex-1001, 6:57-7:3. And while the specification describes a “cylindrical seat 604” *within* bore 608, the first massaging head is not inserted into or removed from this cylindrical seat. *See* Ex-1001, Claim 1, 10:8-10.

91. Moreover, the ’082 Patent contains no disclosure of any “substantially” cylindrical bore. Presumably there is some difference between “cylindrical” (like pocket 622 and seat 604) and “substantially cylindrical.” The ’082 Patent’s failure to disclose any embodiment with a substantially cylindrical bore would indicate that the inventor was not in possession of how to practice the claimed invention with such a bore. That is because, in the context of Claim 13, a POSITA would understand that the bore is cylindrical, and not merely “substantially” cylindrical, so

as to receive the proximal end of the attachment “while the piston reciprocates,” which would be done without the need for alignment. Ex-1001, 6:55-56 (“Moreover, the exemplary quick-connect system 600 may be used without turning off the massaging device 100.”).

92. This would be confirmed by a review of the prosecution history of the related '482 Patent. There, the inventors distinguished the connector on the device taught by Miller (Ex-1008). Miller describes a “chiropractic adjustment tool or tapper, which, generally, comprises a housing, with or without a handle and a motor or power source to drive an axially reciprocating rod.” Ex-1008 at ¶6. One end of the reciprocating rod “extends from the housing” with an “impact head with a coupler for the mounting of one or more impact heads.” *Id.* The coupler 62, shown below in Figure 1, “is used for affixing impact heads 70 of varying shapes,” and “is formed so as to permit the impact head 70 to be removably affixed to the reciprocating rod 16 at a set, but adjustable angle.” *Id.* at ¶26.



**Ex-1008, Fig. 1**

93. The Applicants argued that a POSITA “would understand that Miller’s head ***must be aligned in one orientation***, such that the pin on the bottom of the collar 62 mates with hook or loop 72 to retain the impact head 70,” and that “the horizontal pin ***must be aligned and inserted into a pin notch 68*** in order to retain the impact head.” Ex-1013 at 2356 (emphasis added). The Applicants then argued that “Miller is silent regarding the ability for its impact heads to be ***connected to the coupler during reciprocation of the reciprocating rod.***” *Id.* at 2356-57 (emphasis added).

94. The Applicants’ distinguishing of Miller based on the need to align its massaging head and piston in a particular orientation would confirm to one of skill in the art that other systems requiring similar alignment would not be configured to be inserted during reciprocation of the piston. The ’082 Patent’s failure to disclose any “substantially” cylindrical bore, as opposed to a cylindrical one, and in particular

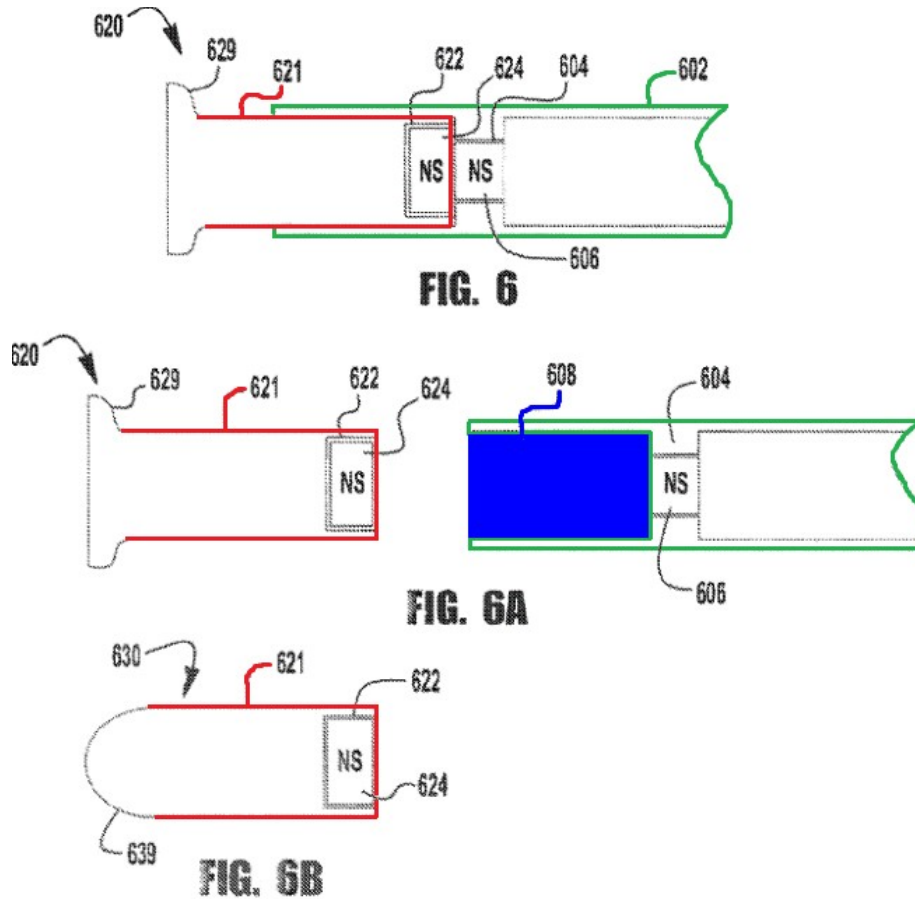
the failure to disclose a “substantially” cylindrical bore into which a proximal end of the first massaging head could be inserted into or removed without alignment, would not convey to a POSITA that the inventors were in possession of the claimed invention.

95. A POSITA would understand that there is no disclosure in the '082 Patent of a “substantially cylindrical bore,” as recited in Claim 13.

96. This is an additional reason why Claim 13 is invalid for lack of written description support.

97. Dependent Claim 17 is also invalid for lack of written description support for the claimed “proximal end of the first massaging head has a pocket to receive the distal end of the piston.” Ex-1001, 11:1-3. A POSITA would also understand that there is no disclosure in the '082 Patent of a pocket in the first massaging head receiving the distal end of the piston, as recited in Claim 17.

98. Instead, the only disclosed embodiments in the '082 Patent show the opposite configuration. As shown in the annotated Figures 6, 6A, and 6B below, in the only embodiment disclosed in the '082 Patent, *the piston 602* “has a *hollow-end bore 608* for receiving the *shaft 621* of a massaging head 620.” Ex-1001 at 6:57-59. The '082 Patent describes that, “when the *shaft 621* of massaging head 620 is slid into opening in *bore 608*, the magnets 606 and 624 are attracted to one another and magnetically hold massaging head 620 firmly in place.” *Id.* at 6:67-7:3.



**Ex-1001, Figs. 6, 6A, 6B (annotated)**

99. The only disclosure of a “pocket” *in the massaging head*, on the other hand, is the pocket 622 located in the massaging head’s shaft for holding magnet 624. *See* Ex-1001 at 6:63-65 (“Massaging head 620 includes a shaft 621 having a cylindrical pocket 622 at the distal end. Located within the cylindrical pocket 622 is a magnet 624.”). As shown in the figures above, this “pocket” in the massaging head does not and cannot receive the distal end of the piston. Rather, this pocket 622 merely holds the magnet 624. Both the magnet and the pocket are then received

by bore 608 in the piston. *See* Ex-1001 at 6:67-7:3 (“Accordingly, when the shaft 621 of massaging head 620 is slid into opening in bore 608, the magnets 606 and 624 are attracted to one another and magnetically hold massaging head 620 firmly in place.”).

100. A POSITA would understand that there is no disclosure in the ’082 Patent of a proximal end of the first massaging head having a “pocket to receive the distal end of the piston,” as recited in Claim 17.

101. This is an additional reason why Claim 17 is invalid for lack of written description support.

**B. Ground 2: Claims 13-16 Are Unpatentable Under 35 U.S.C. § 112 Because They Are Indefinite.**

102. I understand that a claim is invalid for indefiniteness if, when read in light of the specification delineating the patent and the prosecution history, it fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention.

103. In my opinion, Claim 13’s recited limitation of “the bore comprises a substantially cylindrical bore,” as well as the “substantially cylindrical structure” recited in Claims 14-16, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention, because a POSITA would not understand how far from perfectly cylindrical the recited bore or structure within the bore could deviate while still meeting this limitation.

104. The specification provides no guidance as to how to determine whether a bore or structure within the bore is “substantially” cylindrical. The claims confirm there is some difference between “cylindrical” and “substantially cylindrical.” Claim 15 recites uses both terms, with a both a “cylindrical” element being a more specific requirement than and a “substantially cylindrical” element, i.e., a “*substantially cylindrical* structure comprises a *cylindrical* seat.”

105. Yet as discussed above in Section VI.A, the '082 Patent's specification does not describe a substantially cylindrical bore. At most, it describes **the seat 604** in the bore 608 of the piston and **the pocket 622** in the shaft 621 of the massaging head as “cylindrical,” without qualifier. Ex-1001 6:59-65. Neither of these elements correspond to a bore into which the “proximal end of the first massaging head” is “inserted into or removed from.” *Id.* Claim 1, 10:8-10.

106. The specification also does not describe a “substantially cylindrical structure” in the shaft. The seat 604 is described as “cylindrical,” Ex-1001, 6:59-65, as later recited in the narrower dependent Claim 15. *See* Ex-1001, 10:63-64 (reciting “wherein the *substantially cylindrical* structure comprises a *cylindrical* seat).

107. Understanding what qualified as a “substantially cylindrical” bore would be critical for informing a POSITA of the scope of the invention. Claim 1, from which Claims 13-16 depend, recites that the “quick-connect system is configured to have a proximal end of the first massaging head inserted into or

removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.” Ex-1001, 10:8-12. But for Claim 13, if the bore is not cylindrical enough, then a perfectly cylindrical proximal end of the massaging head would either not fit in that “substantially” cylindrical bore, or else would not be securely held by that bore. If, on the other hand, both the bore and the proximal end of the massaging head had the same non-cylindrical shape, a user would be required to align the two when inserting the massaging head into the bore, and thus it would not be “configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed,” as recited in Claim 1.

108. Thus, as written, Claim 13, reciting “the bore comprises a substantially cylindrical bore,” and Claims 14-16, reciting a “substantially cylindrical structure within the bore,” prevent a POSITA from understanding what is being claimed with reasonable certainty, because they fail to provide any guidance as to the difference between “cylindrical” and “substantially cylindrical,” or how cylindrical the bore/structure must be to practice the invention.

109. For at least these reasons, Claims 13-16 are invalid for indefiniteness.

## **VII. INVALIDITY OF THE '082 PATENT IN VIEW OF PRIOR ART**

### **A. Ground 3: Claims 1, 7, 9-11, 13, and 18 Are Unpatentable Under 35 U.S.C. § 103 As Obvious Over Mabuchi in View of Colloca.**

110. For the reasons discussed below and in the corresponding claims found in the Claim Mapping Chart attached as Appendix B1 (Ex-1017), it is my opinion that Claims 1, 7, 9-11, 13, and 18 are unpatentable as obvious over Mabuchi in view of Colloca.

#### **1. A POSITA Would Have Been Motivated to Combine Mabuchi's Teachings With Colloca and Would Have Had a Reasonable Expectation of Success.**

111. A POSITA would have been motivated to combine Mabuchi and Colloca, and would have had a reasonable expectation of success in doing so. Motivations to combine specific teachings are laid out clearly in the below limitation-by-limitation analysis. However, in my opinion, a POSITA would be motivated to combine Mabuchi and Colloca as they are analogous art.

112. First, Mabuchi and Colloca are from the same field of endeavor. Both references describe percussive massage devices. Mabuchi describes a “beauty treatment device having a space guide that permits an actuator to repeatedly reciprocate and controls the motion of the actuator wherein a padder repeatedly pats a skin surface being treated at a given rate.” Ex-1005, 1:7-12. Colloca describes a “chiropractic adjusting instrument” that is “used to apply controlled dynamic forces to the human body.” Ex-1009, Abstract *and* [0001].

113. Further, Mabuchi and Colloca are directed to solving similar technical problems known in the art at the time of the invention. Mabuchi discloses that the objects of the invention are to provide a device “in which the entire patten assembly is removably fitted to the actuator that produces a reciprocating motion and “having patters of different shapes which are interchangeably used . . . .” Ex-1005, 1:42-49. Similarly, Colloca discloses that a “disadvantage [of other hand held devices] is that they do not provide a thrust nose piece to accept interchangeable impact heads or reduce vibrations to the operator to provide comfort.” Ex-1009, [0010].

114. Colloca complements Mabuchi by expressly teaching “a thrust nose piece 130” including “a bore 139 adapted to the at least one impact head 70.” Ex-1009, [0034]. A POSITA would have been motivated to modify Mabuchi to have a bore in the piston’s distal end adapted to accept the shanks of interchangeable impact heads as taught by Colloca.

115. A POSITA would have had a reasonable expectation of success in combining the teachings of Mabuchi and Colloca because they teach compatible systems—namely, percussive massage devices with interchangeable massaging heads that can easily be inserted or removed.

116. Furthermore, because Mabuchi and Colloca provide percussive massage devices that operate in similar ways, a POSITA would have understood that their teachings could be combined with little to no change in their respective

functions. Specifically, Colloca's bore for receiving the attachment head could be implemented on Mabuchi incorporating a bore to accept a massaging head shank, and optionally combining actuator 14 and coupling 4.

117. Considering the state of the art at the time of the Priority Date, a POSITA would be motivated to combine these references to achieve a massage tool that would solve the problems described above. Thus, there was a clear motivation to combine the teachings of these references, as discussed in further detail below.

## **2. Independent Claim 1**

### **a. Element 1[pre]: "A percussive massager comprising:"**

118. Mabuchi teaches<sup>3</sup> a percussive massager, to the extent this limitation is limiting. For example, Mabuchi discloses that it "relates generally to a beauty treatment device, and more specifically to a beauty treatment device having a space guide that permits an actuator to repeatedly reciprocate and controls the motion of the actuator wherein a padder repeatedly pats a skin surface being treated at a given rate." Ex-1005, 1:6-12. A POSITA would understand that by causing the "actuator to repeatedly reciprocate," the device is a percussive device. Furthermore, Mabuchi discloses that the device can "remove subcutaneous fat, stimulate subcutaneous muscular tissues and prevent the skin from loosening or wrinkling by patting the skin

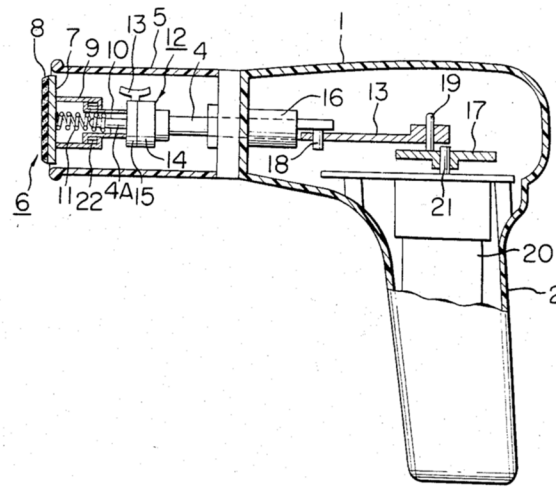
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<sup>3</sup> Throughout this Declaration I use the term "teaches," which I understand from Counsel includes both express teachings and those fairly suggested to a person of ordinary skill in the art.

surface with the pater assembly 6,” and that the pater can be changed “in accordance with the portion being treated or the purpose of treatment.” *Id.*, 5:52-60. Accordingly, a POSITA would understand that Mabuchi teaches a percussive massager.

**b. Element 1[a]: “a housing;”**

119. Mabuchi teaches element 1[a]. For example, Mabuchi discloses that the “invention comprises a housing 2.” Ex-1005, 4:58. A POSITA would understand, as shown in Figure 1 (below), that the housing surrounds the exterior of the device.



**Ex-1005, Fig. 1**

**c. Element 1[b]: “a piston having a proximal end and a distal end, the distal end of the piston having a bore;”**

120. Mabuchi in view of Colloca teaches Element 1[b]. As shown in Figure 1 above, Mabuchi discloses an actuator 4 (the piston) with a proximal end attached

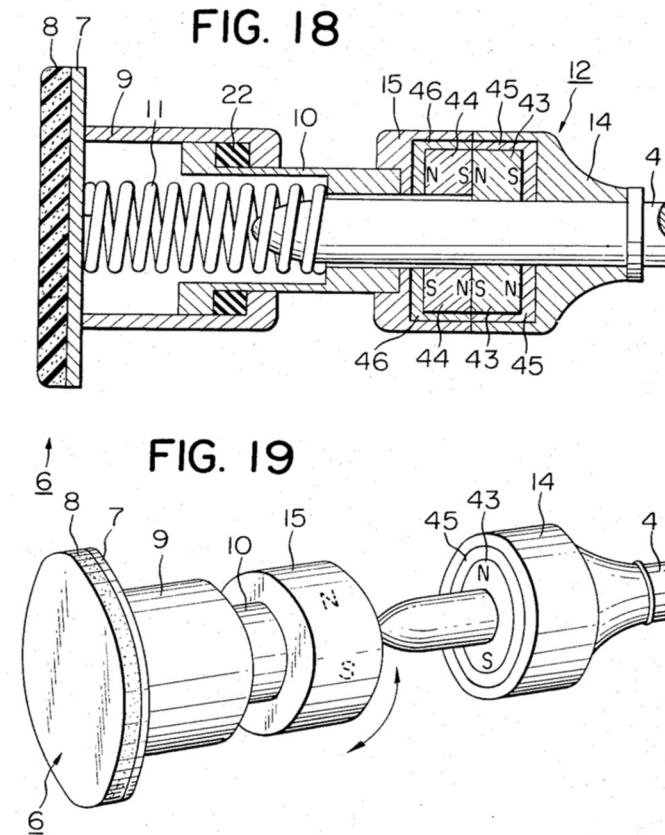
to rod 3<sup>4</sup>, and a distal end attached to patten 6 by the patten connection mechanism

12. Ex-1005, 2:55-58. In the context of the '082 Patent, a POSITA would understand the “proximal end” of the piston to refer to the region near an interior end of the piston, and the “distal end” of the piston to refer to the region near an exterior end of the piston. Mabuchi discloses that “as the rotating disc 17 rotates, the actuator 4 is caused to reciprocate within an actuator bearing 16 via the rod 3.” Ex-1005, 2:50-52.

121. Mabuchi does not expressly teach that the distal end of the piston has a bore. As shown below, Mabuchi discloses a coupling 14 on the distal end of the piston having a bore containing magnet 43 and yoke core 45. Ex-1005, Figs. 18-19. The protruding head of actuator 4 engages a bore in patten slide tube 10 to stabilize an impact head 6 upon attachment to the percussive massager. *Id.*

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<sup>4</sup> In Mabuchi’s Figure 1, the rod 3 appears to be mislabeled with the reference number “13.” Note that a different element—connecting shaft 13—is also labeled with the same reference number in Figure 1. Figures 2-7, which also show the operation of rod 3, confirm that the element between crankshaft 19 and rod shaft 18 in Figure 1 is rod 3.



**Ex-1005, Figs. 18-19**

122. Colloca, however, also discloses a percussive device, with a “preload switch plunger 150 (comprising a plunger rod 151 and a[] plunger cap 152)” having a proximal end and a distal end similar to Mabuchi’s actuator 4 (the piston). Ex-1009, Figs. 9-10. A “thrust nose piece 130” on the distal end of the piston includes a bore 139. *Id.* Colloca teaches that “the preload switch plunger 150 may be integral with the thrust nose piece 130,” and that both may be made of metal. *Id.* at [0034], [0037].

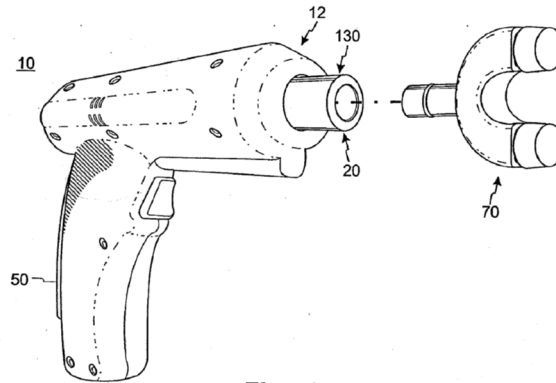


**Fig. 2**

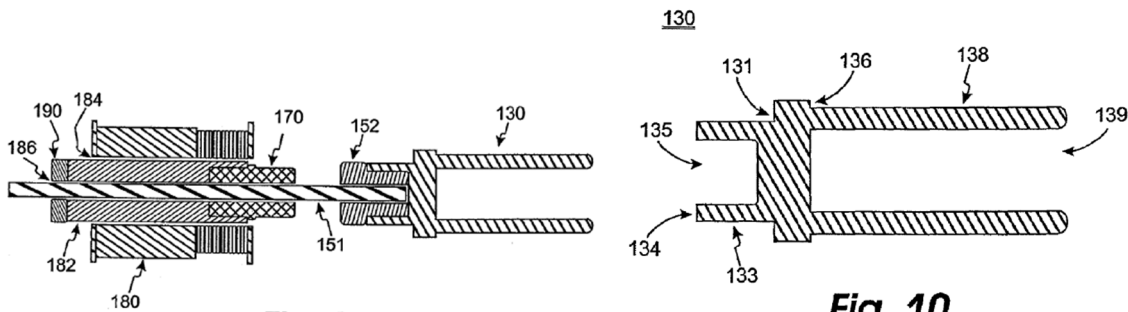


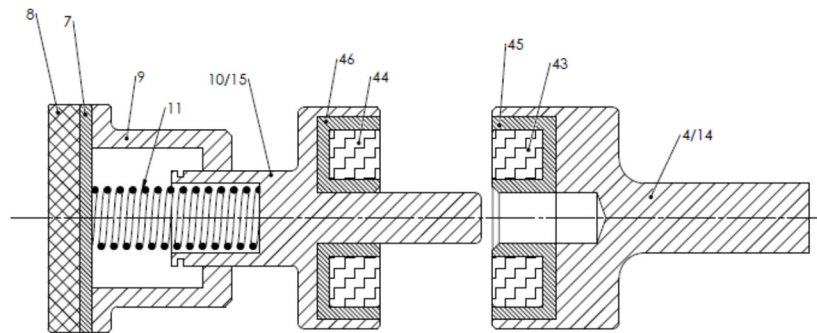
**Fig. 9**

**Fig. 10**

**Ex-1009, Figs. 2, 9-10**

123. As shown in Figures 9 and 10 above, thrust nose piece 130 “includes an outer end 136, an outer end shank 138 adapted to couple to at least one impact head 70.” *Id.* [0034]. Colloca also teaches that thrust nose piece 130 includes a bore 139 that is “adapted to the at least one impact head 70.” *Id.* The outer end shank 138 of thrust nose piece 130 “extends through the opening 20” in the housing 12 of Colloca’s instrument 10, as shown in Figure 2. An “impact coupler” 78, such as an o-ring, on the impact head 70 “form[s] a press fit with the thrust nose piece 130.” *Id.* [0056].

124. A POSITA would understand that it would have been a simple design choice to modify Mabuchi's patten connection mechanism to make coupling 14 integral with actuator 4, like the thrust nose piece 130 formed integral with the plunger 150, and incorporating a bore in the distal end of actuator 4 and coupling 14 that, like Colloca's integral preload switch plunger 150 and thrust nose piece 130, was adapted to accept the shanks of a patten. A diagram of Mabuchi's patten connection mechanism, as modified by the teachings of Colloca, is shown below.



**Mabuchi FIG. 18 modified in view of Colloca**

- d. **Element 1[c]: “a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed;”**

125. Mabuchi teaches Element 1[c]. As shown above in Mabuchi's Figure 1, a motor 20 with motor output shaft 21 is operatively connected to the proximal end of actuator 4 (the piston), and causes it to reciprocate at a first speed. Mabuchi discloses that motor 20 causes motor output shaft 21 “to rotate via a reduction gear (not shown),” and the output shaft 21 “in turn causes the rotating disc 17 to rotate.” Ex-1005, 2:43-47. A rod 3 has one end fitted to crankshaft 19 on rotating disc 17,

and the other end connected to actuator 4. *Id.*, 2:47-49. Further, Mabuchi discloses that the speed of the reciprocation of actuator 4 depends in part on the angular velocity  $\omega$  of rotating disc 17, which is caused in turn by the rotation of motor output shaft 21. *Id.*, 3:38-57.

**e. Element 1[d]: “a drive mechanism that controls a predetermined stroke length of the piston; and”**

126. Mabuchi teaches Element 1[d]. Mabuchi discloses a drive mechanism including rotating disk 17, crankshaft 19, and rod 3. Motor output shaft 21 of motor 20 is connected to rotating disc 17, while one end of rod 3 is fitted to crankshaft 19 on rotating disc 17, and the other end of rod 3 is connected to actuator 4. *Id.*, 2:45-50.

127. A POSITA would understand that the location of crankshaft 19 on rotating disk 17 and rod 3 controls the predetermined stroke length of actuator 4. Mabuchi's Figures 2-5 (below) show the rotation of the rotating disk 17 and corresponding reciprocation along a stroke length of actuator 4. Specifically, as rotating disk 17 rotates in a counterclockwise direction, crankshaft 19 rotates around a circumference of a circle that is defined as  $\pi * r^2$ , where  $r$  is the offset of crankshaft 19 from flywheel axis 21. As a result of this movement, rod 3 pushes actuator 4 forward (Figs. 3-4) then backwards (Figs. 2, 5) at a predetermined stroke length.

FIG. 2

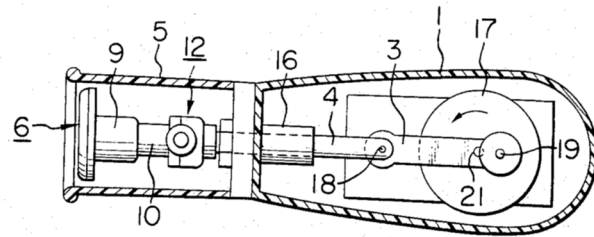


FIG. 3

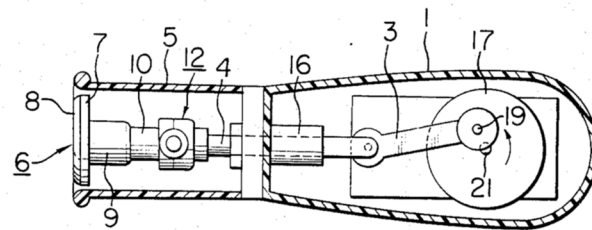


FIG. 4

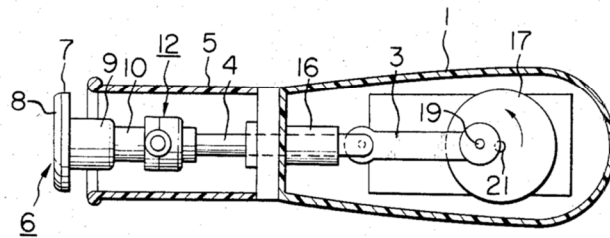
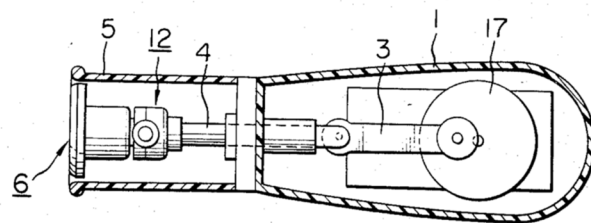


FIG. 5

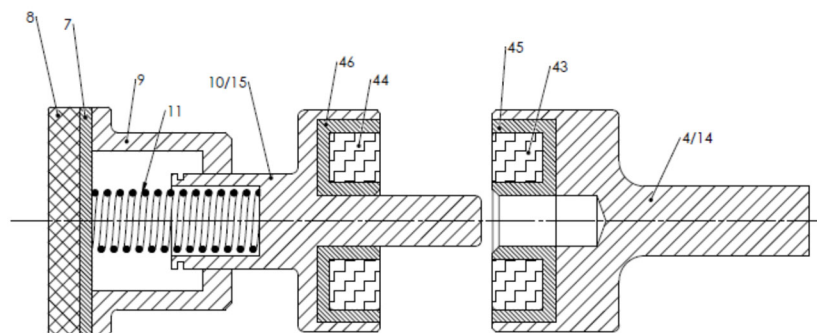


**Ex-1005, Figs. 2-5.**

- f. **Element 1[e]: “a quick-connect system comprising the distal end of the piston and a first massaging head, wherein the quick-connect system is configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”**

128. Mabuchi teaches Element 1[e].

129. First, Mabuchi discloses a quick-connect system comprising the distal end of actuator 4. In particular, the “patter connecting mechanism” in Mabuchi’s Figures 18 and 19, as modified by the teachings of Colloca, includes magnet 43 implanted in the integrated actuator 4 and coupling 14. Ex-1005, 7:67-8:10. Along with patter assembly 6 (i.e., the “first massaging head”), a POSITA would understand this mechanism is a quick-connect system: “The changing of the patter assembly 6 can be easily accomplished since the actuator 4 and the patter assembly 6 are automatically disconnected merely by turning each other.” *Id.*, 8:40-43.



**Mabuchi FIG. 18 modified in view of Colloca**

130. Second, a POSITA would understand that Mabuchi’s patter connecting mechanism, as modified in view of Colloca, “is configured to have a proximal end

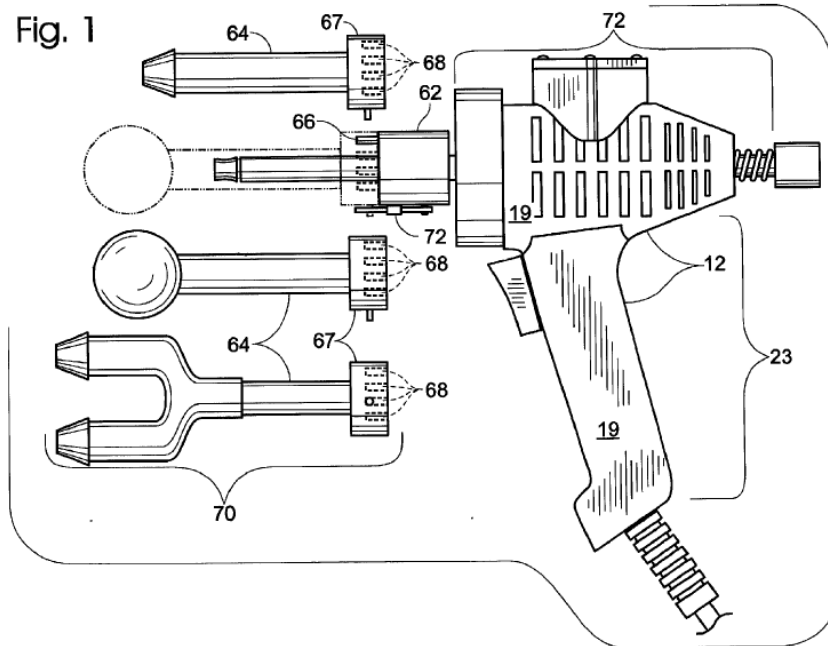
of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”

131. Mabuchi discloses that the purpose of the patten connecting mechanism is to allow for it to be quickly changed during treatment, i.e., “changing the shape or patting intensity of the patten assembly 6 . . . in accordance with the portion being treated or the purpose of treatment,” and thus patten assembly 6 must be “interchangeable” while also “securely connected to the actuator 4 to prevent unwanted disengagement.” Ex-1005, 5:52-64. The specific patten connecting mechanism of Figures 18 and 19 relies on the “attracting force caused by different polarities on the two magnets 43 and 44.” *Id.*, 8:11-15. Because Mabuchi’s patten connecting mechanism as modified in view of Colloca would still include the magnets 43 and 44, these magnets would function in the same manner to “ensure[] positive connection of the actuator 4 and the pattern assembly 6, both of which are subjected to vibrations caused by high-speed reciprocating motion.” *Id.*, 8:33-37.

132. Moreover, Mabuchi discloses that, by using a patten connecting mechanism with magnets 43 and 44, a “positive connection can be ensured ***without positioning*** the actuator 4 and the patten assembly 6.” *Id.*, 8:33-39 (emphasis added). Configuring the connecting mechanism to ensure a positive connection without positioning the actuator 4 and the patten assembly 6 suggests to a POSITA that the connecting mechanism is configured to have the patten assembly 6 (the first

massaging head) inserted into or removed from the piston while actuator 4 reciprocates a predetermined stroke length at the first speed. Because the connecting mechanism is configured such that a user does not need to carefully control the angular orientation or spatial positioning of the padder assembly in relation to head of the actuator during attachment, a POSITA would understand that it is configured to be inserted or removed while the actuator was reciprocating.

133. The Applicants' statements during prosecution of the related '482 Patent indicate a similar understanding. There, the Applicants sought to distinguish the prior art Miller reference's teaching of an "impact head with a coupler for the mounting of one or more impact heads." Ex-1008 at ¶6. Miller's coupler 62, shown below in Figure 1, "is used for affixing impact heads 70 of varying shapes," and "is formed so as to permit the impact head 70 to be removably affixed to the reciprocating rod 16 at a set, but adjustable angle." *Id.* at ¶26.



**Ex-1008, Fig. 1**

134. The Applicants argued that a “Person of Ordinary Skill in the Art would understand that Miller’s head *must be aligned* in one orientation, such that the pin on the bottom of the collar 62 mates with hook or loop 72 to retain the impact head 70,” and that “the horizontal pin *must be aligned* and inserted into a pin notch 68 in order to retain the impact head.” Ex-1013 at 2356 (emphasis added). The Applicants then argued that “Miller fails to teach or suggest that ‘the quick release connector is configured to connect the first massaging head while the piston moves between the minimum reciprocation stroke length and the maximum reciprocation stroke length at the first speed,’ as presently recited in claim 1.” *Id.* at 2356-57. The Applicants argued “Miller is silent regarding the ability for its impact heads to be connected to the coupler during reciprocation of the reciprocating rod.” *Id.* at 2357.

135. A POSITA would understand that the Applicants were arguing that Miller's coupler would not be understood to be configured to have the massage head inserted and secured while the piston reciprocates a predetermined stroke length at a first speed because it was instead designed to be aligned with the piston in order to be secured. Conversely, Mabuchi teaches that a patten connecting mechanism using magnets (like the one later disclosed in the '082 Patent) can be inserted and secured without such alignment, and easily removed in the same manner.

136. A POSITA would also understand that this modified quick-connect system with its self-aligning actuator 4 is configured to have a proximal end (flange 15 and magnet 44) of the first massaging head inserted into or removed from the bore 139 formed by outer end shank 138 while the piston reciprocates the predetermined stroke length at the first speed. This self-aligning feature of actuator 4 and magnet 44 inside flange 15 in combination with magnetic coupling between magnets 43 and 44 facilitate attaching the massage head at a variety of speeds and stroke lengths because the user does not need to carefully control the angular orientation or spatial positioning of the massage head in relation to the massage tool during attachment.

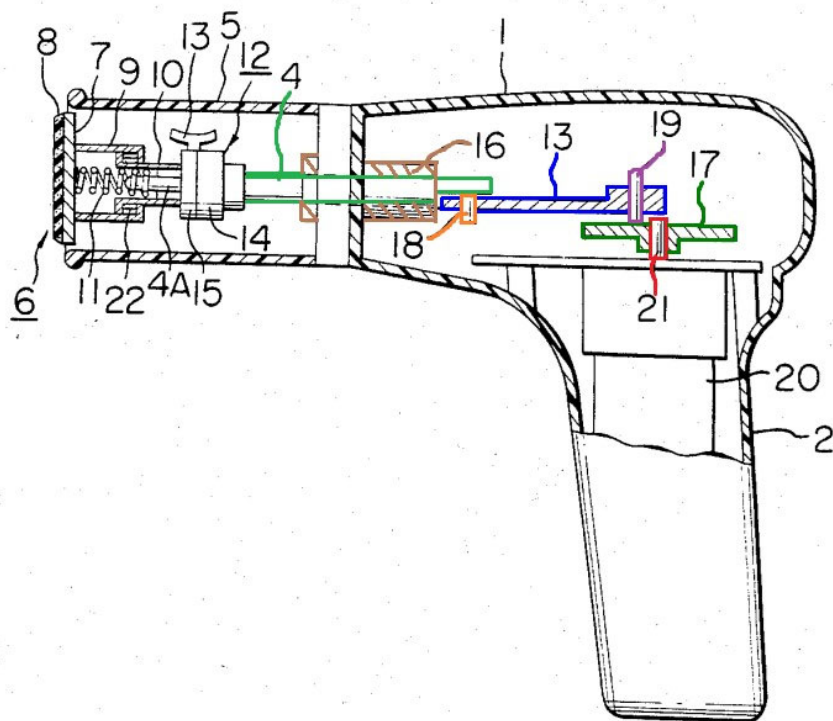
137. Similarly, a POSITA would understand that modifying Mabuchi in view of Colloca as described above would provide the same functionality in that the

mating of the massage head shank into the piston's bore provides spatial positioning of the massage head in relation to the massage tool during operation.

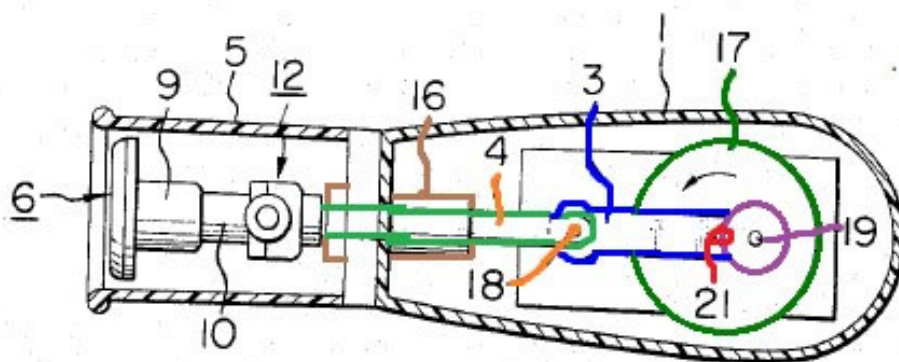
3. **Claim 7: “The percussive massager of claim 1, wherein the motor has an output shaft configured to rotate about a rotation axis, and wherein the drive mechanism comprises: a flywheel operatively connected to the output shaft of the motor to rotate about a flywheel axis, the output shaft extending into the flywheel along the flywheel axis; and a crank pin extending from the flywheel, the crank pin being operatively connected to the piston.”**

138. Mabuchi teaches Claim 7. As discussed above, Mabuchi teaches a motor 20 with a motor output shaft 21. A POSITA would understand that the motor output shaft 21 rotates about a rotation axis. *See* Ex-1005, 2:43-45 (motor 20 “causes a motor output shaft 21 to rotate via a reduction gear (not shown) fitted thereto as necessary”).

139. Mabuchi's disclosure of the recited arrangement of the “drive mechanism” is shown below in the annotated images of Mabuchi's Figures 1 and 2. Mabuchi discloses that “**rotating disc 17** is fixed to the **motor output shaft 21**, which in turn causes the rotating disc 17 to rotate. A **rod 3** is fitted at an end thereof to a **crankshaft 19** provided on the rotating disc 17, the other end thereof being connected to an **actuator 4** via a **rod shaft 18**. Consequently, as the rotating disc 17 rotates, the actuator 4 is caused to reciprocate within an **actuator bearing 16** via the rod 3.” Ex-1005, 2:45-52.



**Ex-1005, Fig. 1 (annotated)**



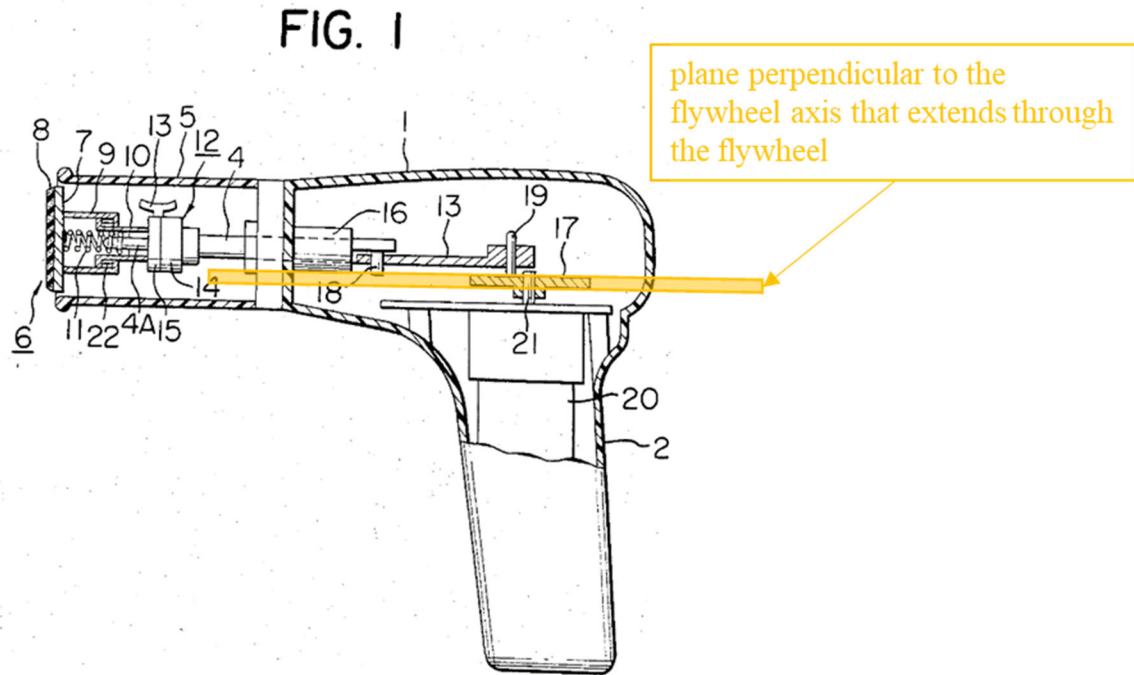
**Ex-1005, Fig. 2 (annotated)**

140. Accordingly, as shown above, Mabuchi's "drive mechanism" includes a "flywheel operatively connected to the output shaft of the motor to rotate about a flywheel axis." Specifically, Mabuchi's "rotating disk 17" is a "flywheel" that rotates about a "flywheel axis" defined by the motor output shaft 21 located in the center of flywheel 17. As shown in Figure 1, output shaft 21 extends into rotating disk 17.

141. Mabuchi's drive mechanism also includes a "crank pin" formed by crankshaft 19. Rod 3 operatively connects the crankshaft 19 (the "crank pin") to the actuator 4 (the "piston").

**4. Claim 9: "The percussive massager of claim 7, further comprising a handle, wherein the motor and the handle are on a same side of a plane perpendicular to the flywheel axis that extends through the flywheel."**

142. Mabuchi teaches Claim 9. Mabuchi discloses that the motor 20 is housed in the handle 2. Ex-1005, 2:42-52. As shown in the annotated version of Mabuchi's Figure 1 below, the handle 2 and motor 20 are configured below the rotating disk 17 such that the motor and the handle are on a same side of (i.e., below) a plane perpendicular to the flywheel axis that extends through the flywheel. *Id.*, Fig. 1.



**Ex-1005, Fig. 1 (annotated)**

5. **Claim 10:** “The percussive massager of claim 7, wherein an offset between the flywheel axis and an axis of the crank pin controls the predetermined stroke length of the piston.”

143. As discussed above in connection with Element 1[d], a POSITA would understand that the location of crankshaft 19 on rotating disk 17 (and its connection to rod 3) controls the predetermined stroke length of actuator 4, as shown in Mabuchi's Figures 2-5. Specifically, as rotating disk 17 rotates in a counterclockwise direction, crankshaft 19 rotates around a circumference of a circle having a diameter of  $2r$ , where  $r$  is the offset of crankshaft 19 from flywheel axis 21. As a result of this movement, rod 3 pushes actuator 4 forward (Figs. 3-4) then backwards (Figs. 2, 5) at a predetermined stroke length. *See also* Ex-1005, 4:1-2

(with the flywheel in the position shown in Figure 2, “the actuator 4 is moved to the extreme right side”) *and* 4:21-22 (with the flywheel in the position shown in Figure 4, “the actuator 4 assumes the extreme left-hand position”).

**6. Claim 11: “The percussive massager of claim 7, wherein the motor is directly connected to the flywheel, and wherein the crank pin is directly connected to the flywheel.”**

144. Mabuchi teaches Claim 11. Mabuchi discloses that rotating disk 17 (i.e., the “flywheel”) “is fixed to the motor output shaft 21,” which is part of motor 20. Mabuchi also teaches that rod 3 and crankshaft 19 (i.e., the “crank pin”) is “provided on the rotating disk 17.” Ex-1005, 2:45-50.

**7. Claim 13: “The percussive massager of claim 1, wherein the bore comprises a substantially cylindrical bore.”**

145. Mabuchi in view of Colloca teaches Claim 13. For example, Colloca’s Figure 2 shows that bore 139 in thrust nose piece 130 is substantially cylindrical. Ex-1009, Fig. 2.

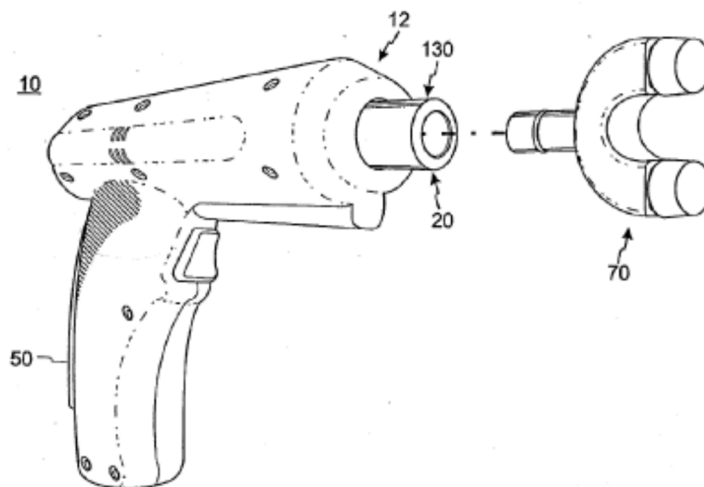


**Fig. 2**

**Ex-1009, Fig. 2**

**8. Independent Claim 18**

- a. Element 18 [pre]: “A method of assembling a percussive massager, the method comprising:”**

146. Mabuchi in view of Colloca teaches a method of assembling a percussive massager, to the extent this limitation is limiting. *See* Section VII.A.2.a. Claim 18 does not specify any specific method for assembling the components recited in elements 18[a], 18[b], and 18[c]. A POSITA would understand the method for assembling the percussive massager of Mabuchi, as modified by the teachings of Colloca, based on their respective disclosures. *See* Section VII.A.1.

- b. Element 18 [a]: “operatively connecting a motor to a proximal end of a piston, wherein the motor is configured to cause the piston to reciprocate at a first speed, wherein a distal end of the piston has a bore,”**

147. Mabuchi in view of Colloca teaches this limitation. *See* Sections VII.A.2.c (disclosing a piston with a distal end having a bore) and VII.A.2.d (describing operatively connecting a motor to the proximal end of the piston and causing it to reciprocate at a first speed). A POSITA would have understood from the teachings of Mabuchi and Colloca how to operatively connect the motor to the proximal end of the piston. *See, e.g.*, Ex-1005 at 2:45-52 (“A rotating disc 17 is fixed to the motor output shaft 21, which in turn causes the rotating disc 17 to rotate. A rod 3 is fitted at an end thereof to a crankshaft 19 provided on the rotating disc 17, the other end thereof being connected to an actuator 4 via a rod shaft 18.

Consequently, as the rotating disc 17 rotates, the actuator 4 is caused to reciprocate within an actuator bearing 16 via the rod 3.”).

**c. Element 18 [b]: “providing a drive mechanism configured to control a predetermined stroke length of the piston;”**

148. Mabuchi teaches this limitation. *See* Section VII.A.2.e. A POSITA would have understood from the teachings of Mabuchi and Colloca how to provide the recited drive mechanism. *See, e.g.*, Ex-1005 at 2:47-50 (“A rod 3 is fitted at an end thereof to a crankshaft 19 provided on the rotating disc 17, the other end thereof being connected to an actuator 4 via a rod shaft 18.”).

**d. Element 18 [c]: “providing a quick-connect system comprising the distal end of the piston and a first massaging head, wherein a proximal end of the first massaging head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”**

149. Mabuchi in view of Colloca teaches this limitation. *See* Section VII.A.2.f. A POSITA would understand that, because the proximal end of Mabuchi’s pater assembly 6 (i.e., the “first massaging head”), as modified by Colloca, includes magnet 44, it has been configured to be inserted into or removed from the bore in integrated actuator 4 and coupling 14 while the piston reciprocates the predetermined stroke length at the first speed. “The changing of the pater assembly 6 can be easily accomplished since the actuator 4 and the pater assembly 6 are automatically disconnected merely by turning each other.” Ex-1005, 8:40-43.

150. Further, a POSITA would have understood from the teachings of Mabuchi and Colloca how to provide the recited “quick-connect system.” *See, e.g.*, Ex-1005 at 8:3-10 (“As shown in FIGS. 18 and 19, the magnet 43 is implanted in the coupling 14, with polarity at the end face thereof being disposed as shown in the figures. The magnet 44 is also implanted in the flange 15 fixed to the end of the patter slide tube 10, with polarity at the end face thereof being disposed in such a manner that the number and position of the poles of the magnet 44 correspond with those of the magnet 43.”); Ex-1009 at [0034] (“The thrust nose piece 130 may be made of metals, such as steel, or other hard materials.”); [0037] (“In one embodiment the preload switch plunger 150 may be integral with the thrust nose piece 130.”).

**B. Ground 4: Claims 2-4 are unpatentable under 35 U.S.C. § 103 as obvious over Mabuchi and Colloca, further in view of Harris.**

151. For the reasons discussed below and in the corresponding claims found in the Claim Mapping Chart attached as Appendix B1 (Ex-1017), it is my opinion that Claims 2-4 are unpatentable as obvious over Mabuchi and Colloca, further in view of Harris.

**1. A POSITA Would Have Been Motivated to Combine Mabuchi and Colloca’s Teachings With Harris and Would Have Had a Reasonable Expectation of Success.**

152. A POSITA would have been motivated to combine Mabuchi, as modified by Colloca, with Harris, and would have had a reasonable expectation of success in doing so. Motivations to combine specific teachings are laid out clearly

in the below limitation-by-limitation analysis. However, in my opinion a POSITA would be motivated to combine Mabuchi, Colloca, and Harris as they are analogous art.

153. First, they are from the same field of endeavor. As discussed above in Section VII.A.1, Mabuchi and Colloca describe percussive massage devices. Likewise, Harris describes a “a hand-held massager having both vibratory and percussive massage capabilities and including a vibratory massage head, and a pair of percussive massage nodes suitable to deliver an effective therapeutic massage to the various contours of the body.” Ex-1006, 1:34-37.

154. Further, Mabuchi, Colloca, and Harris are directed to solving similar technical problems known in the art at the time of the invention. Similar to Mabuchi and Colloca (*see* Section VII.A.1), Harris seeks to “provide the user with a greater range of therapy,” and discloses that by providing “the ability to independently manipulate the speed, intensity and the pattern of the vibratory massage, the user may create a multitude of sensations to attain the desired result.” Ex-1006, 4:20-30.

155. Furthermore, both Mabuchi and Harris disclose devices that use internal rotary electric motors that drive flywheel-type devices to provide the massaging effect. In Mabuchi, the output shaft 21 of motor 20 is connected to flywheel 17, the rotation of which causes rod 3 to reciprocate actuator 4. Ex-1005, 2:43-52. In Harris, electric rotary motor 40 is connected to rotating drives 6 that

drive cylindrical cams 8. Ex-1006, 3:23-24. “[A]s motor 40 turns, the rotation of rotary drives 6 causes cylindrical cams 8 to rotate around rotary drive arms 7 and reciprocally lift and push down pivot arms 9.” *Id.*, 3:23-29. Both disclose that an increase in the rotation of their respective motors increases the speed of the percussion. Ex-1005, 3:38-57 (disclosing that the speed of the reciprocation of actuator 4 depends in part on the angular velocity  $\omega$  of rotating disc 17); Ex-1006, 3:36-41 (“As power to the motor 40 increases, the rotational speed of cylindrical eccentric cams 8 driven by rotary drives 6 and rotary drive arms 7 increases, increasing the speed of the stroke cycle of spacers 21 striking surfaces 18, resulting in greater intensity of the percussion of massage nodes 20.”). Accordingly, a POSITA would understand that their teachings (including the control aspects of Harris described below) could be readily combined.

156. Harris complements Mabuchi and Colloca by expressly teaching a “control panel 5” that includes a “plurality of touch sensitive control buttons or switches, including power control button 5a, speed setting control button 5b, LED speed indicator 5c, and various massage program buttons 5d-g for setting massage sensation, intensity and frequency of the vibrations of the percussive massage nodes 20 and vibratory massage head 3.” Ex-1006 at 2:49-57.

157. A POSITA would have been motivated to improve Mabuchi and Colloca by adding Harris’s teaching of a control panel that allows the motor to be

driven at multiple speeds, resulting in multiple different selectable speeds of the percussive massage. For example, Mabuchi teaches that its beneficial effects “can be enhanced by changing the shape or patting intensity of the padder assembly 6 . . . in accordance with the portion being treated or the purpose of the treatment.” Ex-1005, 5:56-60. Harris’s control panel, which includes speed setting controls and indicators, as well as specific “massage program buttons 5d-g for setting massage sensation, intensity and frequency of the vibrations of the percussive massage nodes 20 and vibratory massage head 3.” Ex-1006 at 2:49-57.

158. A POSITA would have had a reasonable expectation of success in combining the teachings of Mabuchi, Colloca, and Harris because they teach compatible systems—namely, they both include similar motor and drive systems, both of which power percussive massage devices for similar purposes. Changing the speed of reciprocation in Mabuchi’s device would be accomplished the same way it is accomplished in Harris – by increasing or decreasing the rotation of the motor. Moreover, as acknowledged by Mabuchi and Harris, percussive massage devices based on converting rotation to percussive movement were well known and conventional. *See* Ex-1005, 1:16-20 (“Conventionally, various apparatuses have been invented to produce similar face-lifting effects, in which included are an apparatus for applying vibrations to the skin surface and an apparatus for patting part of the body.”); Ex-1006, 1:15-21 (“Hand-held vibrating massagers are well known

in the art. Such massagers include a handle attached to a vibratory massaging head and driven by an electric motor with limited adjustment for intensity of the vibration. Also known in the art are hand-held percussive massagers, typically having a pair of percussion massage nodes.”).

159. Furthermore, because Mabuchi, Colloca, and Harris provide percussive massage devices that operate in similar ways, a POSITA would have understood that their teachings could be combined with little to no change in their respective functions. Specifically, Harris’ control panel could be implemented on Mabuchi, as modified by Colloca, by controlling the rotation speed of motor 20, which controls the angular velocity  $\omega$  of rotating disc 17, which in turn controls the speed of reciprocation of actuator 4.

160. Considering the state of the art at the time of the Priority Date, a POSITA would be motivated to combine these references to achieve a massage tool that would solve these problems described above. Thus, there was a clear motivation to combine the teachings of these references, as discussed in further detail below.

**1. Claim 2: “The percussive massager of claim 1, wherein the motor is configured to cause the piston to reciprocate at a second speed.”**

161. Mabuchi and Colloca further in view of Harris teaches Claim 2. Mabuchi discloses “repeatedly patting the skin surface at a given speed,” and that the speed of the actuator 4 is controlled by the angular velocity  $\omega$  of the rotating disk

17. Ex-1005, 9:14-17, 3:38-57. To the extent that Mabuchi does not expressly disclose that the motor is configured to cause the piston to reciprocate the predetermined stroke length at a second speed, Harris discloses a percussive massager with a control panel 5 that includes “speed setting control button 5b” and “LED speed indicator 5c.” Ex-1006, 2:49-57. Harris also discloses that “[a]s power to the motor 40 increases,” the increased “rotational speed” of the rotating drive mechanism “increas[es] the speed of the stroke cycle of spacers 21 striking surfaces.” *Id.* at 3:36-40.

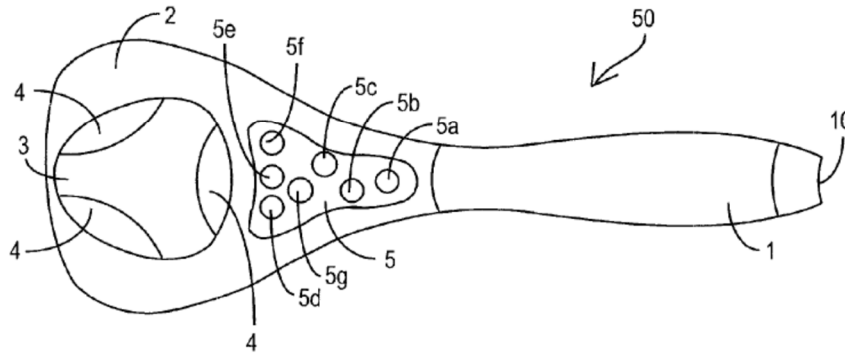
162. A POSITA would understand that implementing the control panel 5 with speed setting control button 5b would be a readily available modification to Mabuchi.

**2. Claim 3: “The percussive massager of claim 1, further comprising: a control panel positioned on an exterior of the housing.”**

163. Mabuchi and Colloca further in view of Harris teaches or suggests Claim 3. As shown in Harris’s Figure 1, below, Harris discloses a percussive massager with a “control panel 5” that is “sealed to the handle” and includes “a plurality of touch sensitive control buttons or switches.” Ex-1006, 2:49-57. A POSITA would understand that the handle where control panel 5 is located is on an exterior of the housing of Harris’s device. Further, a POSITA would understand that

the control panel should be similarly located on the exterior of the housing 2 of Mabuchi's device to be accessible to a user.

FIG. 1



Ex-1006, Fig. 1

3. **Claim 4: “The percussive massager of claim 3, wherein the control panel is configured to display one or more visual indicators.”**

164. Mabuchi and Colloca further in view of Harris teaches Claim 4. For example, Harris discloses that the control panel 5 includes an “LED speed indicator 5c.” Ex-1006, 2:49-57. A POSITA would understand that “LED” refers to “light emitting diode,” and that “LED speed indicator 5c” refers to an LED screen or other visual indicator identifying the speed of the percussion during operation of Harris’ device.

**C. Ground 5: Claims 1, 7, 9-11, 13, and 18 Are Unpatentable Under 35 U.S.C. § 103 As Obvious Over Pivaroff In View of Clark.**

165. For the reasons discussed below and in the corresponding claims found in the Claim Mapping Chart attached as Appendix B2 (Ex-1018), it is my opinion

that Claims 1, 7, 9-11, 13, and 18 are unpatentable as obvious over Pivaroff in view of Clark.

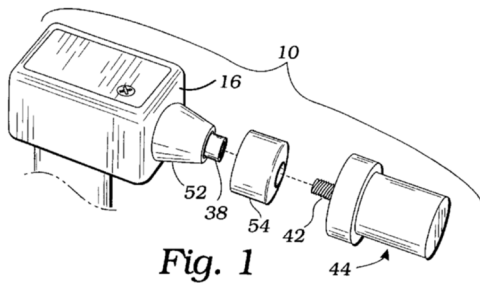
**1. A POSITA Would Have Been Motivated to Combine Pivaroff and Clark's Teachings and Would Have Had a Reasonable Expectation of Success.**

166. A POSITA would have been motivated to combine the teachings of Pivaroff and Clark, and would have had a reasonable expectation of success in doing so. Motivations to combine specific references are laid out clearly in the below limitation-by-limitation analysis. However, in my opinion a POSITA would be motivated to combine the teachings of Pivaroff and Clark.

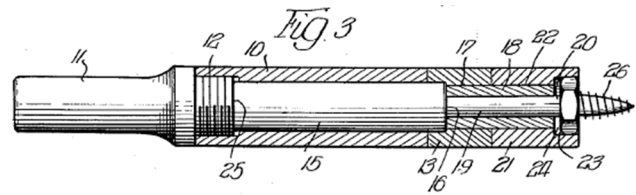
167. Pivaroff describes a “deep muscle stimulation device, which provides deep muscle tissue with kinetic forms of percussion.” Ex-1007, 1:30-34. It is “developed for use by professionals in the chiropractic, medical and physical therapy fields,” as well as by “massage therapists, rehabilitation providers and sports trainers in all athletic disciplines,” and designed to be “used for a range of patients.” *Id.* 3:65-4:26. To that end, Pivaroff discloses that hollow heads with “various mixtures” of granular materials can be used in a hollow head 44 that is “quickly reciprocated back and forth to provide sufficient percussion and mechanical vibrations against a portion of a patient to which it is applied by a user.” *Id.* 2:63-3:19; 3:48-54. As shown in Pivaroff’s Figure 1 below, Pivaroff discloses that the hollow head 44 is attached to reciprocating rod 38, with an “outer end of the rod 38 includes a recessed

opening formed therein,” which “captures one end of a connecting means” for the hollow head 44. *Id.*, 2:48-54.

168. Clark describes connecting means for “magnetic tools . . . adapted to magnetically hold and drive a multiplicity of different types of screws or the like.” Ex-1014, 1:8-10. Clark discloses a bar magnet 15 such that the “magnetic tool [is] adapted to receive, interchangeably, a plurality of tool endings such as bits, sockets, and the like . . . while the same are magnetically held in contact with the tool.” Ex-1014, 1:66-70.



**Ex-1007, Fig. 1**



**Ex-1014, Fig. 3**

169. Clark complements Pivaroff by teaching a connecting means that uses magnetic connection, including a bar magnet 15 which “abuts at one end of the shank 11 and terminates at the other end near the joint between shell 10 and the cylindrical member 13” such that “the magnetic forces are transmitted to the tip of the screw driver 28 so that the screw will be held thereto.” Ex-1014, 3:2-4; 3:72-73.

170. A POSITA would have been motivated to apply Clark’s teaching of a magnetic connection mechanism to Pivaroff’s teachings of connecting means 42 on

the proximal end of hollow body 44 so that the changing of the hollow body can be easily accomplished. For example, Clark teaches that “the magnetic forces which are transmitted through the magnetically permeable membrane 19 from the magnet 15 are utilized to hold the workpiece in driving position.” *Id.* at 3:45-48.

171. A POSITA would have had a reasonable expectation of success in combining Clark’s teachings with those of Pivaroff because they teach compatible systems—namely, connecting means for interchangeable heads that can easily be inserted or removed.

172. Furthermore, because Pivaroff and Clark’s connecting means operate in similar ways, a POSITA would have understood that their teachings could be combined with little to no change in their respective functions. Specifically, Clark’s magnetic connection could be implemented on Pivaroff’s connecting means 42 on the proximal end of hollow body 44.

173. Considering the state of the art at the time of the Priority Date, a POSITA would be motivated to combine these references to achieve a massage tool that would solve these problems described above. Thus, there was a clear motivation to combine the teachings of these references, as discussed in further detail below.

**2. Independent Claim 1**

**a. Element 1[pre]: “A percussive massager comprising:”**

174. Pivaroff teaches the preamble, to the extent it is limiting. For example, Pivaroff discloses a device that “provides deep muscle tissue with kinetic forms of percussion.” Ex-1007, 1:32-33.

**b. Element 1[a]: “a housing;”**

175. Pivaroff teaches Element 1[a]. Pivaroff discloses that “the deep muscle stimulation device 10 of the present invention includes a body 12 comprised of an elongated, substantially hollow handle 14, a top element or housing 16, and a hollow head 44.” Ex-1007, 2:30-33. A POSITA would understand that the “housing” of Pivaroff is not limited to the top hollow housing 16, but rather covers the exterior of the device, including handle 14. To that end, Pivaroff discloses that “[t]he top hollow housing 16 of the device 10 of the present invention is preferably made from the same material as the elongated handle 14 ....” *Id.*, 3:33-35.

**c. Element 1[b]: “a piston in the housing having a proximal end and a distal end, the distal end of the piston having a bore;”**

176. Pivaroff teaches Element 1[b]. Pivaroff discloses “a connecting element or rod 38” that includes an “inner end” (“proximal end”) and an “outer end” (“distal end”). Ex-1007, 2:44-50. Rod 38 is within the housing of the device, and specifically within top element or housing 16. *See, e.g., id.*, 3:33-38 (“The top hollow housing 16 . . . includes a removable top plate and a truncated, pyramid-

shape extending portion 52 which surrounds and provides protection around the reciprocating rod 38.”).

177. Pivaroff further teaches the distal end of the piston having a bore. Pivaroff discloses that “[t]he reciprocating link 34 is coupled to a connecting element or rod 38, as by means of a pin 36, held in one or more openings formed in a first or inner end of the connecting element or rod 38. The inner end of rod 38 or an outer end or reciprocating link 34 may be bifurcated. The other or outer end of the rod 38 includes a recessed opening 40 formed therein.” Ex-1007, 2:44-50. Thus, Pivaroff discloses that rod 38, which is the piston, includes a recessed opening 40, which is the bore. *See, e.g., id.*, Figs. 1, 3-6.

**d. Element 1[c]: “a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed;”**

178. Pivaroff teaches Element 1[c]. For example, “[a]n electrical motor 24 is mounted within the elongated, hollow handle 14, and includes a central rotary arbor or shaft 26, driven by the motor.” Ex-1007, 2:37-40. Pivaroff discloses that the motor 24 is operatively connected to the proximal end of rod 38 (“the piston”). As shown in Pivaroff’s Figure 6 below, the motor’s rotary shaft 26 is coupled to “an offset cam element or means 30.” *Id.*, 2:40-44. And as shown in Pivaroff’s Figures 3-5 below, the offset cam element 30 has “an upwardly extending offset element or

finger connected to a reciprocating link 34.” *Id.*, 2:40-44. The reciprocating link 34 is coupled to the proximal end of rod 38. *Id.*, 2:44-47.

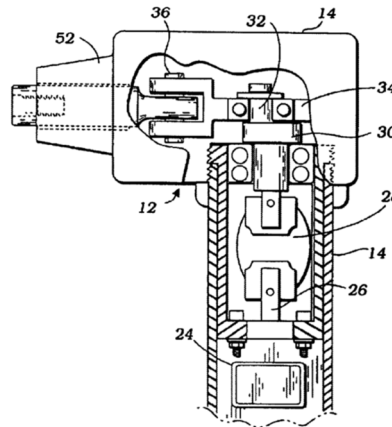


Fig. 6

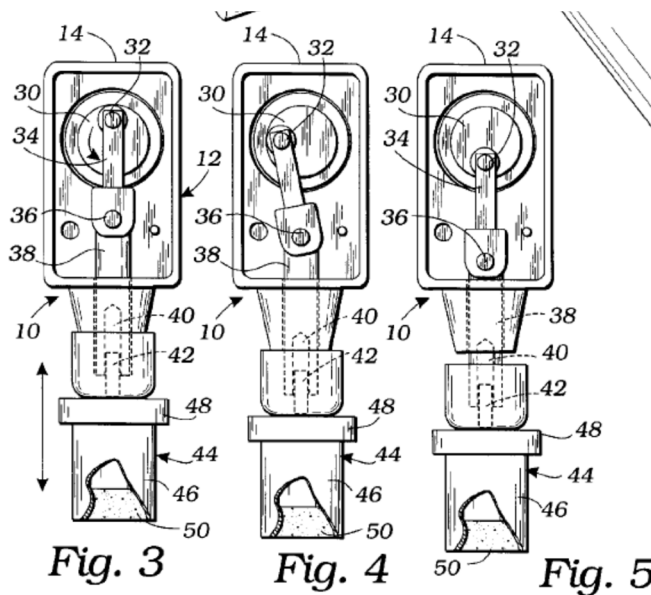
**Ex-1007, Fig. 6**

Fig. 3

Fig. 4

Fig. 5

**Ex-1007, Figs. 3-5.**

179. Pivaroff also discloses that the motor causes the piston to reciprocate at a first speed. Pivaroff discloses that the “electric motor operates at a speed of

between about 2000 to 3600 RPM, so as to rotate the shaft 26 and coupling system 28 at that speed. This rotational speed is transferred to a reciprocating motion, as shown by arrow 56 in FIG. 3, whereby the head 44 is quickly reciprocated back and forth to provide sufficient percussion and mechanical vibrations against a portion of a patient to which it is applied by a user, to provide the deep muscle tissue within the patient's body with kinetic forms of percussion and concussion vibration.” Ex-1007, 3:41-53. A POSITA would understand that the speed of reciprocation of rod 38 corresponds to the rotating speed of the motor 24.

**e. Element 1[d]: “a drive mechanism that controls a predetermined stroke length of the piston; and”**

180. Pivaroff teaches Element 1[d]. As shown in Figures 3-5 below, the drive mechanism is comprised of cam element 30 and reciprocating link 34. A POSITA would understand that the stroke length of rod 38 is controlled by the drive mechanism, including the location of finger 32 on cam element 30. Specifically, as cam element 30 rotates in a counterclockwise direction, finger 32 rotates around a circumference of a circle that is defined as  $\pi * r^2$ , where r is the offset of finger 32 from the center of cam element 30. As a result of this movement, reciprocating link 34 pushes rod 38 forward (Figs. 4-5) then backwards (Fig. 3) at a predetermined stroke length.



**Ex-1007, Figs. 3-5**

- f. Element 1[e]: “a quick-connect system comprising the distal end of the piston and a first massaging head, wherein the quick-connect system is configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”**

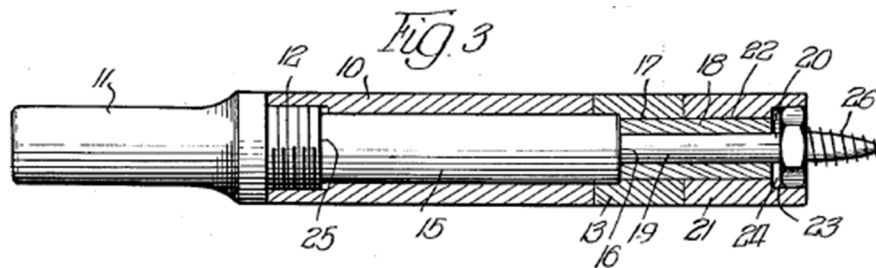
181. Pivaroff in view of Clark teaches Element 1[e].

182. First, Pivaroff in view of Clark teaches a quick-connect system comprising the distal end of the piston and a first massaging head. Pivaroff discloses a hollow head 44 that attaches to the distal end of rod 38 and “is quickly reciprocated back and forth to provide sufficient percussion and mechanical vibrations against a portion of a patient to which it is applied by a user, to provide the deep muscle tissue within the patient's body with kinetic forms of percussion and concussion vibration.”

Ex-1007, 3:47-54. A POSITA would understand that hollow head 44 is a first

massaging head. *Id.*, Figure 1. Pivaroff further discloses that the recessed opening 40 at the distal end of rod 38 (i.e., the piston) “captures one end of a connecting means, such as a pin 42, as by having screw threads formed therein. The other or outer end of the pin 42 is screw threaded or otherwise captured in the hollow head 44.” *Id.*, 2:50-54.

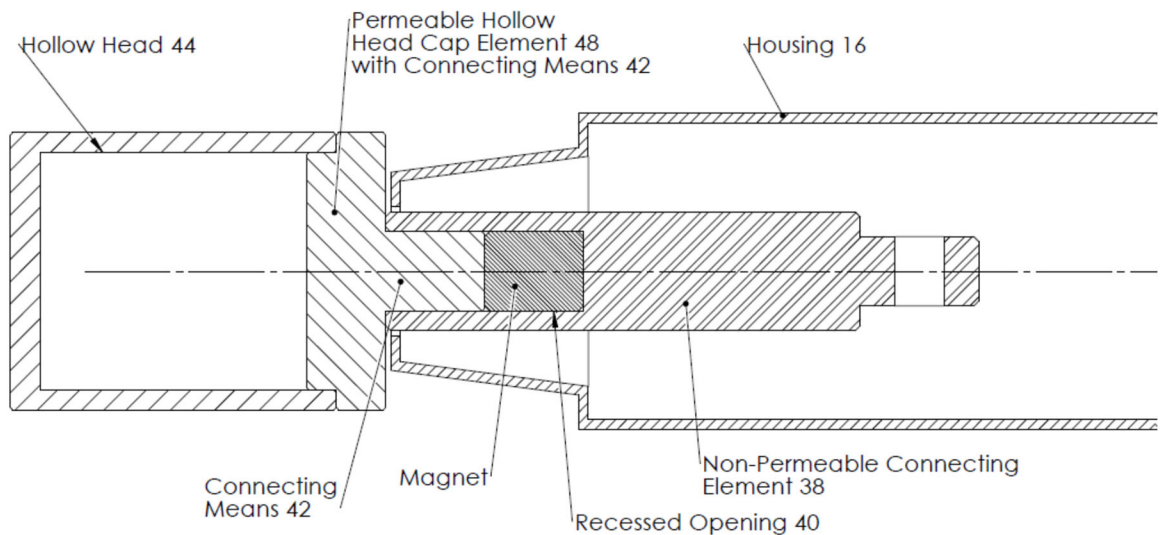
183. Furthermore, Clark discloses a bar magnet 15 which “abuts at one end of the shank 11 and terminates at the other end near the joint between the shell 10 and the cylindrical member 13.” Ex-1014, 3:2-4. The embodiment in Clark’s Figure 3 (shown below) discloses that “the magnetic forces which are transmitted through the magnetically permeable membrane 19 from the magnet 15 are utilized to hold the workpiece in driving position.” *Id.*, 3:45-48. Clark also discloses that “the workpiece holder 21 may be easily removed from its assembled position and a workpiece holder having a different size or shape chamber 23 substituted therefor.” *Id.* at 4:1-3.



**Ex-1014, Fig. 3**

184. A POSITA would have been motivated to configure the recessed opening 40 to capture the connecting means (i.e., connecting means 42 on the

proximal end of hollow body 44) by using a magnetic connection as taught by Clark to provide a quick-connect system so that the changing of the hollow body (the first massaging head) can be easily accomplished. An illustration of how a POSITA would have understood to modify Pivaroff in view of Clark is shown below.



**Pivaroff FIG. 5 modified in view of Clark**

185. Furthermore, a POSITA would understand that Pivaroff, as modified with Clark's teachings of a quick-connect system, would be configured to have a proximal end of the massaging massage head (i.e., connecting means 42) inserted into or removed from recessed opening 40 while rod 38 reciprocates the predetermined stroke length at the first speed. Clark teaches that "the workpiece holder 21 may be easily removed from its assembled position and a workpiece holder having a different size or shape chamber 23 substituted therefor." Ex-1014, 4:1-3. Moreover, Clark also teaches that the bore 17 in the cylindrical portion 13 "is

particularly adapted to” the configuration of the tool held therein. *Id.* 3:11-14. As discussed above in Section VII.A.2.f, configuring a connecting mechanism to ensure a positive connection without positioning the piston and the first massaging head suggests to a POSITA that the connecting mechanism is configured to have the first massaging head inserted into or removed from the piston while the piston reciprocates a predetermined stroke length at the first speed. A POSITA would similarly understand that Pivaroff’s connecting means, using a bar magnet as taught by Clark in place of a threaded connection, would ensure a positive connection without positioning the piston and the first massaging head.

**3. Claim 7: “The percussive massager of claim 1, wherein the motor has an output shaft configured to rotate about a rotation axis, and wherein the drive mechanism comprises: a flywheel operatively connected to the output shaft of the motor to rotate about a flywheel axis, the output shaft extending into the flywheel along the flywheel axis; and a crank pin extending from the flywheel, the crank pin being operatively connected to the piston.”**

186. Pivaroff teaches Claim 7. Pivaroff’s rotary shaft 26 is an output shaft of the motor 24. A POSITA would understand that a rotary shaft of a motor is configured to rotate about a rotation axis.

187. Pivaroff’s disclosure of the recited arrangement of the “drive mechanism” is shown below in the annotated image of Pivaroff’s Figure 6 below. Pivaroff discloses that motor 24 “includes a **central rotary arbor or shaft 26.**” Ex-1007, 2:37-40. The “**rotary shaft 26** is coupled by any available or desired means,

such as a coupling system 28 to an **offset cam element or means 30**, having an **upwardly extending offset element or finger 32** connected to a **reciprocating link 34**. The **reciprocating link 34** is coupled to a connecting element or rod 38, as by means of a **pin 36**, held in one or more openings formed in a first or inner end of the **connecting element or rod 38**.” *Id.* at 2:40-47.

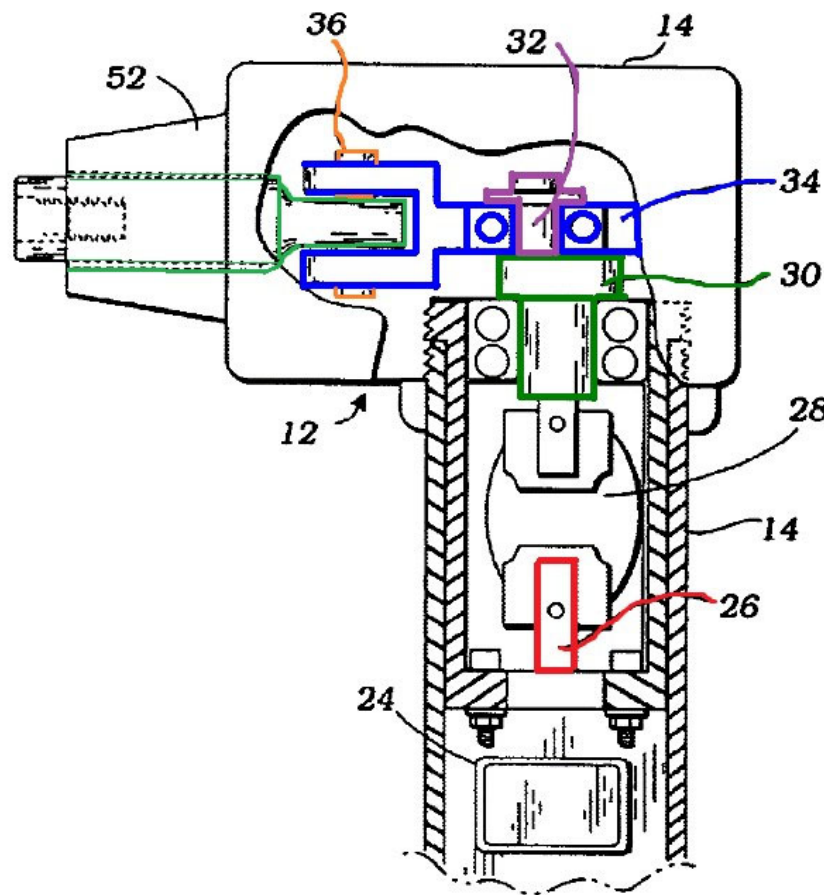


**Fig. 6**

**Ex-1007, Fig. 6 (annotated)**

188. Pivaroff's cam element 30 discloses the recited "flywheel" that rotates about a "flywheel axis." As shown in the figure above, cam element 30 is operatively connected to the motor output shaft 26.

189. Pivaroff's finger 32 discloses the recited "crank pin." Finger 32 extends from cam element 30 (the "flywheel") and is operatively connected to rod 38 (the "piston"). *See also* Ex-1007, Figs. 3-5.

190. Pivaroff does not expressly disclose the output shaft extending into the flywheel along the flywheel axis. However, Pivaroff discloses that "rotary shaft 26 is coupled *by any available or desired means*, such as a coupling system 28" to cam element 30. Ex-1007, 2:40-42 (emphasis added). Accordingly, one of skill in the art would understand that rotary shaft 26 could be coupled directly to cam element 30, and thus extend into the flywheel along the flywheel axis.

**4. Claim 9: "The percussive massager of claim 7, further comprising a handle, wherein the motor and the handle are on a same side of a plane perpendicular to the flywheel axis that extends through the flywheel."**

191. Pivaroff teaches Claim 9. Pivaroff discloses "motor 24 is mounted within the elongated, hollow handle 14, and includes a central rotary arbor or shaft 26, driven by the motor. The rotary shaft 26 is coupled by any available or desired means, such as a coupling system 28 to an offset cam element or means 30, having an upwardly extending offset element or finger 32 connected to a reciprocating link 34. The reciprocating link 34 is coupled to a connecting element or rod 38, as by

means of a pin 36, held in one or more openings formed in a first or inner end of the connecting element or rod 38.” Ex-1007, 2:37-50. As shown in the annotated Figure 6 below, the handle 14 and motor 24 are configured below the cam element 30 such that the motor and the handle are on a same side of (i.e., below) a plane perpendicular to the flywheel axis.

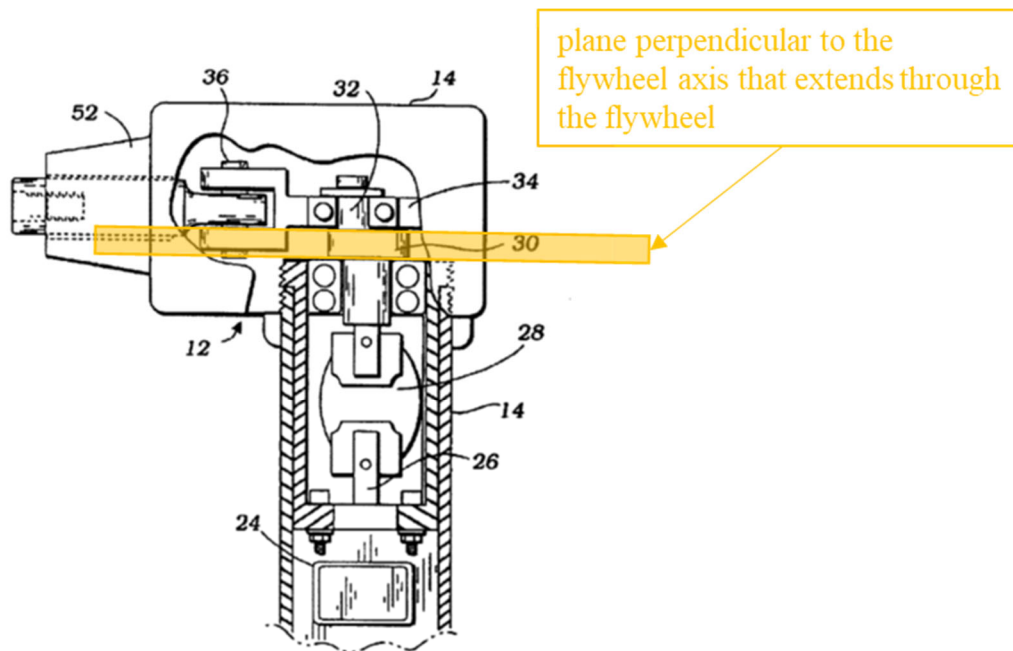


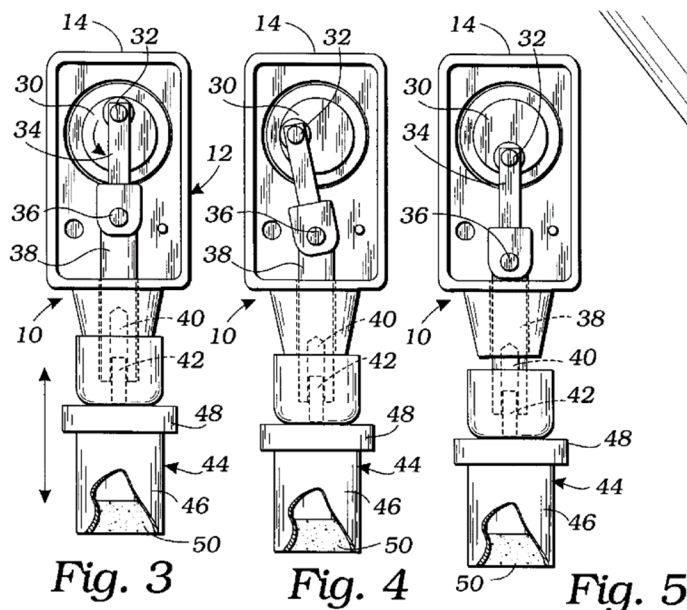
*Fig. 6*

**Ex-1007 FIG. 6 (annotated)**

5. **Claim 10:** “The percussive massager of claim 7, wherein an offset between the flywheel axis and an axis of the crank pin controls the predetermined stroke length of the piston.”

192. Pivaroff teaches Claim 10. As discussed above in Section VII.C and shown in Pivaroff’s Figures 3-5 below, Pivaroff discloses that “[t]he rotary shaft 26 is coupled by any available or desired means, such as a coupling system 28 to an

offset cam element or means 30, having an upwardly extending offset element or finger 32 connected to a reciprocating link 34. The reciprocating link 34 is coupled to a connecting element or rod 38, as by means of a pin 36, held in one or more openings formed in a first or inner end of the connecting element or rod 38.” Ex-1007, 2:40-54. A POSITA would understand that the offset between Pivaroff’s offset cam element 30 and the reciprocating link 34 to which rod 38 is attached controls the stroke length of rod 38.



**Ex-1007, Figs. 3-5**

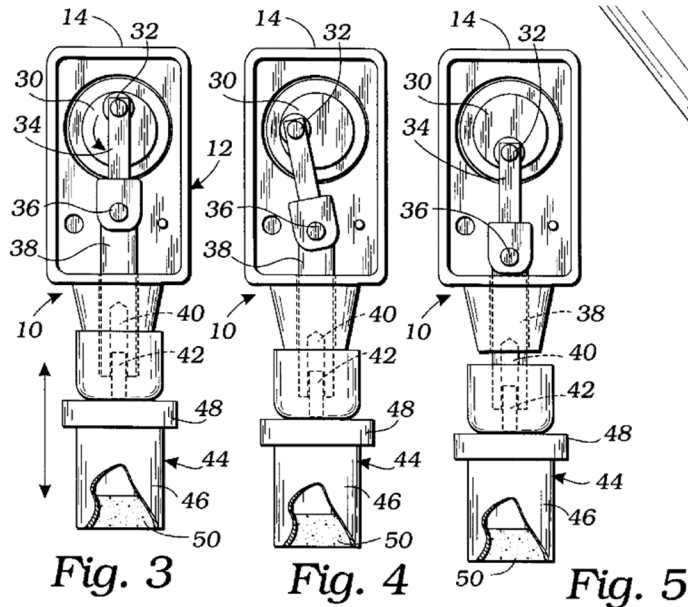
6. **Claim 11: “The percussive massager of claim 7, wherein the motor is directly connected to the flywheel, and wherein the crank pin is directly connected to the flywheel.”**

193. Pivaroff teaches Claim 11. Pivaroff discloses that rotary shaft 26 of motor 24 “is coupled by any available or desired means, such as a coupling system 28 to an offset cam element or means 30,” (i.e., the recited “flywheel”) “having an

upwardly extending offset element or finger 32 connected to a reciprocating link 34.” Ex-1007, 2:40-44. Accordingly, a POSITA would understand that alternatives to coupling system 28 would include a direct connection of motor shaft 26 to the flywheel and that the finger 32 (i.e., the recited “crank pin”) is directly connected to the offset cam element 30 (i.e., the recited “flywheel”).

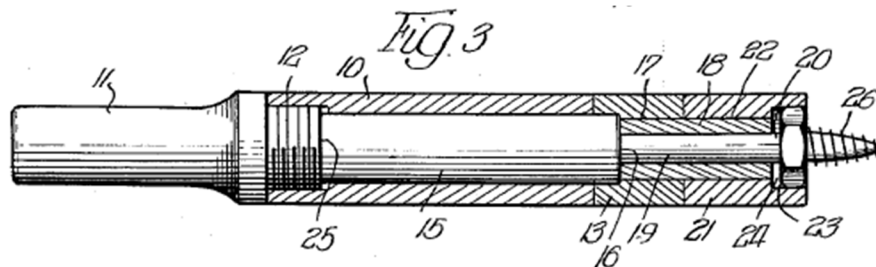
**7. Claim 13: “The percussive massager of claim 1, wherein the bore comprises a substantially cylindrical bore.”**

194. Pivaroff in view of Clark teaches Claim 13. For example, Pivaroff discloses that “the rod 38 includes a recessed opening 40 formed therein. The recessed opening 40 captures one end of a connecting means, *such as* a pin 42, as by having screw threads formed therein. The other or outer end of the pin 42 is screw threaded *or otherwise* captured in the hollow head 44.” Ex.1007, 2:49-54 (emphases added). A POSITA would understand Pivaroff as teaching that a threaded connection is just one way of connecting the rod 38 to pin 42, and that, when using a magnetic connection as taught by Clark, the pin and corresponding recessed opening 40 (i.e., the “bore”) would be cylindrical.



**Ex-1007, Figs. 3-5**

195. Furthermore, as shown in Figure 3, Clark discloses a shell 10 that has a cylindrical bore to accept a cylindrical magnet 15.



**Ex-1014, Fig. 3**

## 8. Independent Claim 18

- a. Element 18 [pre]: “A method of assembling a percussive massager, the method comprising:”

196. Pivaroff in view of Clark teaches a method of assembling a percussive massager, to the extent this limitation is limiting. See Section VII.C.2.a. Claim 18 does not specify any specific method for assembling the components recited in

elements 18[a], 18[b], and 18[c]. A POSITA would understand the method for assembling the percussive massager of Pivaroff, as modified by the teachings of Clark, based on their respective disclosures. *See* Section VII.C.1.

- b. Element 18 [a]: “operatively connecting a motor to a proximal end of a piston, wherein the motor is configured to cause the piston to reciprocate at a first speed, wherein a distal end of the piston has a bore,”**

197. Pivaroff in view of Clark teaches this limitation. *See* Sections VII.C.2.c and VII.C.2.d. A POSITA would have understood from the teachings of Pivaroff and Clark how to operatively connect the motor to the proximal end of the piston. *See, e.g.*, Ex-1007 at 2:40-47 (“The rotary shaft 26 is coupled by any available or desired means, such as a coupling system 28 to an offset cam element or means 30, having an upwardly extending offset element or finger 32 connected to a reciprocating link 34. The reciprocating link 34 is coupled to a connecting element or rod 38, as by means of a pin 36, held in one or more openings formed in a first or inner end of the connecting element or rod 38.”).

- c. Element 18 [b]: “providing a drive mechanism configured to control a predetermined stroke length of the piston;”**

198. Pivaroff in view of Clark teaches this limitation. *See* Section VII.C.2.e. A POSITA would have understood from the teachings of Pivaroff and Clark how to provide the recited drive mechanism. *See, e.g.*, Ex-1007 at 2:44-48 (“The reciprocating link 34 is coupled to a connecting element or rod 38, as by means of a

pin 36, held in one or more openings formed in a first or inner end of the connecting element or rod 38. The inner end of rod 38 or an outer end or reciprocating link 34 may be bifurcated.”).

- d. Element 18 [c]: “providing a quick-connect system comprising the distal end of the piston and a first massaging head, wherein a proximal end of the first massaging head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.”**

199. Pivaroff in view of Clark teaches this limitation. *See* Section VII.C.2.f. A POSITA would understand that, because the proximal end of Pivaroff’s hollow head (i.e., the “first massaging head”), as modified by Clark, is configured to connect to bar magnet 15 in Pivaroff’s recessed opening 40 at the distal end of rod 38 (i.e., the piston), it has been configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed. “From the foregoing description it can readily be seen that the workplace holder 21 may be easily removed from its assembled position and a workplace holder having a different size or shape chamber 23 substituted therefor.” Ex-1014, 3:75-4:3.

200. Further, a POSITA would have understood from the teachings of Pivaroff and Clark how to provide the recited “quick-connect system.” *See, e.g.*, Ex-1007 at 2:48-50 (“The other or outer end of the rod 38 includes a recessed opening 40 formed therein.”); Ex-1014 at 2:66-3:1 (“A hollow cylindrical member 13 is permanently secured to the other end of the shell 10 by some suitable means

such as brazing or welding and as will be seen later on, forms a work piece holder receiving end. The cylindrical member 13 is made from a magnetically permeable material such as a nonaustenitic steel. A bar magnet 15 of substantially the same length as shell 10 is assembled therein.”).

**D. Ground 6: Claims 2-4 Are Unpatentable Under 35 U.S.C. § 103 As Obvious Over Pivaroff in View of Clark, Further In View of Harris.**

201. For the reasons discussed below and in the corresponding claims found in the Claim Mapping Chart attached as Appendix B2 (Ex-1018), it is my opinion that Claims 2-4 are unpatentable as obvious over Pivaroff in view of Clark, further in view of Harris.

**1. A POSITA Would Have Been Motivated to Combine Pivaroff and Clark With Harris’s Teachings and Would Have Had a Reasonable Expectation of Success.**

202. A POSITA would have been motivated to combine Pivaroff, as modified by Clark, with the teachings of Harris, and would have had a reasonable expectation of success in doing so. Motivations to combine specific teachings are laid out clearly in the below limitation-by-limitation analysis. However, in my opinion a POSITA would be motivated to combine the Pivaroff, as modified by Clark, with Harris as they are analogous art.

203. First, they are from the same field of endeavor. Both Pivaroff and Harris describe percussive massage devices. Pivaroff describes a “deep muscle

stimulation device, which provides deep muscle tissue with kinetic forms of percussion.” Ex-1007, 1:30-34. Harris describes “a hand-held massager having both vibratory and percussive massage capabilities and including a vibratory massage head, and a pair of percussive massage nodes suitable to deliver an effective therapeutic massage to the various contours of the body.” Ex-1006, 1:34-37.

204. Further, Pivaroff and Harris are directed to solving similar technical problems known in the art at the time of the invention. Pivaroff discloses that its device was developed to be used in a range of fields, including chiropractic, medical, physical therapy, massage therapists, rehabilitation providers, and sports trainers, as well as “for a range of patients who suffer chronic pain in both everyday life and professional athletes.” Ex-1007, 3:65-4:22. Similarly, Harris seeks to “provide the user with a greater range of therapy,” and discloses that by providing “the ability to independently manipulate the speed, intensity and the pattern of the vibratory massage, the user may create a multitude of sensations to attain the desired result.” Ex-1006, 4:20-30.

205. Harris, like Pivaroff (see Section VII.C.1) discloses a device that uses an internal rotary electric motor that drives a flywheel-type devices to provide the massaging effect. In Harris, electric rotary motor 40 is connected to rotating drives 6 that drive cylindrical cams 8. Ex-1006, 3:23-24. “[A]s motor 40 turns, the rotation of rotary drives 6 causes cylindrical cams 8 to rotate around rotary drive arms 7 and

reciprocally lift and push down pivot arms 9.” *Id.*, 3:23-29. Harris likewise discloses that an increase in the rotation of the motor increases the speed of the percussion. Ex-1006, 3:36-41 (“As power to the motor 40 increases, the rotational speed of cylindrical eccentric cams 8 driven by rotary drives 6 and rotary drive arms 7 increases, increasing the speed of the stroke cycle of spacers 21 striking surfaces 18, resulting in greater intensity of the percussion of massage nodes 20.”). Accordingly, a POSITA would understand that their teachings (including the control aspects of Harris described below) could be readily combined.

206. Harris complements Pivaroff and Clark by expressly teaching a “control panel 5” that includes a “plurality of touch sensitive control buttons or switches, including power control button 5a, speed setting control button 5b, LED speed indicator 5c, and various massage program buttons 5d-g for setting massage sensation, intensity and frequency of the vibrations of the percussive massage nodes 20 and vibratory massage head 3.” Ex-1006, 2:49-57.

207. A POSITA would have been motivated to improve Pivaroff and Clark by adding Harris’s teaching of a control panel that allows the motor to be driven at multiple speeds, resulting in multiple different selectable speeds of the percussive massage. For example, Pivaroff teaches that “[p]referably, the electric motor operates at a speed of between about 2000 to 3600 RPM, so as to rotate the shaft 26 and coupling system 28 at that speed.” Ex-1007, 3:44-47. Harris’s control panel,

which includes speed setting controls and indicators, as well as specific “massage program buttons 5d-g for setting massage sensation, intensity and frequency of the vibrations of the percussive massage nodes 20 and vibratory massage head 3.” Ex-1006, 2:49-57.

208. A POSITA would have had a reasonable expectation of success in combining the teachings of the Pivaroff/Clark combination with Harris because they teach compatible systems—namely, they both include similar motor and drive systems, both of which power percussive massage devices for similar purposes. Changing the speed of reciprocation in Pivaroff’s device would be accomplished the same way it is accomplished in Harris – by increasing or decreasing the rotation of the motor. Moreover, as acknowledged by Harris, percussive massage devices based on converting rotation to percussive movement were well known and conventional. *See* Ex-1006, 1:15-21 (“Hand-held vibrating massagers are well known in the art. Such massagers include a handle attached to a vibratory massaging head and driven by an electric motor with limited adjustment for intensity of the vibration. Also known in the art are hand-held percussive massagers, typically having a pair of percussion massage nodes.”).

209. Furthermore, because Pivaroff and Harris provide percussive massage devices that operate in similar ways, a POSITA would have understood that their teachings could be combined with little to no change in their respective functions.

Specifically, Harris' control panel could be implemented on Pivaroff by controlling the rotation speed of motor 24. Pivaroff discloses that the motor's operation at a particular speed "rotate[s] the shaft 26 and coupling system 28 at that speed," and that "rotational speed is transferred to a reciprocating motion . . . whereby the head 44 is quickly reciprocated back and forth." Ex-1007, 3:44-52.

210. Considering the state of the art at the time of the Priority Date, a POSITA would be motivated to combine these references to achieve a massage tool that would solve these problems described above. Thus, there was a clear motivation to combine the teachings of these references, as discussed in further detail below.

**2. Claim 2: "The percussive massager of claim 1, wherein the motor is configured to cause the piston to reciprocate at a second speed."**

211. Pivaroff in view of Clark and Harris teaches Claim 2. For example, Pivaroff discloses that "[p]referably, the electric motor operates at a speed of between about 2000 to 3600 RPM, so as to rotate the shaft 26 and coupling system 28 at that speed," and that "[t]his rotational speed is transferred to a reciprocating motion." Ex-1007, 3:41-53; *see also* Fig. 3. To the extent that Pivaroff and Clark do not expressly disclose that the motor is configured to cause the piston to reciprocate the predetermined stroke length at a second speed, as discussed above in Section VII.B.1, Harris discloses a percussive massager with a control panel 5 that includes "speed setting control button 5b" and "LED speed indicator 5c." Ex-1006,

2:49-57. Harris also discloses that “[a]s power to the motor 40 increases,” the increased “rotational speed” of the rotating drive mechanism “increas[es] the speed of the stroke cycle of spacers 21 striking surfaces.” *Id.*, 3:36-40.

**3. Claim 3: “The percussive massager of claim 1, further comprising: a control panel positioned on an exterior of the housing.”**

212. Pivaroff in view of Clark and Harris teaches Claim 3. As discussed in Section VII.B.2, Harris discloses a percussive massager with a “control panel 5” that is “sealed to the handle” and includes “a plurality of touch sensitive control buttons or switches.” Ex-1006, 2:49-57. For the reasons discussed in that section, a POSITA would understand that control panel 5 would similarly be positioned on an exterior of the housing of Pivaroff’s device.

**4. Claim 4: “The percussive massager of claim 3, wherein the control panel is configured to display one or more visual indicators.”**

213. Pivaroff in view of Clark and Harris teaches Claim 3. As discussed in Section VII.B.3, Harris discloses that the control panel 5 includes an “LED speed indicator 5c.” Ex-1006, 2:49-57.

## **VIII. CONCLUSION**

214. For the reasons set forth above, I believe that Claims 1-18 of the ’082 Patent are unpatentable under 35 U.S.C. § 112(a), and Claims 1-4, 7, 9-11, 13, and 18 are also unpatentable in view of the prior art.

215. In signing this declaration, I recognize that it will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place in the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

216. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

217. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

By: \_\_\_\_\_  
John D. Pratt, Ph.D., P.E.

Date: December 23, 2024