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(54) **HAIR DRYER**

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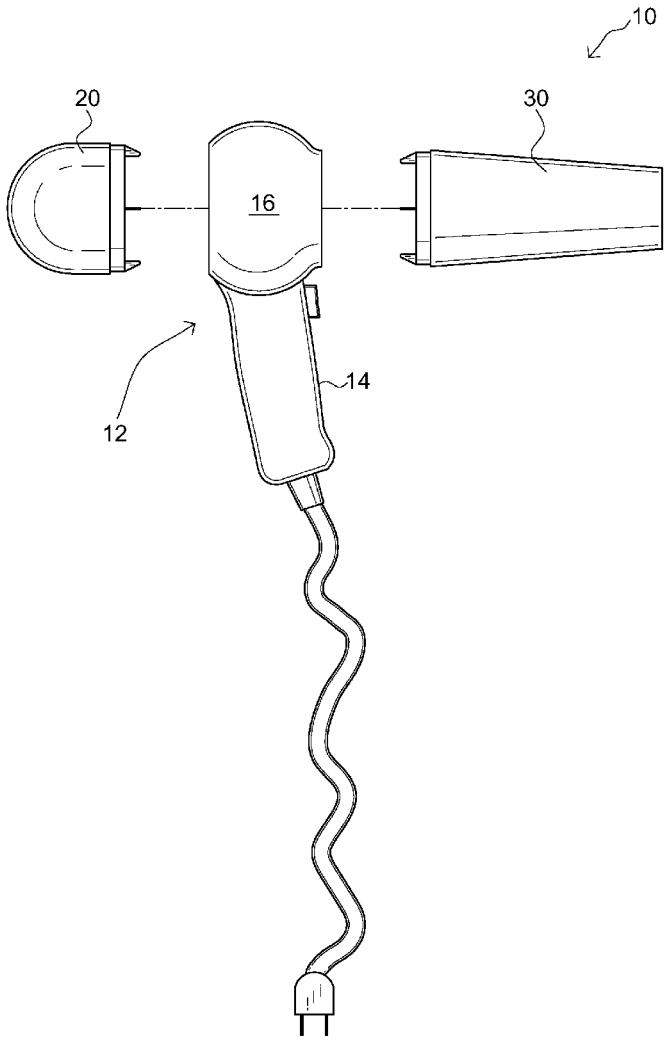
USPC **34/97**

(57) **ABSTRACT**

A hair dryer including a main body having a handle and a housing. The hair dryer includes a first module and a second module, both selectably coupleable and thereby functionally coupleable to the main body. The first module and the second module each include a hair dryer component selected from the group of hair dryer components consisting of a heater module and a blower module. The first module is a blower module including a motor. The second module is a heater module including a heating element. The first module includes an identification device configured to identify a characteristic of the first module and wherein the housing includes a communication module configured to read an identification device and communicate a read characteristic to a control module. The hair dryer includes a plurality of interchangeable first modules that include varying operational characteristics.



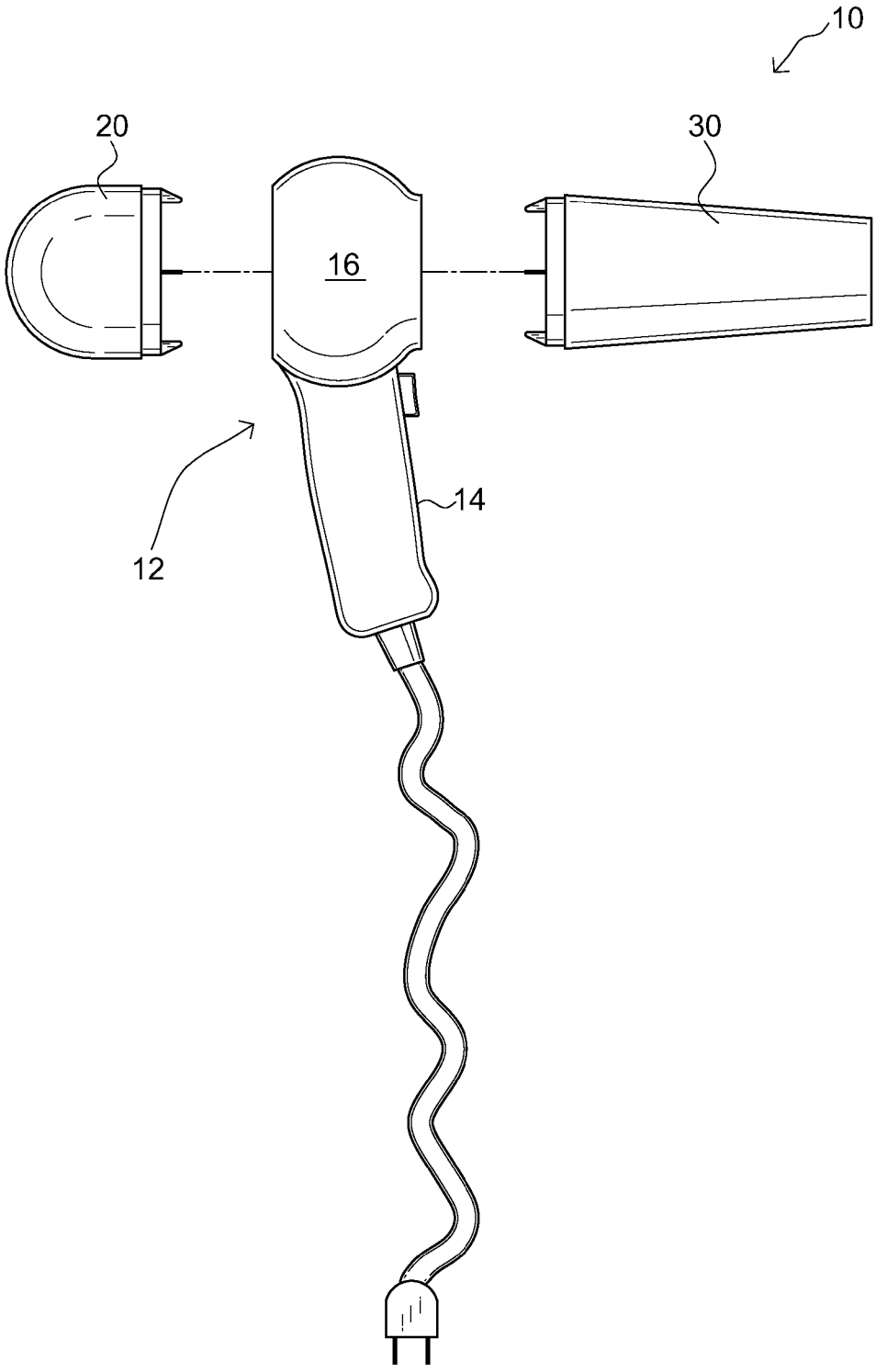


FIG. 1

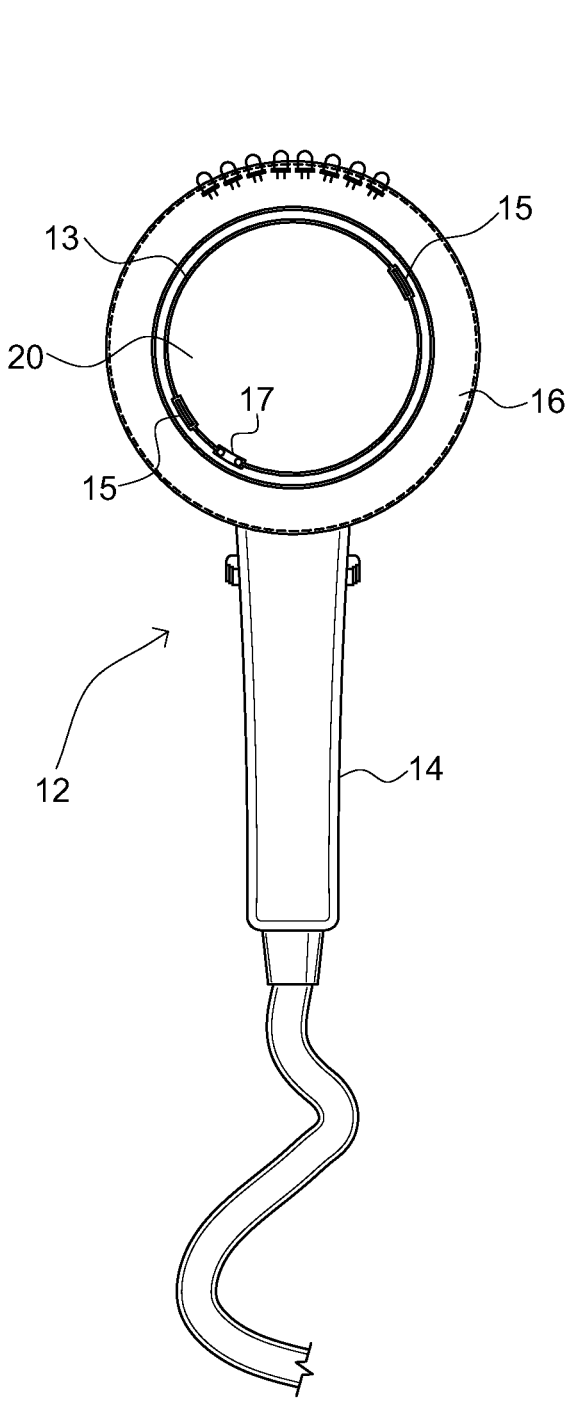


FIG. 2

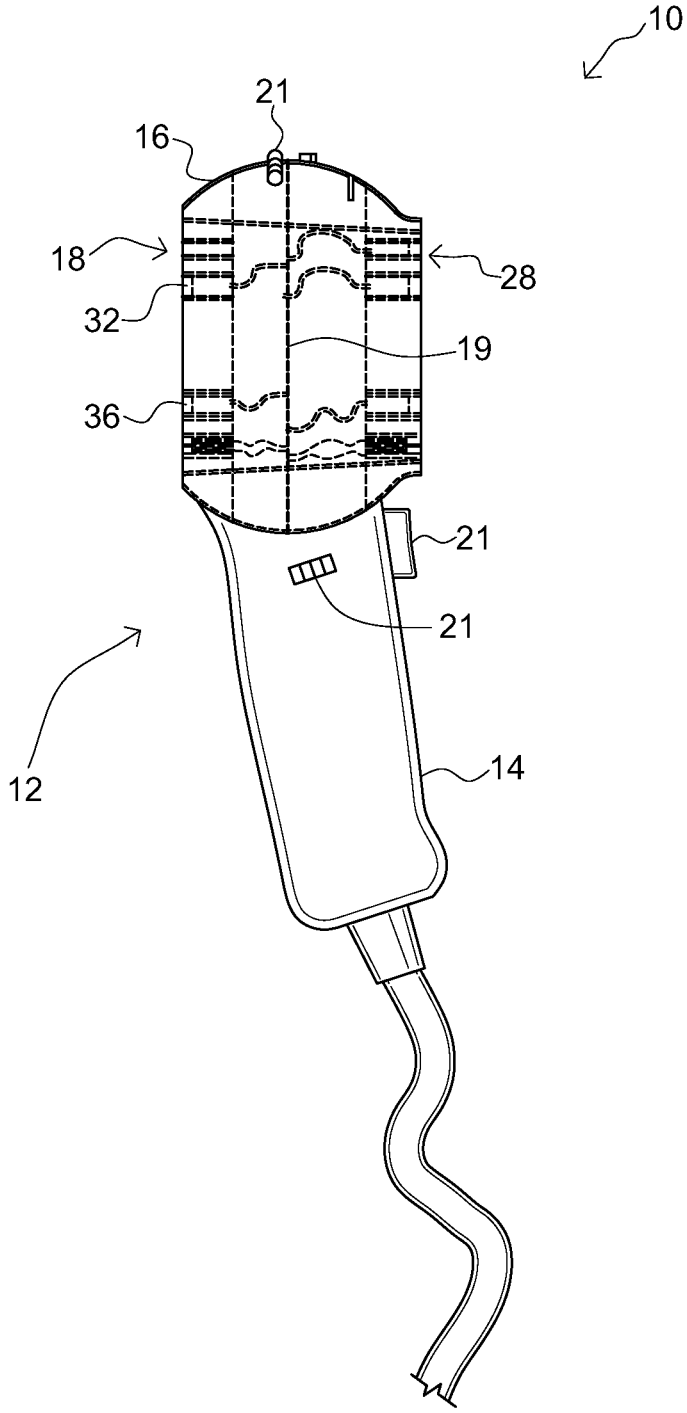


FIG. 3

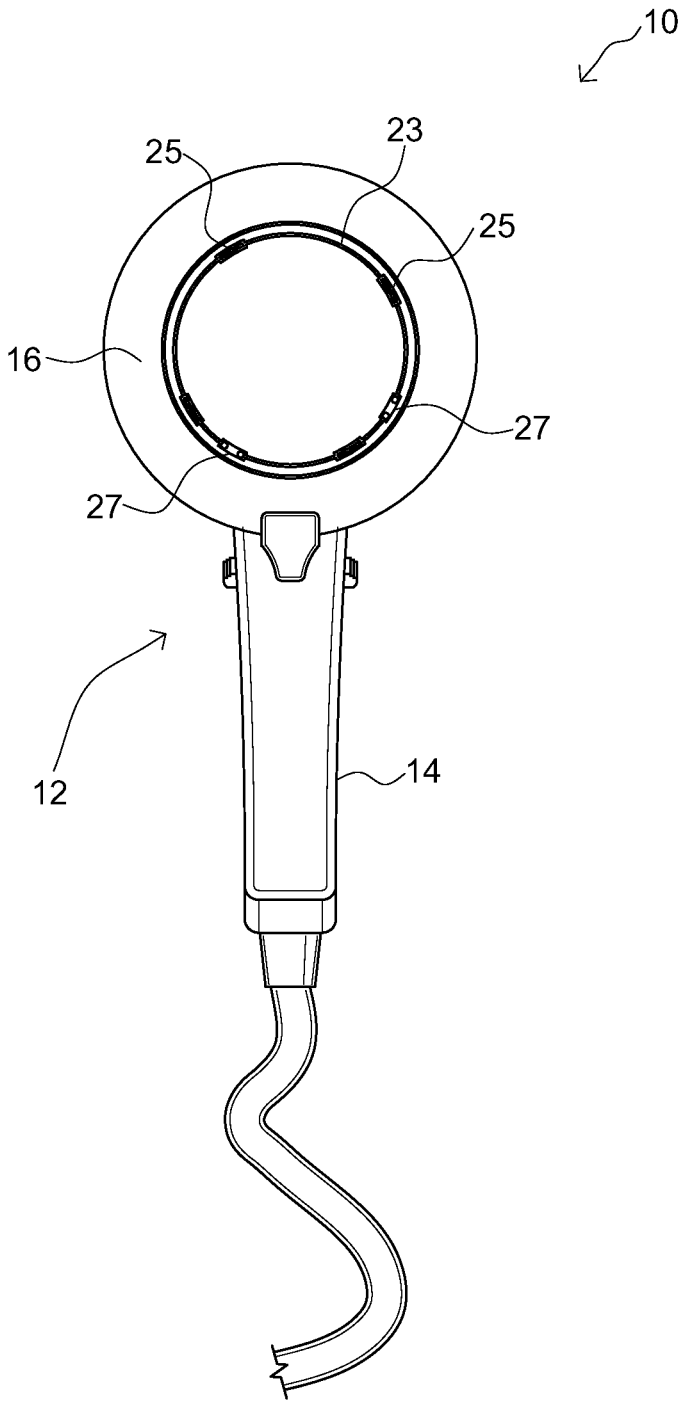


FIG. 4

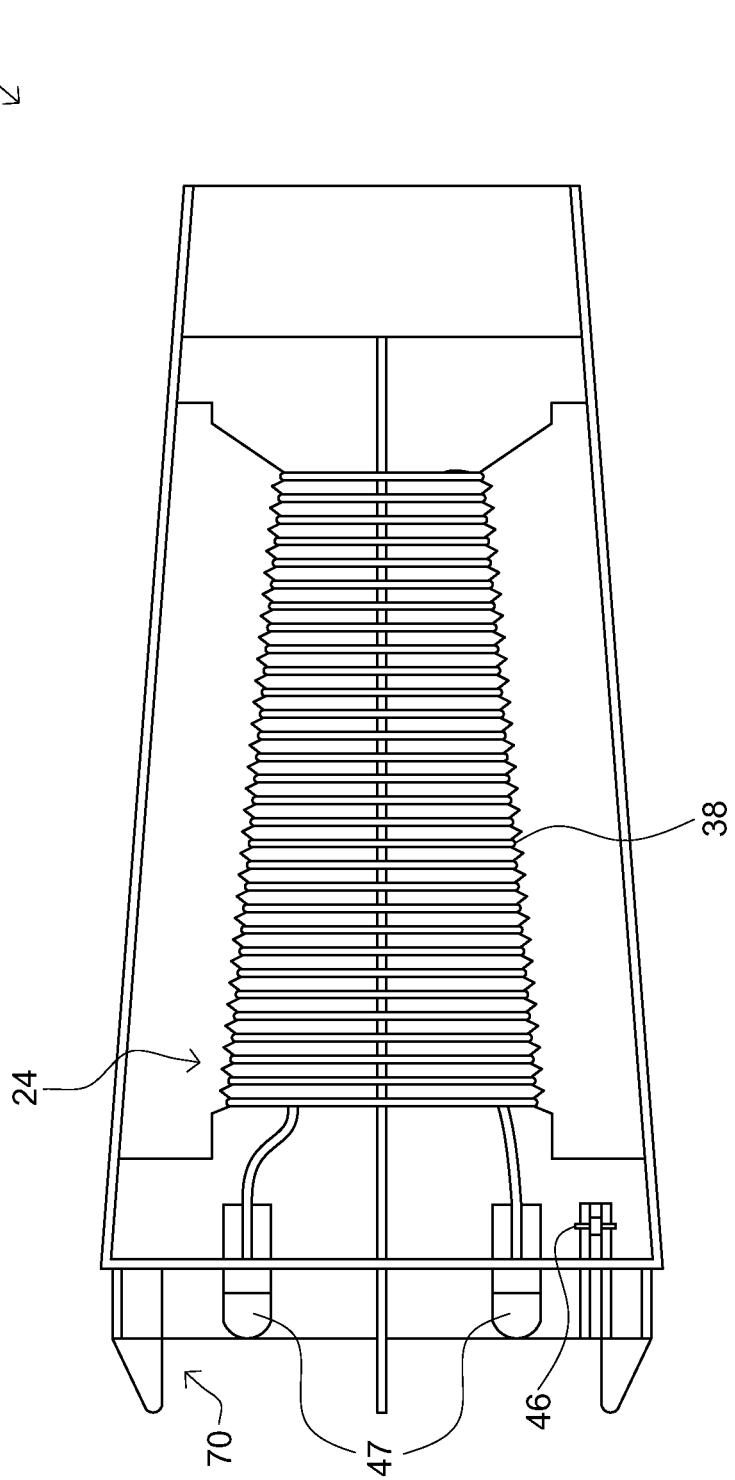


FIG. 5

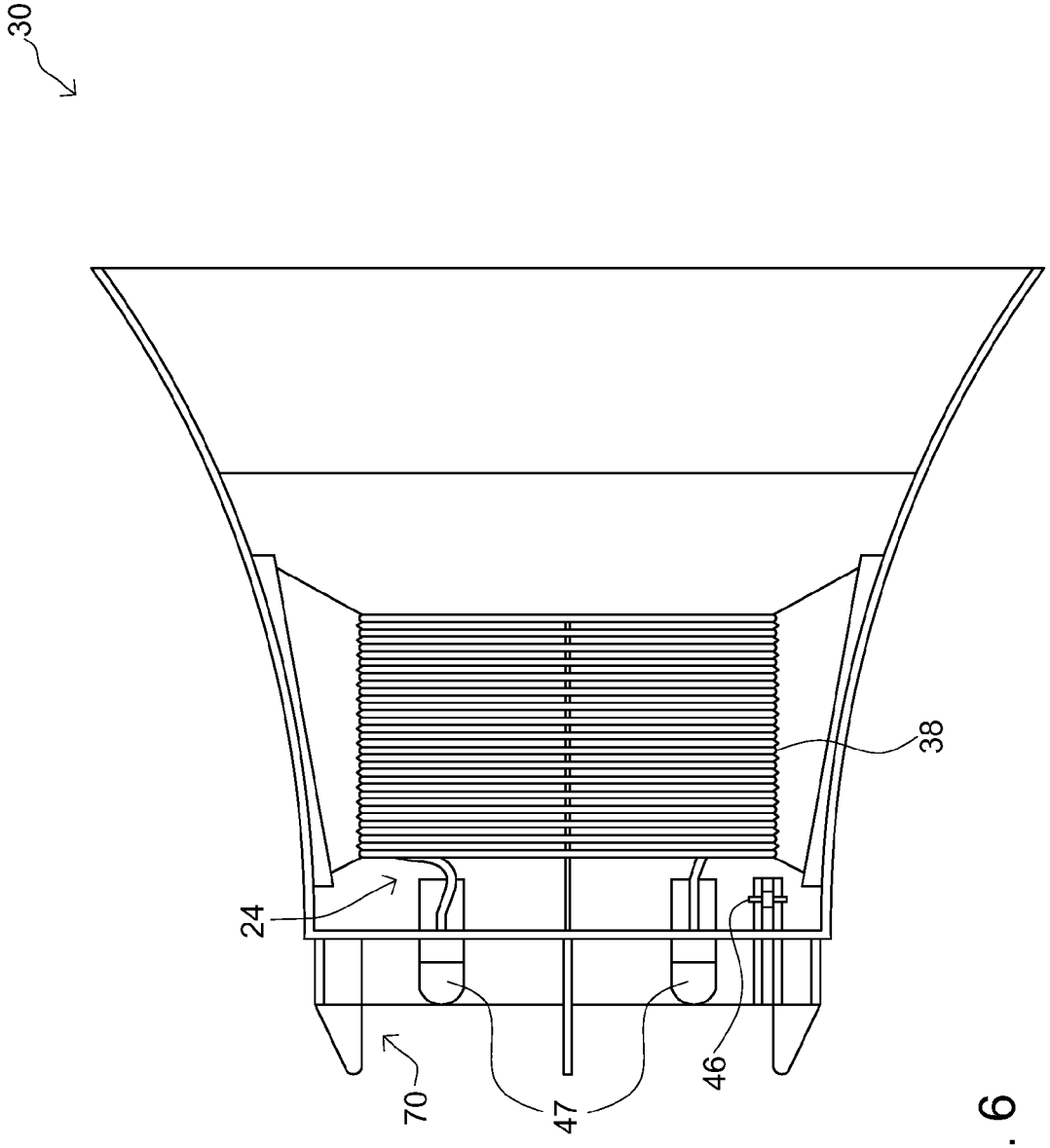


FIG. 6

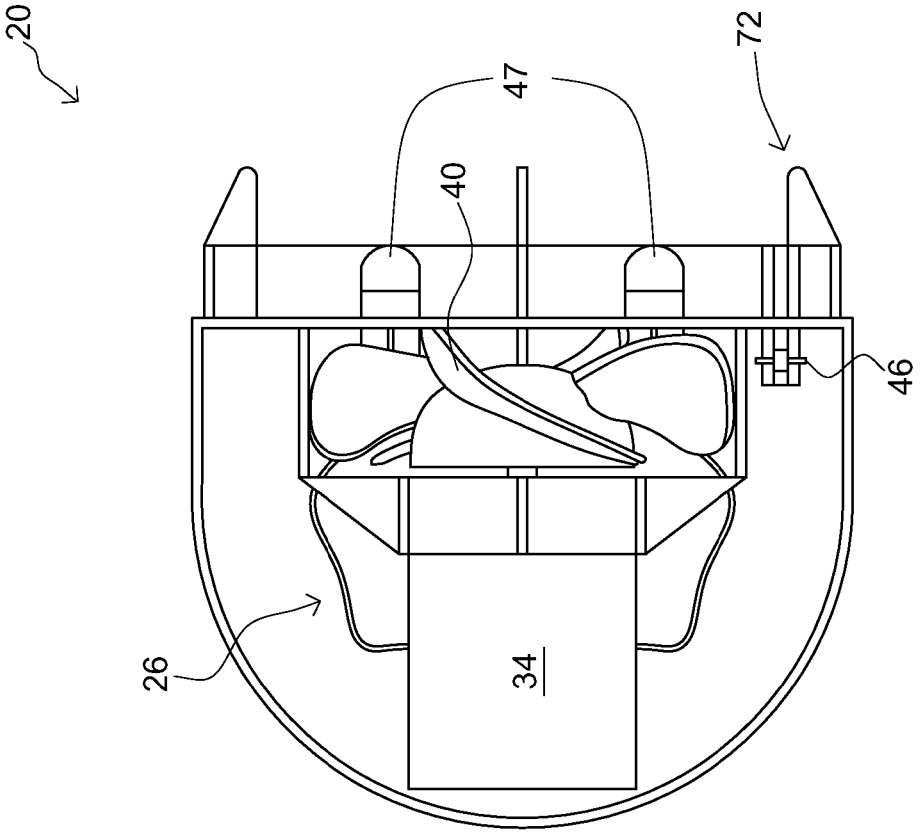


FIG. 7

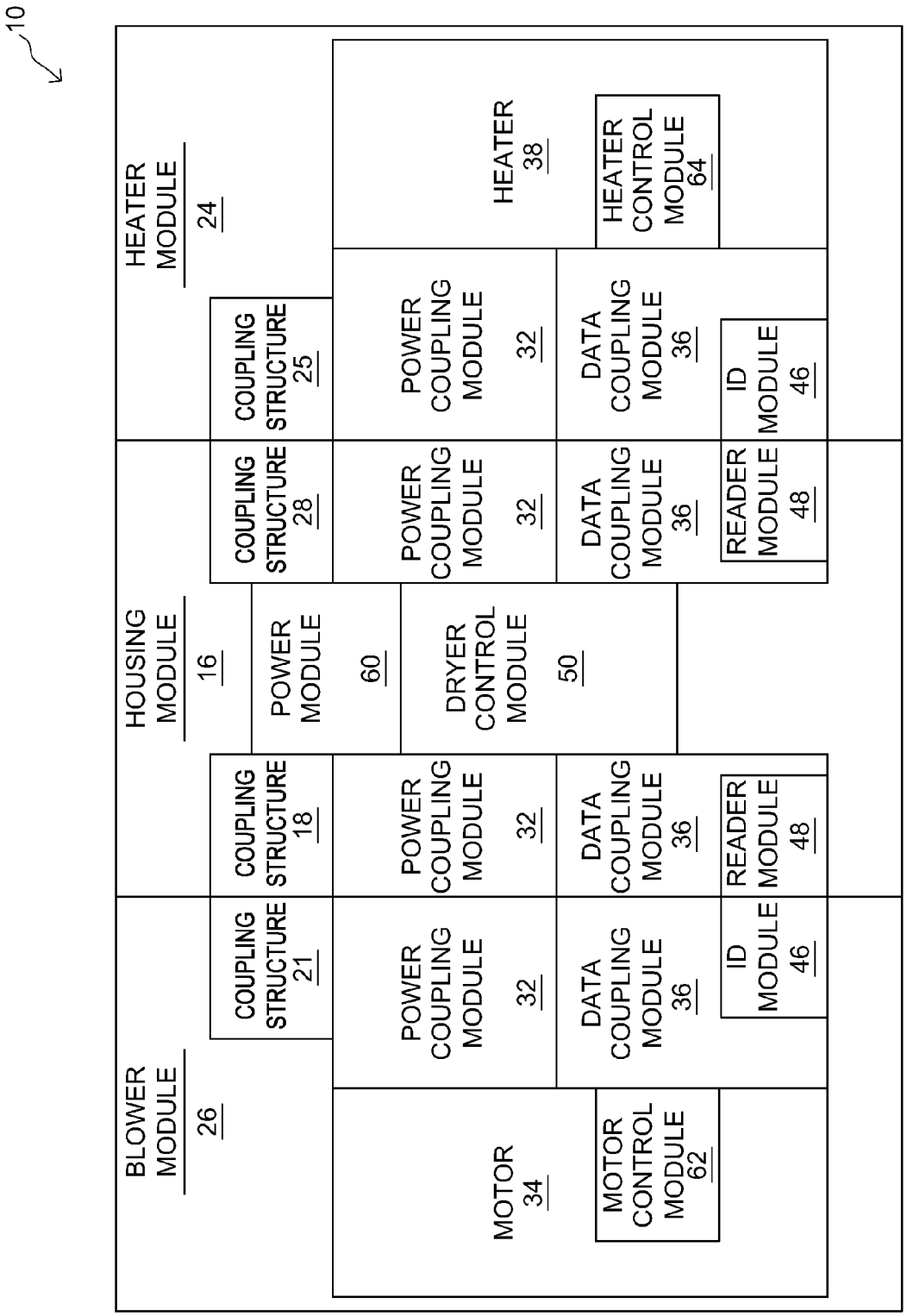

10
BLOWER MODULE 26
HOUSING MODULE 16
HEATER MODULE 24
COUPLING STRUCTURE 21
COUPLING STRUCTURE 18
COUPLING STRUCTURE 28
COUPLING STRUCTURE 25
POWER MODULE 60
DRYER CONTROL MODULE 50
MOTOR 34
MOTOR CONTROL MODULE 62
POWER COUPLING MODULE 32
DATA COUPLING MODULE 36
ID MODULE 46
READER MODULE 48
HEATER 38
HEATER CONTROL MODULE 64

FIG. 8

HAIR DRYER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This invention claims priority, under 35 U.S.C. §120, to the U.S. Provisional Patent Application No. 61/564,979 to David M. Hadden filed on Nov. 30, 2011, which is incorporated by reference herein in its entirety. This invention claims priority, under 35 U.S.C. §120, to the U.S. Provisional Patent Application No. 61/621,841 to David M. Hadden filed on Apr. 9, 2012, which is incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to hair dryers, specifically a modular hair dryer.

[0004] 2. Description of the Related Art

[0005] A hair dryer or a blow dryer is an electromechanical device designed to blow cool or hot air over wet or damp hair, in order to accelerate the evaporation of water particles and dry the hair. Hair dryers allow to better control the shape and style of hair, by accelerating and controlling the formation of temporary hydrogen bonds inside each strand. These hydrogen bonds are very powerful (allowing for stronger hair shaping than even the sulfur bonds formed by permanent waving products), but are temporary and extremely vulnerable to humidity. They disappear with a single washing of the hair.

[0006] Hairstyles using hair dryers usually have volume and discipline, which can be further improved by the use of styling products and hairbrushes during drying to add tension, hold and lift. Hair dryers are used both in the beauty salon by professional stylists, and in the average household by consumers.

[0007] Most models use coils of wire that have a high electric resistivity and heat rapidly with an electric current. A fan usually blows ambient air past the hot coils resulting in heated air effective for drying. The heating element in most hairdryers is a bare, coiled nichrome wire that is wrapped around insulating mica heating boards. Nichrome wire is used in heating elements, because of two important properties: it is a poor conductor of electricity and it does not oxidize when heated.

[0008] Hair dryers are available with different attachments, such as diffusers, airflow concentrators, and comb nozzle attachments. A diffuser is an attachment that is used on hair that is fine, colored, permed or naturally curly. It works by diffusing the heat so that the hair dries more slowly at a cooler temperature. This makes it so that the hair is less likely to frizz and it gives the hair more volume. An airflow concentrator does the exact opposite of a diffuser. It makes the end of the hair dryer more narrow and thus helps to concentrate the heat into one spot in order to make it dry rapidly. The comb nozzle attachment is the same as the airflow concentrator, but it ends with comb-like teeth so that the user can dry the hair using just the dryer without a brush or comb.

[0009] Some improvements have been made in the field. Examples of references related to the present invention are described below in their own words, and the supporting teachings of each reference are incorporated by reference herein:

[0010] U.S. Pat. No. 7,926,198, issued to Merritt, discloses a handheld dryer having low power consumption is provided. A fan operates to cause air to be drawn into the housing of the dryer, creating an airstream of substantial velocity that is forced through a heater assembly. The heater assembly includes two Peltier thermoelectric modules in thermal communication with a plurality of heat sinks. The airstream generated by the fan passes through the heat sinks to remove the heat therefrom, and is, in turn, heated. The passage of the airstream through the dryer housing results in each thermoelectric module operating at essentially a zero temperature differential between its hot and cold face. Resultantly, hot air is discharged from the handheld dryer, which can be used to dry hair or other objects.

[0011] U.S. Pat. No. 7,296,580, issued to Sbardella, discloses an apparatus **10** discloses a plurality of hair curlers **40** having means for engaging a hair curling appliance comprising a handle assembly **12** having curler engaging and disengaging means, a circuit for producing a volume of heated air, control means for energizing and de-energizing the circuit, an actuator for engaging a temperature burst and means for tapping a power source. The housing incorporates a handle assembly **12** containing a heating element for electrically heating the air in use, an on/off switch **24**, quick release ring **26** and temperature burst button **20**. At one distal end of the curling wand **12** is a curler attachment port **30** that allows the user to insert a curler **14** and release the curler by a quick release ring **26**. The assembly **12** allows for the use of a variety of different size and style curlers **14**. A storage case **38** is provided.

[0012] U.S. Pat. No. 7,040,021, issued to Talavera, discloses a hand held hair trimming device which when pulled through the hair trims only a determined portion of the ends of hair strands while leaving adjacent hairs uncut. The device will cut a predetermined length off only the distal ends of the hair shafts each time it has the hair drawn through one or a plurality of serpentine pathways formed by retainer cavities and an engageable retainer. The cutting head portion of the device may be removed and replaced and optional hair dryer or vacuum may be attached to an aperture on the rear of the cutting head to dry hair, vacate cut ends, or encourage distal ends of hairs toward the cutting blade.

[0013] U.S. Pat. No. 6,775,922, issued to Langley et al., discloses a hair dryer attachment system provides a dryer and a plurality of attachments. A fastening mechanism is provided so that multiple attachments are each securable to the generally circular or ovate dryer barrel using the same fastening technology. Each of the attachments forms part of the barrel, and when used with the preferred present shortened barrel, a so-called "standard-length" drier is provided which provides the additional benefits of the respective attachments, without being overly long so as to be cumbersome during use. Each attachment features an apron which is supported by the barrel and, with engagement formations on the barrel and complementary formations on the apron, the attachment is releasably secured to the barrel. Aeration barrel and finger/comb attachments are also provided.

[0014] U.S. Pat. No. 6,067,724, issued to Depoyian, discloses a hair drying assembly has a hair dryer that is particularly suited for using one of a plurality of interchangeable brush heads. The hair dryer has an ellipsoid shaped housing with a cylindrical outlet section at one end and a pivotal grip section at the other end. The handle is pivotally and removably attached to the housing. In one embodiment the handle is attached with air inlet passages formed by legs connecting to the housing and additional slots at the inlet end of the housing. Control buttons for regulating the motor are on the pivotal

handle grip section. Outlet passages are provided in the outlet section. One form of brush head is hollow with peripheral openings and bristles extending therethrough and another brush head is solid with the bristles fixedly attached. In another embodiment there is a bifurcated handle with spaced arms that pivotally connect to the housing inwardly of the air inlet end.

[0015] The inventions heretofore known suffer from a number of disadvantages which include being limited in function, being limited in use, being limited in adaptabilities, being limited in interchangeability, being difficult to use, being expensive, being difficult to replace, being expensive to replace, being limited in application, being too bulky, being difficult to use, being more expensive over time, being difficult to upgrade, being single-use only, failing to perform both primary functions of a hair dryer (drying and heating), being inefficient, being heavy, having poor balance during use, requiring expensive repairs, failing to induce loyalty among consumers, having poor controls, and being fragile.

[0016] What is needed is a hair dryer that solves one or more of the problems described herein and/or one or more problems that may come to the attention of one skilled in the art upon becoming familiar with this specification.

SUMMARY OF THE INVENTION

[0017] The present invention has been developed in response to the present state of the art, and in particular, in response to the problems and needs in the art that have not yet been fully solved by currently available hair dryer. Accordingly, the present invention has been developed to provide a hair dryer with interchangeable components.

[0018] According to one embodiment of the invention, there is a hair dryer that may have a main body. The main body may include a handle and a housing that may be coupled to the handle. The main body may include a first module interface structure that may be coupled to the housing. The hair dryer may include a first module that may be selectably coupleable and thereby may be functionally coupleable to the first module interface structure of the main body. The first module may include a hair dryer component selected from the group of hair dryer components consisting of a heater module and a blower module.

[0019] The hair dryer may include a second module interface structure that may be coupled to the housing and may be disposed opposite the first module interface structure. The hair dryer may include a second module that may be selectably coupleable and thereby may be functionally coupleable to the second module interface structure of the main body. The second module may include a hair dryer component selected from the group of hair dryer components consisting of a heater module and a blower module.

[0020] The first module interface structure may include a reusable power coupling with mating contacts. The first module may be a blower module that may include a motor. The first module interface structure may include a data connection that may be configured to communicate data between the main body and the first module. The first module may be a heater module that may include a heating element. The first module may include a heater module and a blower module. The first module may include a fan. The first module interface structure may include a first alignment structure that may mate with a second alignment structure that may be disposed on the first module and wherein mating of the first and second alignment structures may result in functional alignment of the first module with the housing. The first module may include an identification device that may be configured to identify a characteristic of the first module and wherein the housing may include a communication module that may be configured to read an identification device and communicate a read characteristic to a control module. The hair dryer may include a plurality of interchangeable first modules that may include varying operational characteristics.

[0021] According to one embodiment of the invention, there is a hair dryer that may comprise a selectably removable motor that may have a reusable power coupling module with mating power contacts. The selectably removable motor may include an identification device that may be configured to identify a characteristic of the selectably removable motor and wherein the hair dryer may include a communication module that may be configured to read an identification device and communicate a read characteristic to a control module.

[0022] The hair dryer may comprise a selectably removable heater that may have a reusable power coupling with mating power contacts. The hair dryer may comprise an alignment structure included with at least one of the selectably removable motor and the selectably removable heater, wherein the alignment structure facilitates alignment during coupling. The hair dryer may comprise a data connection between the heater and a housing of the hair dryer and a communication module within the hair dryer in communication with the data connection. The selectably removable heater may include an identification device that may be configured to identify a characteristic of the selectably removable heater. The hair dryer may comprise a plurality of interchangeable selectably removable motors and a plurality of interchangeable selectably removable heaters. The plurality of selectably interchangeable removable motors and heaters may include varying operational characteristics.

[0023] According to one embodiment of the invention, there is a hair dryer kit. The kit may include a main body. The main body may include a handle and a housing that may be coupled to the handle. The main body may include a first module interface structure that may be coupled to the housing. The main body may include a second module interface structure that may be coupled to the housing and may be disposed opposite the first module interface structure. The kit may include a plurality of interchangeable heater modules that may include heating elements selectably coupleable and thereby may be functionally coupleable to the first module interface structure of the main body. The kit may include a plurality of interchangeable blower modules that may include motors selectably coupleable and thereby may be functionally coupleable to the second module interface structure of the main body.

[0024] Reference throughout this specification to features, advantages, or similar language does not imply that all of the features and advantages that may be realized with the present invention should be or are in any single embodiment of the invention. Rather, language referring to the features and advantages is understood to mean that a specific feature, advantage, or characteristic described in connection with an embodiment is included in at least one embodiment of the present invention. Thus, discussion of the features and advantages, and similar language, throughout this specification may, but do not necessarily, refer to the same embodiment.

[0025] Furthermore, the described features, advantages, and characteristics of the invention may be combined in any

suitable manner in one or more embodiments. One skilled in the relevant art will recognize that the invention can be practiced without one or more of the specific features or advantages of a particular embodiment. In other instances, additional features and advantages may be recognized in certain embodiments that may not be present in all embodiments of the invention.

[0026] These features and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In order for the advantages of the invention to be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawing(s). It is noted that the drawings of the invention are not to scale. The drawings are mere schematics representations, not intended to portray specific parameters of the invention. Understanding that these drawing(s) depict only typical embodiments of the invention and are not, therefore, to be considered to be limiting its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawing(s), in which:

[0028] FIG. **1** is a side elevational exploded view of a hair dryer, according to one embodiment of the invention;

[0029] FIG. **2** is a rear elevational view of a hair dryer main body exterior, according to one embodiment of the invention;

[0030] FIG. **3** is a side elevational view of a hair dryer main body, according to one embodiment of the invention;

[0031] FIG. **4** is a front elevational view of a hair dryer main body exterior, according to one embodiment of the invention;

[0032] FIG. **5** is a side cross-sectional view of a second module of a hair dryer, according to one embodiment of the invention;

[0033] FIG. **6** is a side cross-sectional view of a second module of a hair dryer, according to one embodiment of the invention;

[0034] FIG. **7** is a side elevational view of a first module of a hair dryer, according to one embodiment of the invention; and

[0035] FIG. **8** is a module diagram of a hair dryer, according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0036] For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the exemplary embodiments illustrated in the drawing(s), and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications of the inventive features illustrated herein, and any additional applications of the principles of the invention as illustrated herein, which would occur to one skilled in the relevant art and having possession of this disclosure, are to be considered within the scope of the invention.

[0037] Many of the functional units described in this specification have been labeled as modules, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.

[0038] Modules may also be implemented in software for execution by various types of processors. An identified module of programmable or executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve the stated purpose for the module.

[0039] Indeed, a module and/or a program of executable code may be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different storage devices, and may exist, at least partially, merely as electronic signals on a system or network.

[0040] The various system components and/or modules discussed herein may include one or more of the following: a host server or other computing systems including a processor for processing digital data; a memory coupled to said processor for storing digital data; an input digitizer coupled to the processor for inputting digital data; an application program stored in said memory and accessible by said processor for directing processing of digital data by said processor; a display device coupled to the processor and memory for displaying information derived from digital data processed by said processor; and a plurality of databases. As those skilled in the art will appreciate, any computers discussed herein may include an operating system (e.g., Windows Vista, NT, 95/98/2000, OS2; UNIX; Linux; Solaris; MacOS; and etc.) as well as various conventional support software and drivers typically associated with computers. The computers may be in a home or business environment with access to a network. In an exemplary embodiment, access is through the Internet through a commercially-available web-browser software package.

[0041] The present invention may be described herein in terms of functional block components, screen shots, user interaction, optional selections, various processing steps, and the like. Each of such described herein may be one or more modules in exemplary embodiments of the invention. It should be appreciated that such functional blocks may be realized by any number of hardware and/or software components configured to perform the specified functions. For example, the present invention may employ various integrated circuit components, e.g., memory elements, processing elements, logic elements, look-up tables, and the like, which may carry out a variety of functions under the control of one or more microprocessors or other control devices. Similarly, the software elements of the present invention may be implemented with any programming or scripting language such as C, C++, Java, COBOL, assembler, PERL, Visual Basic, SQL Stored Procedures, AJAX, extensible markup

language (XML), with the various algorithms being implemented with any combination of data structures, objects, processes, routines or other programming elements. Further, it should be noted that the present invention may employ any number of conventional techniques for data transmission, signaling, data processing, network control, and the like. Still further, the invention may detect or prevent security issues with a client-side scripting language, such as JavaScript, VBScript or the like.

[0042] Additionally, many of the functional units and/or modules herein are described as being "in communication" with other functional units and/or modules. Being "in communication" refers to any manner and/or way in which functional units and/or modules, such as, but not limited to, computers, laptop computers, PDAs, modules, and other types of hardware and/or software, may be in communication with each other. Some non-limiting examples include communicating, sending, and/or receiving data and metadata via: a network, a wireless network, software, instructions, circuitry, phone lines, internet lines, satellite signals, electric signals, electrical and magnetic fields and/or pulses, and/or so forth.

[0043] As used herein, the term "network" may include any electronic communications means which incorporates both hardware and software components of such. Communication among the parties in accordance with the present invention may be accomplished through any suitable communication channels, such as, for example, a telephone network, an extranet, an intranet, Internet, point of interaction device (point of sale device, personal digital assistant, cellular phone, kiosk, etc.), online communications, off-line communications, wireless communications, transponder communications, local area network (LAN), wide area network (WAN), networked or linked devices and/or the like. Moreover, although the invention may be implemented with TCP/IP communications protocols, the invention may also be implemented using IPX, Appletalk, IP-6, NetBIOS, OSI or any number of existing or future protocols. If the network is in the nature of a public network, such as the Internet, it may be advantageous to presume the network to be insecure and open to eavesdroppers. Specific information related to the protocols, standards, and application software utilized in connection with the Internet is generally known to those skilled in the art and, as such, need not be detailed herein. See, for example, DILIP NAIK, INTERNET STANDARDS AND PROTOCOLS (1998); JAVA 2 COMPLETE, various authors, (Sybex 1999); DEBORAH RAY AND ERIC RAY, MASTERING HTML 4.0 (1997); and LOSHIN, TCP/IP CLEARLY EXPLAINED (1997), the contents of which are hereby incorporated by reference.

[0044] Reference throughout this specification to an "embodiment," an "example" or similar language means that a particular feature, structure, characteristic, or combinations thereof described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases an "embodiment," an "example," and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment, to different embodiments, or to one or more of the figures. Additionally, reference to the wording "embodiment," "example" or the like, for two or more features, elements, etc. does not mean that the features are necessarily related, dissimilar, the same, etc.

[0045] Each statement of an embodiment, or example, is to be considered independent of any other statement of an embodiment despite any use of similar or identical language characterizing each embodiment. Therefore, where one embodiment is identified as "another embodiment," the identified embodiment is independent of any other embodiments characterized by the language "another embodiment." The features, functions, and the like described herein are considered to be able to be combined in whole or in part one with another as the claims and/or art may direct, either directly or indirectly, implicitly or explicitly.

[0046] As used herein, "comprising," "including," "containing," "is," "are," "characterized by," and grammatical equivalents thereof are inclusive or open-ended terms that do not exclude additional unrecited elements or method steps. "Comprising" is to be interpreted as including the more restrictive terms "consisting of" and "consisting essentially of."

[0047] FIG. **1** is a side elevational exploded view of a hair dryer, according to one embodiment of the invention. There is shown a hair dryer **10** including a main body **12** having a handle **14** and a housing **16**; the hair dryer **10** also includes a first module **20** and a second module **30** coupled to the housing **16**.

[0048] The illustrated hair dryer **10** is configured to dry wet hair and assist in styling desired hair styles. The hair dryer **10** is configured to provide an interchangeable component hair dryer with interchangeable modules. The hair dryer **10** includes a main body **12** configured to support the modules and components disposed therein. The main body **12** includes a handle **14** and a housing **16**. The housing **16** is coupled to the handle **14** and disposed there above. The handle **14** is configured to extend from a bottom portion of the housing **16**.

[0049] The main body **12** includes a first module **20** that is selectably coupleable and thereby functionally coupleable to the housing **16** of the main body **12**. The first module **20** may include a hair dryer component selected from the group of hair dryer components consisting of a heater module and a blower module. The illustrated first module **20** is a blower module configured to force air through the housing **16** of the main body **12** of the hair dryer **10**.

[0050] The illustrated hair dryer **10** includes a second module **30** that is selectably coupleable and thereby functionally coupleable to the housing **16** of the main body **12**. The second module **30** may include a hair dryer component selected from the group of hair dryer components consisting of a heater module and a blower module. The illustrated second module **30** is a heater module configured to heat air forced through the housing **16** of the first module **20**.

[0051] In one non-limiting embodiment, there is a hair dryer made up of a plurality of separable but integratable parts, including but not limited to a heater, electronic controls, nozzles, main bodies, indicators, handles, blowers, and motors. One or more of the previous list may be permanently combined with one or more of the others of the list. One or more of the previous list may be selectably removable to one or more of the others on the list. One or more on the list may include mating structures for combining with one or more of the others on the list. One or more on the list may include communication structure(s) configured to communicate instructions, configurations, identification, and/or etc. to one or more others on the list. There may be one or more mounting points where one may add/remove various modules/components/items from the list above. It may be that components may only attach/detach top/from a main body and not to each other, such that nozzles must be removed for a different

nozzle to be applied, thus keeping the overall length, balance, weight, etc. of the device low/small/balanced during use/operation. It may be that components that tend to be very durable may be housed in the main body, while components that tend to have a shorter life cycle may be removable, thus decreasing operational expenses for consumers.

[0052] In operation, a user may attach/detach modules to a main body as desired from a selection of modules and/or main bodies. The modules may provide information while attached to the main body and the main body or other modules may use that information in the setup and/or operation of the hair dryer. The electronic components of the hair dryer may change one or more operational characteristics, including but not limited to power deliver, function of user buttons, function of indicators, and the like and combinations thereof and such may be in response to information provided by one or more modules. The user may then operate the combined hair dryer in a desired manner. Wherein one or more modules ceases to function or otherwise is no longer desired, it may be selectably removed and replaced with another module that may be a duplicate of the same or may have other characteristics.

[0053] FIG. **2** is a rear elevational view of a hair dryer main body exterior, according to one embodiment of the invention. There is shown a hair dryer **10** including a main body **12** having a housing **16** and a handle **14**. The hair dryer **10** also includes a mating structure **13** configured to permit coupling of a module thereto.

[0054] The illustrated hair dryer **10** is configured to provide different replaceable heater and motor attachments options. The hair dryer **10** includes a main body **12** having a handle **14** and a housing **16**. The handle **14** is configured to extend out from a bottom surface of the housing **16**. The hair dryer **10** includes a mating structure **13** configured to permit a first module **20** that is selectably coupleable and thereby functionally coupleable to the housing **16** to couple thereto. The illustrated mating structure **13** includes a circular guide structure with receiving brackets **15** and **17**. The illustrated receiving brackets **15** and **17** are configured to receive complimentary structure from a module to be coupled thereto and to help align and secure attachment thereto. One of the illustrated receiving brackets **17** is asymmetrically placed so that the attached module may be properly aligned when coupled. The illustrated asymmetrically placed receiving bracket **17** also includes a communication device configured to mate with an associated structure on a module to be attached thereto so that the main body can "read" information from the module when it is so attached. The communication device may be simply a pair of electrical contacts shaped and positioned to come in contact with associated electrical contacts of a module to be attached so that when so coupled the main body and the module are in electrical communication. Receiving brackets **15** and/or **17** may also include one or more reusable power couplings to provide power to the module to be attached thereto.

[0055] FIG. **3** is a side elevational view of a hair dryer, according to one embodiment of the invention. There is shown a hair dryer **10** including a main body **12** having a handle **14** and a housing **16** with various controls and indicators **21**.

[0056] The illustrated hair dryer **10** is configured to provide different interchangeable and replaceable heater and motor attachments options. The hair dryer **10** includes a main body **12** having a handle **14** and a housing **16**. The main body **12** includes a first module interface structure **18** coupled and disposed within the housing **16**. The hair dryer **10** may include a first module that is selectably and functionally coupleable to the first module interface structure **18** of the main body **12**.

[0057] The hair dryer **10** includes a second module interface structure **28** that is coupled and disposed within the housing **16**. The second module interface structure **28** is disposed opposite the first module interface structure **18**. The hair dryer **10** may include a second module that is selectably and functionally coupleable to the second module interface structure **28** of the main body **12**.

[0058] The illustrated first module interface structure **18** includes a reusable power coupling with mating contacts **32**. The reusable power coupling with mating contacts **32** is configured to provide power coupling capabilities to a first module coupled to the first module interface structure **18**. The illustrated first module interface structure **18** includes a data connection **36** that is configured to communicate data between the main body **12** and a first module of the hair dryer **10**. The illustrated mating contacts **32** and data connection **36** may be in addition to the illustrated brackets **15** and **17** of FIG. **2** or may be synonymous with the same. The mating contacts **32** and data connection **36** are functionally coupled to a control board **19** that may be a circuit board enclosed within the housing and may include such circuitry and components needed to facilitate operation of the mating contacts **32** and data connection **36** in coordination with the controls and indicators **21**.

[0059] The illustrated second module interface structure **28** also includes a reusable power coupling with mating contacts. The reusable power coupling with mating contacts is configured to provide power coupling capabilities to a second module coupled to the second module interface structure **28**. The illustrated second module interface structure **28** includes a data connection that is configured to communicate data between the main body **12** and a second module of the hair dryer **10**.

[0060] The first module interface structure **18** may include a first alignment structure that is configured to mate with a second alignment structure that is disposed on a first module and wherein mating of the first and second alignment structures result in functional alignment of a first module with the housing of the main body. The second module interface structure **28** may include a first alignment structure that is configured to mate with a second alignment structure that is disposed on a second module and wherein mating of the first and second alignment structures result in functional alignment of a second module with the housing of the main body. The hair dryer **10** may include a plurality of interchangeable second modules that may include varying operational characteristics.

[0061] According to one embodiment of the invention, there is a single dryer **10** with different replaceable heater and motor attachments options are provided. Since a heater attachment or motor attachment is much less expensive than a total dryer replacement, a stylist may purchase a dryer assembly and a backup heater and motor attachment. Further, different motor and heater attachment designs may be provided giving the stylist a broader range of dryer options by simply changing attachments.

[0062] Two basic drying modes are knockout and styling modes for drying hair. Each requires a different nozzle and heater configuration for optimum performance. While there may be many requirements, the two discussed here illustrate the point. There are also cases where a more powerful motor

is required, but the larger a motor is, the heavier it is and the more expensive it is. By having a variety of motor attachments, a stylist may choose the lightest motor required thus keeping weight and noise to a minimum except when more power is required.

[0063] Another advantage of the modular approach is that the dryer body controls may be designed to recognize the type of nozzle being connected to it via a unique resistance value (that may be merely a resistor with mating contacts positioned to couple to a data structure of a main body when the module is coupled thereto) that may be read by control circuitry **19** of the dryer. As discussed above, typically less temperature is required for styling than for knockout. This may be accounted for by the dryer body controls. That is, when the dryer body control recognizes the resistance value for a styling nozzle, it may automatically re-program all of the temperature settings to reflect operating condition. Such may be accomplished according to preprogramed script, batch file, and/or a table of values stored in memory or the like or combinations thereof.

[0064] A motor or heater module may have its own unique code so the controller automatically operates whatever is plugged into it in one or more preprogrammed modes that may be configured to enhance the efficiency or other operational characteristics thereof. While a controller may be designed to recognize any number of heater and motor modules, there are other methods that may be used for recognition by the controller such as a series of jumper pins in the module, which act like programming dip switches and may operate in a purely physical manner during coupling instead of providing electrical communication.

[0065] It is also possible to program the dryer body controls for different hair types and dryer performance by inserting a micro-Flash drive into a drive reader slot in the body of the control. The drive may be functionally coupled to the control circuitry **19** of the hair dryer by a drive reader module coupled thereto. The drive may include instructions for altering operational characteristics of the hair dryer that may vary according to read characteristics of the attached modules. The micro drives may be sold separately and may be programmed to give a dryer almost any combination of heat and blow settings. These settings may be master controls for the lower level controls the blower and heater modules send to the controller to change the heating profile between the knockout heater and the styling heater.

[0066] For example, one could have a micro-Flash drive for fine hair, course hair, dry hair, etc. Each of these settings would have a subset of settings depending on which blower and/or heater module was installed. Microprocessor controls are often used in hair straightener products because straightener products use much less electrical power than professional blow-type hair dryers. When large amounts of electrical power is required by a blow-type hair dryer, larger, heavy-duty electronic components that often require special cooling consideration are required. This makes a blow-type hair dryer too large and heavy to be practical as do the special cooling requirements of said components.

[0067] FIG. **4** is a front elevational view of a hair dryer main body exterior, according to one embodiment of the invention. There is shown a hair dryer **10** including a main body **12** having a handle **14** and a housing **16**. The hair dryer **10** also includes a mating structure **23** configured to facilitate attachment to a module.

[0068] The illustrated hair dryer **10** is configured to provide different replaceable heater and motor attachments options. The hair dryer **10** includes a main body **12** having a handle **14** and a housing **16**. The handle **14** is configured to extend out from a bottom surface of the housing **16**. The hair dryer **10** includes a mating structure **23** that is configured to couple to a module that may be selectably coupleable and thereby functionally coupleable to the housing **16**. The illustrated mating structure **23** includes a circular guide structure with receiving brackets **25** and **27**. The illustrated receiving brackets **25** and **27** are configured to receive complimentary structure from a module to be coupled thereto and to help align and secure attachment thereto. Two of the illustrated receiving brackets **27** are asymmetrically placed so that the attached module may be properly aligned when coupled. The illustrated asymmetrically placed receiving brackets **27** also includes a communication device configured to mate with an associated structure on a module to be attached thereto so that the main body can "read" information from the module when it is so attached. The communication device may be simply a pair of electrical contacts shaped and positioned to come in contact with associated electrical contacts of a module to be attached so that when so coupled the main body and the module are in electrical communication. Receiving brackets **25** and/or **27** may also include one or more reusable power couplings to provide power to the module to be attached thereto.

[0069] FIGS. **5** and **6** are side cross-sectional views of a variety of second modules of a hair dryer including heating elements and nozzles, according to one embodiment of the invention. In each, there is shown second module **30** including a heater module **24** having a heating element **38** and a nozzle configured to provide a desired airflow characteristic.

[0070] The illustrated second module **30** that may be selectably coupleable and thereby functionally coupleable to a second module interface structure of a main body of a hair dryer. The second module **30** includes a hair dryer component such as a heater module **24**. The heater module **24** includes a heating element **38** configured to heat air passing therethrough. The illustrated second module **30** includes a pair of alignment structures **70** configured to mate with a pair of alignment structure coupled to and disposed within a housing of a main body of a hair dryer. Generally, mating the alignment structures together results in functional alignment of the second module with a main body of the hair dryer. The illustrated second module **30** includes a narrow exit aperture configured to direct heated air out thereof. The narrow exit aperture is configured to dry hair at a focal point in front of the narrow exit aperture.

[0071] The second module **30** includes an identification device **46** configured to identify a characteristic of the second module **30** and wherein the housing of the main body includes a communication module configured to read the identification device **46** and communicate a read characteristic to a control module of the hair dryer. The illustrated identification device **46** may include one or more devices/structures configured to communicate information from the second module **30** to the main body, such as but not limited to through a data reading structure of the main body such as but not limited to a receiving bracket, set of contacts, power coupling, drive reader, data coupling and the like and combinations thereof. The identification device may include one or more electrical components (resistor, transistor, coil, battery, etc.), one or more optical components (polarizer, filter, lens, bar code, QR code, etc.), one or more electromagnetic components (RFID tag,

transmitter, emitter, transcoder, USB drive, ROM, memory card, etc.) and/or the like and/or combinations thereof configured to store and/or communicate information about the second module to the main body.

[0072] The second module **30** also includes reusable power couplings **47** configured to couple to mating power couplings of a main body in a manner that permits the second module to draw power therefrom for heating the heating element **38** disposed therein.

[0073] FIG. **7** is a side elevational view of a hair dryer, according to one embodiment of the invention. There is shown a first module **20** including a blower module **26** having a motor **34** and a fan **40**.

[0074] The illustrated first module **20** may be selectably coupleable and thereby functionally coupleable to a first module interface structure of a main body of a hair dryer. The first module **20** is configured to be coupled about a rear portion of the housing of the main body of the hair dryer. The first module **20** includes a hair dryer component, such as a blower module **26**. The blower module **26** includes a motor **34** and a fan **40**. The motor **34** is configured to provide mechanical movement to the fan **40** of the blower module **26**.

[0075] The illustrated first module **20** includes a pair of alignment structures **72** configured to mate with a pair of alignment structures coupled to and disposed within a housing of a main body of a hair dryer. The mating of the alignment structures results in functional alignment of the first module with the housing of the hair dryer.

[0076] The first module **20** includes an identification device **46** configured to identify a characteristic of the second module and wherein the housing of the main body includes a communication module configured to read the identification device **46** and communicate a read characteristic to a control module of the hair dryer. The illustrated identification device **46** may include one or more devices/structures configured to communicate information from the first module **20** to the main body, such as but not limited to through a data reading structure of the main body such as but not limited to a receiving bracket, set of contacts, power coupling, drive reader, data coupling and the like and combinations thereof. The identification device may include one or more electrical components (resistor, transistor, coil, battery, etc.), one or more optical components (polarizer, filter, lens, bar code, QR code, etc.), one or more electromagnetic components (RFID tag, transmitter, emitter, transcoder, USB drive, ROM, memory card, etc.) and/or the like and/or combinations thereof configured to store and/or communicate information about the second module to the main body.

[0077] The first module **20** also includes reusable power couplings **47** configured to couple to mating power couplings of a main body in a manner that permits the second module to draw power therefrom for operation of the motor **34** disposed therein.

[0078] According to one embodiment of the invention, there is a blower module configured to force air from the blower module through a housing of the main body and to the heater module and out an aperture thereof. The blower module includes a motor **34** functionally coupled to a fan **40** (impeller, or etc.) and configured to cause the operation thereof. A motor may include any one or more of the plethoric motor types, including but not limited to brushed motors, brushless motors, rotary motors, electric motors, non-electric motors, DC motors, AC motors, coreless motors, pancake motors, universal motors, and the like and combinations thereof.

[0079] A system that pressurizes and moves a mass of air, such as a motor and blower in a hair dryer, generates mechanical waves that are oscillations of pressure caused by the mechanical means to generate said pressurized flow of an air mass. The magnitude and frequencies generated are a function of the type of design of the blower and motor and also the size of the motor and blower. For example a centrifugal blower with four blades of a certain diameter will generated different frequencies and magnitudes of oscillation than will the same blower with, say, six blades and a different diameter even though both designs may deliver the same air pressure and volume per unit time.

[0080] Generally speaking the larger the blowing mechanism can be to deliver a given flow and pressure the lower and smaller the oscillations of air pressure are. Generally speaking, lower frequencies are more tolerable than high frequencies and portray a sense of power.

[0081] The blower module may include a centrifugal blower assembly and a remote electronics device configured to receive commands from the hand module to provide controls for the speed of the centrifugal blower assembly and the amount of electrical power delivered to the heating module in the hand module. The blower module may also include a plurality of connectors that are configured to mate with the hose member and with the electrical wiring thereof.

[0082] FIG. **8** is a module diagram of a hair dryer, according to one embodiment of the invention. There is shown a hair dryer **10** including a blower module **26**, a housing module **16**, and a heater module **24**.

[0083] The illustrated hair dryer **10** is configured to provide different replaceable heater and motor attachments options. The hair dryer **10** includes a blower module **26** functionally coupled to a housing module **16**. The hair dryer **10** also includes a heater module **24** functionally coupled to the housing module **16**. The housing module **16** includes a coupling structure **18** configured to couple to a coupling structure of a blower module **26**. The housing module **16** also includes a second coupling structure **28** configured to couple to a coupling structure of the heater module **24**.

[0084] According to one embodiment of the invention, the housing module **16** includes a first alignment structure **18**, **28** configured to mate with a second alignment structure **21**, **25** respectively, disposed within each of the blower module **26** and the heater module **24**; wherein mating of the first and second alignment structures results in functional alignment of the blower module and the housing module and the heater module and the housing module. As illustrated in FIG. **8**, the alignment structures are the coupling structures.

[0085] The illustrated housing module **16** includes a reusable power coupling module with mating contacts **32** configured to functionally couple to a power coupling module to each of the blower module **26** and the heater module **24**. The housing module **16** includes a data coupling module **36** configured to communicate data between the housing module **16** and each of the blower module **26** and the heater module **24**.

[0086] The blower module and the heater module each include an identification module **46** configured to identify a characteristic of the blower module and the heater module; wherein the housing module includes a reader module **48** configured to read the identification module and communicate a read characteristic to a dryer control module **50** of the

housing module **16**. The housing module includes a power module **60** configured to provide power to the modules and components of the housing modules, and also power to the modules and components to the devices, modules, and systems functionally coupled thereto.

[0087] The dryer control module **50** is disposed within the housing module and is configured to provide operational controls to the components and modules of the housing module and the modules and components functionally coupled thereto. Non-limiting examples of a control modules may be a control module described in U.S. Pat. No. 5,430,836, issued to Wolf et al.; or a control module described in U.S. Pat. No. 6,243,635, issued to Swan et al. which are incorporated for their supported teachings herein. A control module may include but is not limited to a processor, a state machine, a script, a decision tree, and the like.

[0088] The data coupling module **36** may include a communication module in communication with the blower module and the heater module. Such communication may be embodied simply as one or more wires (including power wires serving dual power/signal purpose) between the housing module and the blower module and the heater module. Such communication module may be more complicated such as but not limited to including a wireless communication module in communication with the dryer control module and the heater module and the blower module. The wireless communication module is configured to provide wireless communication to the hair dryer. Non-limiting examples of a communication module may be but not limited to: a communication module described in U.S. Pat. No. 5,307,463, issued to Hyatt et al.; or a communication module described in U.S. Pat. No. 6,133,886, issued to Fariello et al. which are incorporated for their supported herein.

[0089] The illustrated blower module includes a motor **34** configured to provide mechanical movement capabilities thereto. The blower module includes a motor control module **62** in communication with the motor and configured to provide operational instructions thereto.

[0090] The illustrated heater module includes a heater **38** configured to heat air passing through the heater module. The heater module includes a heater control module **64** in communication with the heater and configured to provide operational instructions thereto.

[0091] According to one embodiment of the invention, the heater module includes a heater. The heater may include a heating element configured to heat air passing there through. The heating element may generally be symmetrical, except for the two electrical contacts which may have a specific orientation. The heating element may have indexing so that it may only fit into the housing module in one orientation.

[0092] According to one embodiment of the invention, there is a hair dryer that may comprise a selectably removable motor that may have a reusable power coupling module with mating power contacts. The selectably removable motor may include an identification device that may be configured to identify a characteristic of the selectably removable motor and wherein the hair dryer may include a communication module that may be configured to read an identification device and communicate a read characteristic to a control module.

[0093] The hair dryer may comprise a selectably removable heater that may have a reusable power coupling with mating power contacts. The hair dryer may comprise an alignment structure included with at least one of the selectably removable motor and the selectably removable heater, wherein the alignment structure facilitates alignment during coupling. The hair dryer may comprise a data connection between the heater and a housing of the hair dryer and a communication module within the hair dryer in communication with the data connection. The selectably removable heater may include an identification device that may be configured to identify a characteristic of the selectably removable heater. The hair dryer may comprise a plurality of interchangeable selectably removable motors and a plurality of interchangeable selectably removable heaters. The plurality of selectably interchangeable removable motors and heaters may include varying operational characteristics.

[0094] According to one embodiment of the invention, there is a hair dryer kit. The kit may include a main body. The main body may include a handle and a housing that may be coupled to the handle. The main body may include a first module interface structure that may be coupled to the housing. The main body may include a second module interface structure that may be coupled to the housing and may be disposed opposite the first module interface structure. The kit may include a plurality of interchangeable heater modules that may include heating elements selectably coupleable and thereby may be functionally coupleable to the first module interface structure of the main body. The kit may include a plurality of interchangeable blower modules that may include motors selectably coupleable and thereby may be functionally coupleable to the second module interface structure of the main body.

[0095] According to one embodiment of the invention, there is a hair dryer including a selectably removable data port configured to upload hair dryer configurations for a heater module and a blower module. The selectably removable data port is configured to receive a data storage device, such as a portable flash drive.

[0096] It is understood that the above-described embodiments are only illustrative of the application of the principles of the present invention. The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiment is to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

[0097] For example, although the figures illustrate particular shaped bodies, modules, components, etc. it is expected that there could be numerous variations of the design of this invention. An example is that the housing of the main body may have a non-circular cross section instead of the illustrated circular cross-section.

[0098] Additionally, although the figures illustrate particular mating structures and communication structures, it is understood that the various ways of mating the structures and providing communications therebetween are plethoric.

[0099] It is also envisioned that there may be a plurality of devices, modules, components and that one or more modules may include a plurality of devices, modules and/or components. As a non-limiting example, a blower module may include a plurality of motors.

[0100] Finally, it is envisioned that the components of the device may be constructed of a variety of materials, including

but not limited to plastics, metals, ceramics, fibers, organic materials, woven fibers, rubbers, resins, and the like and composites thereof.

[0101] Thus, while the present invention has been fully described above with particularity and detail in connection with what is presently deemed to be the most practical and preferred embodiment of the invention, it will be apparent to those of ordinary skill in the art that numerous modifications, including, but not limited to, variations in size, materials, shape, form, function and manner of operation, assembly and use may be made, without departing from the principles and concepts of the invention as set forth in the claims. Further, it is contemplated that an embodiment may be limited to consist of or to consist essentially of one or more of the features, functions, structures, methods described herein.

What is claimed is:

1. A hair dryer, comprising:

a) a main body including:

a1) a handle;

a2) a housing coupled to the handle; and

a3) a first module interface structure coupled to the housing; and

b) a first module selectably coupleable and thereby functionally coupleable to the first module interface structure of the main body and including a hair dryer component selected from the group of hair dryer components consisting of heater module and blower module.

2. The hair dryer of claim **1**, further comprising:

a) a second module interface structure coupled to the housing and disposed opposite the first module interface structure; and

b) a second module selectably coupleable and thereby functionally coupleable to the second module interface structure of the main body and including a hair dryer component selected from the group of hair dryer components consisting of heater module and blower module.

3. The hair dryer of claim **1**, wherein the first module interface structure includes a reusable power coupling with mating contacts.

4. The hair dryer of claim **1**, wherein the first module is a blower module including a motor.

5. The hair dryer of claim **1**, wherein the first module interface structure includes a data connection configured to communicate data between the main body and the first module.

6. The hair dryer of claim **1**, wherein the first module is a heater module including a heating element.

7. The hair dryer of claim **1**, wherein the first module includes a heater module and a blower module.

8. The hair dryer of claim **1**, wherein the first module includes a fan.

9. The hair dryer of claim **1**, wherein the first module interface structure includes a first alignment structure that mates with a second alignment structure disposed on the first module and wherein mating of the first and second alignment structures results in functional alignment of the first module with the housing.

10. The hair dryer of claim **1**, wherein the first module includes an identification device configured to identify a characteristic of the first module and wherein the housing includes a communication module configured to read an identification device and communicate a read characteristic to a control module.

11. The hair dryer of claim **1**, further comprising a plurality of interchangeable first modules including varying operational characteristics.

12. A hair dryer comprising a selectably removable motor having a reusable power coupling module with mating power contacts.

13. The hair dryer of claim **12**, wherein the selectably removable motor includes an identification device configured to identify a characteristic of the selectably removable motor and wherein the hair dryer includes a communication module configured to read an identification device and communicate a read characteristic to a control module.

14. The hair dryer of claim **13**, further comprising a selectably removable heater having a reusable power coupling with mating power contacts.

15. The hair dryer of claim **14**, further comprising an alignment structure included with at least one of the selectably removable motor and the selectably removable heater, wherein the alignment structure facilitates alignment during coupling.

16. The hair dryer of claim **15**, further comprising a data connection between the heater and a housing of the hair dryer and a communication module within the hair dryer in communication with the data connection.

17. The hair dryer of claim **16**, wherein the selectably removable heater includes an identification device configured to identify a characteristic of the selectably removable heater.

18. The hair dryer of claim **17**, further comprising a plurality of interchangeable selectably removable motors and a plurality of interchangeable selectably removable heaters.

19. The hair dryer of claim **18**, wherein the plurality of selectably interchangeable removable motors and heaters include varying operational characteristics.

20. A hair dryer kit, comprising:

a) a main body including:

a1) a handle;

a2) a housing coupled to the handle;

a3) a first module interface structure coupled to the housing; and

a4) a second module interface structure coupled to the housing and disposed opposite the first module interface structure;

b) a plurality of interchangeable heater modules including heating elements selectably coupleable and thereby functionally coupleable to the first module interface structure of the main body; and

c) a plurality of interchangeable blower modules including motors selectably coupleable and thereby functionally coupleable to the second module interface structure of the main body.

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