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(54) **APPARATUS AND METHOD FOR STATIC
RESISTANCE TRAINING**

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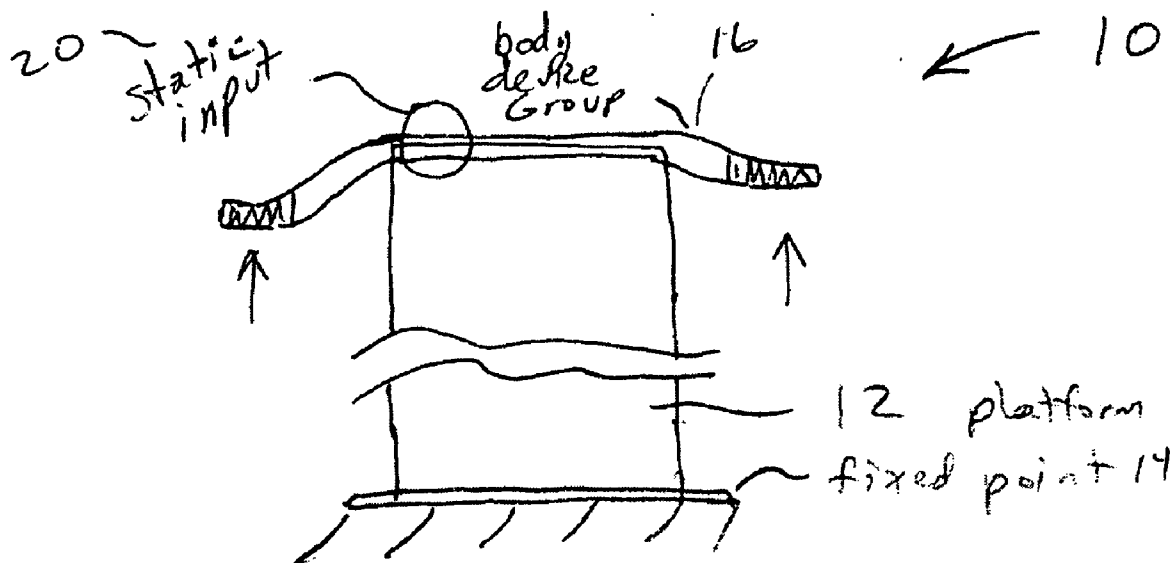
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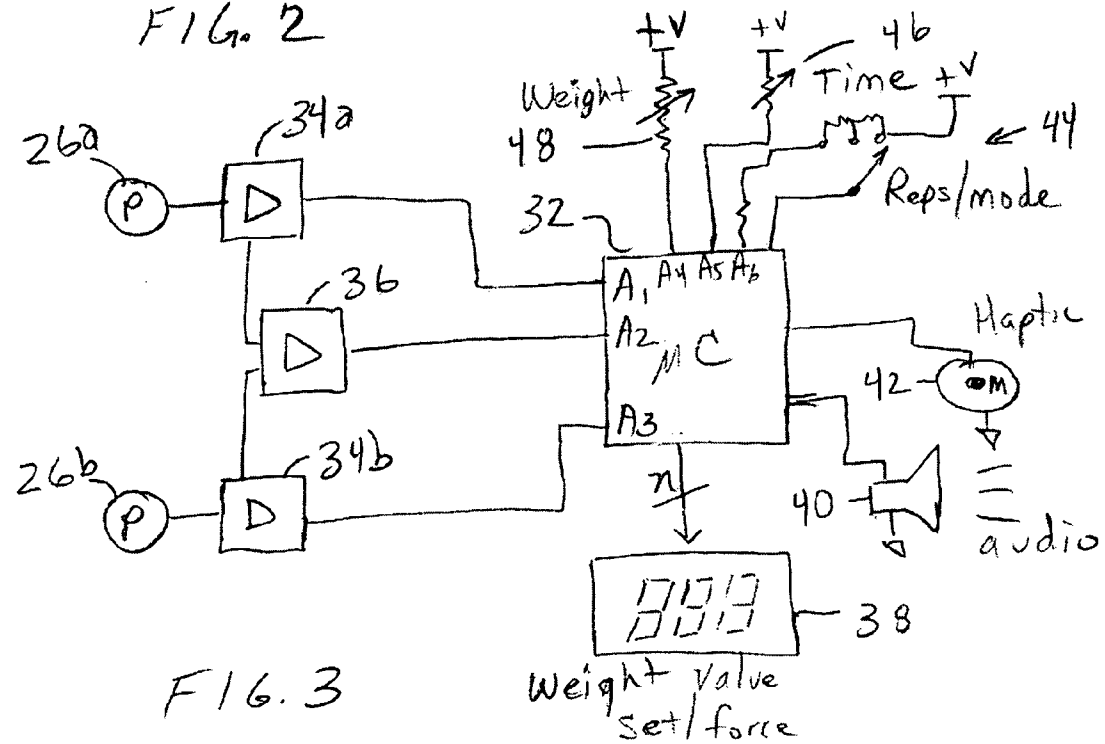
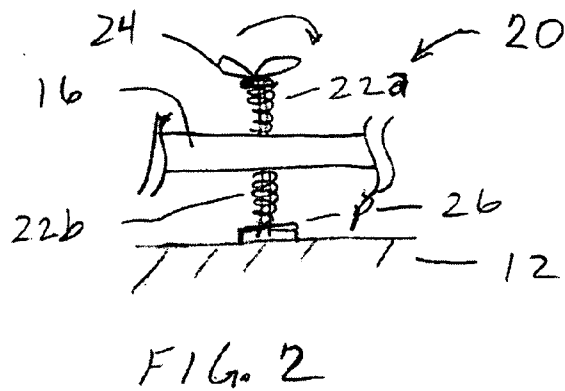
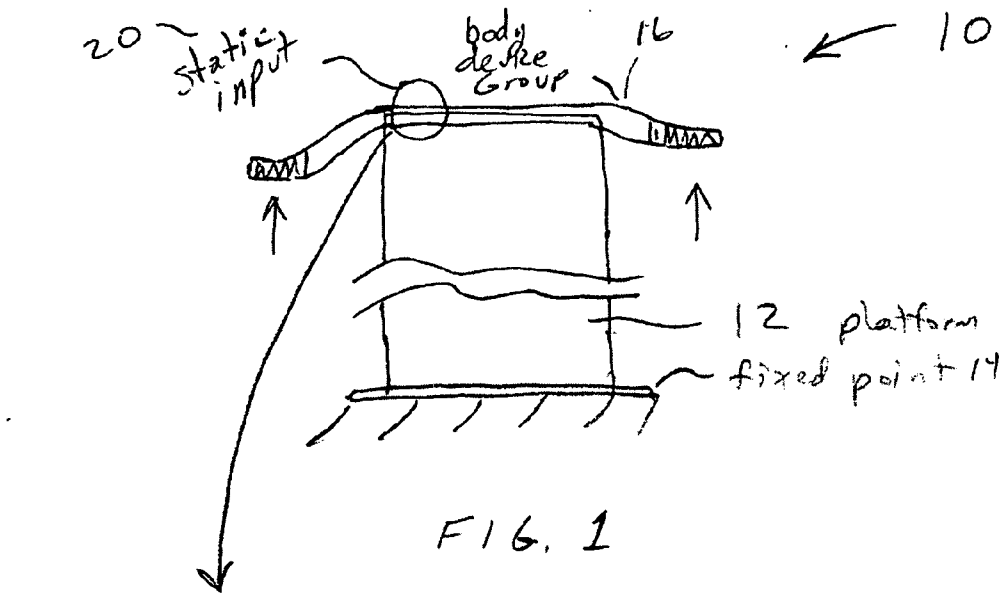
(57) **ABSTRACT**

A system and method for performing static strength training. The system provides tactile feedback as well as directing the user in the proper application of sufficient and balanced force.

(21) Appl. No.: **11/476,991**

(22) Filed: **Jun. 27, 2006**





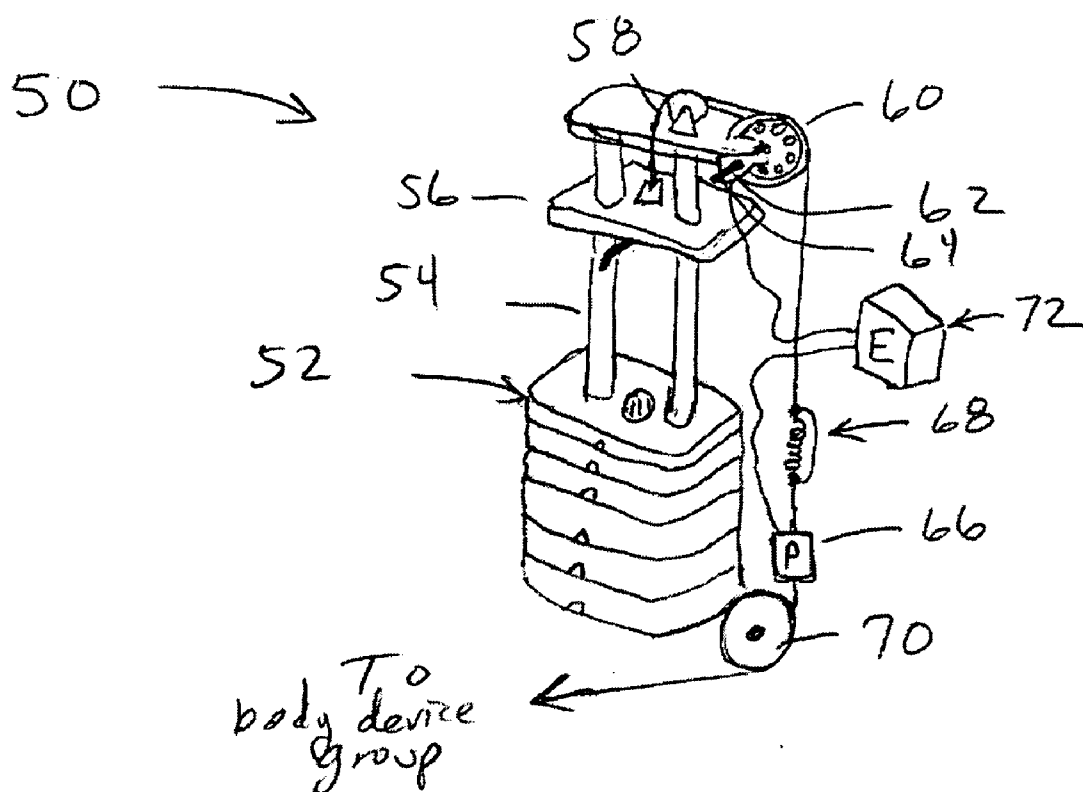
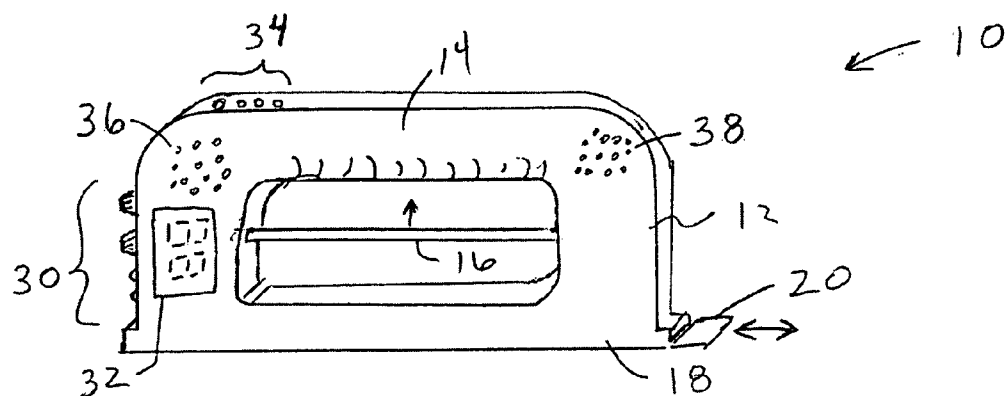
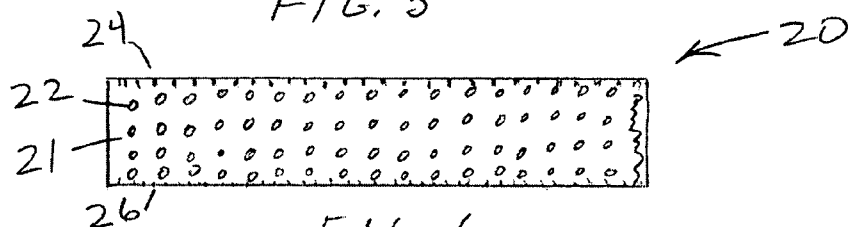


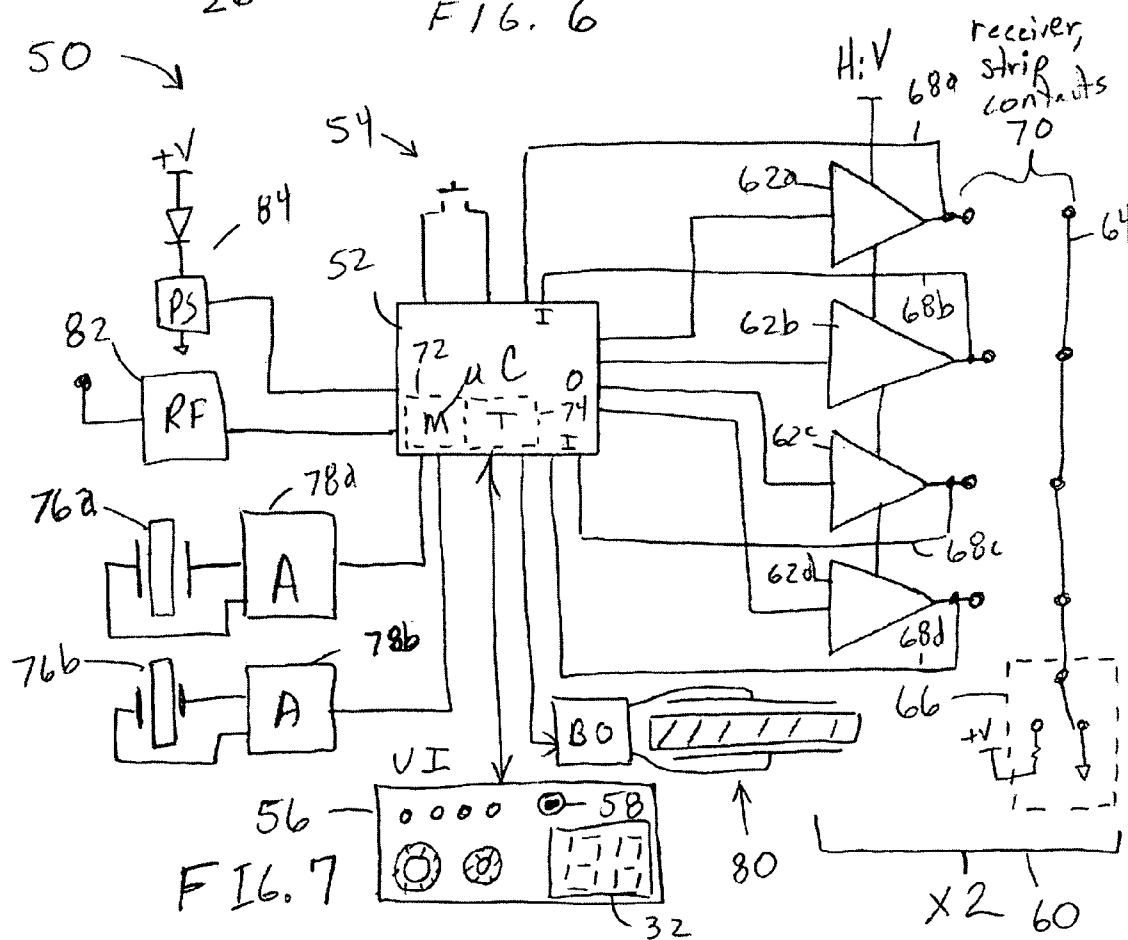
FIG. 4



F16.5



F16.6



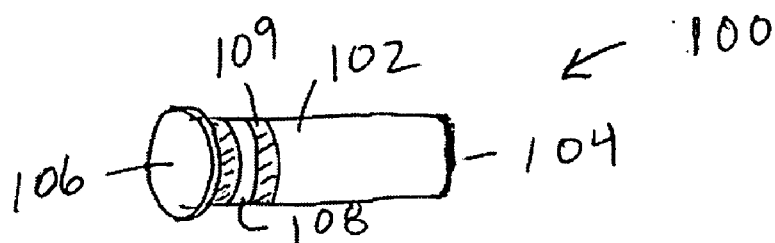


FIG. 8

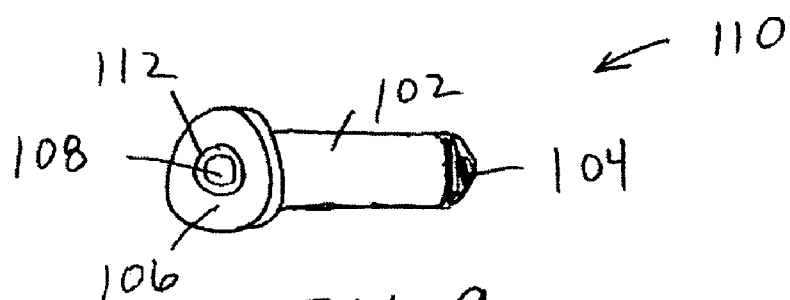


FIG. 9

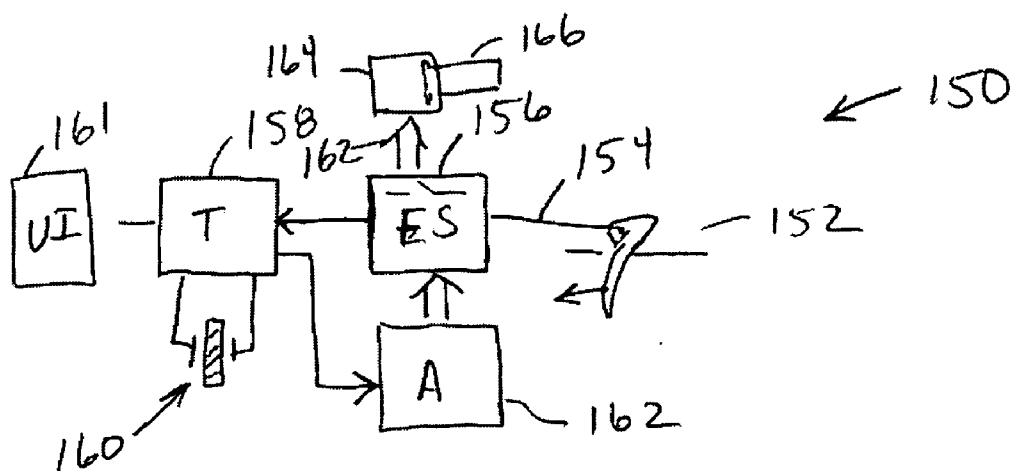


FIG. 10

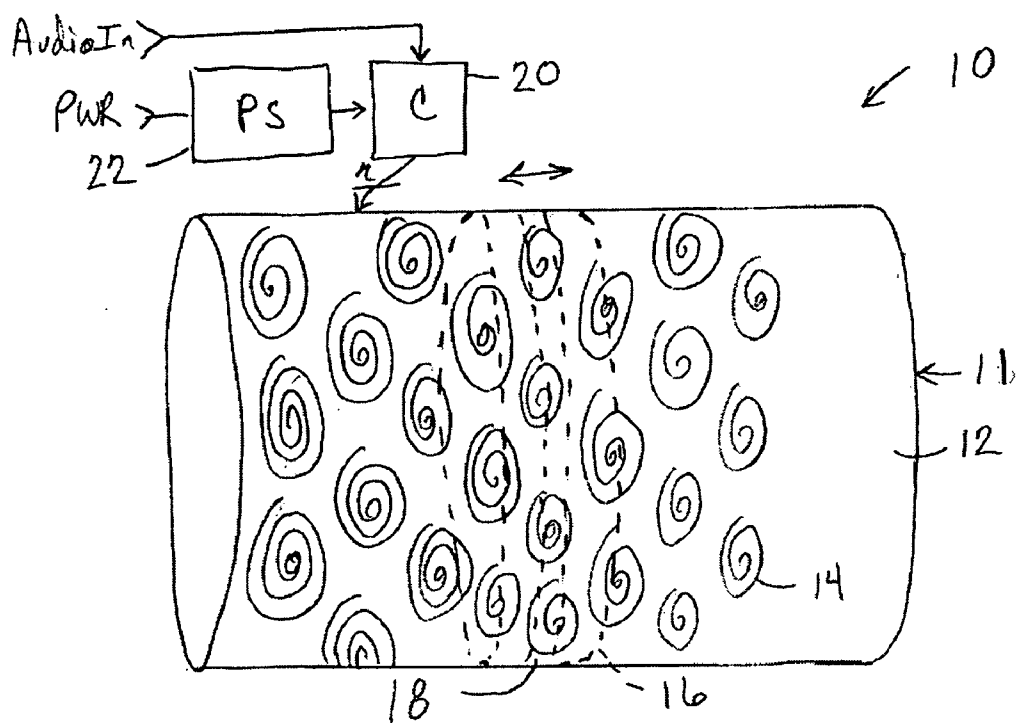


FIG. 11

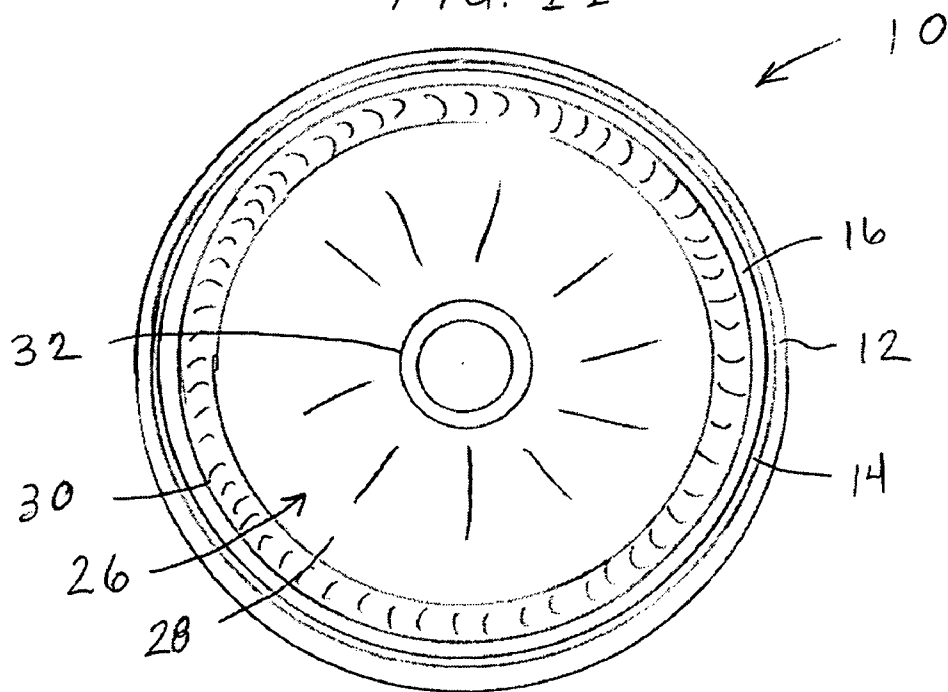


FIG. 12

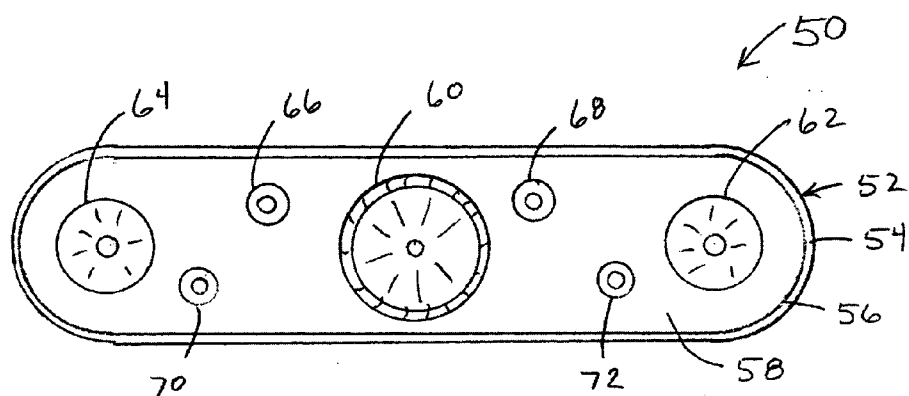


FIG. 13

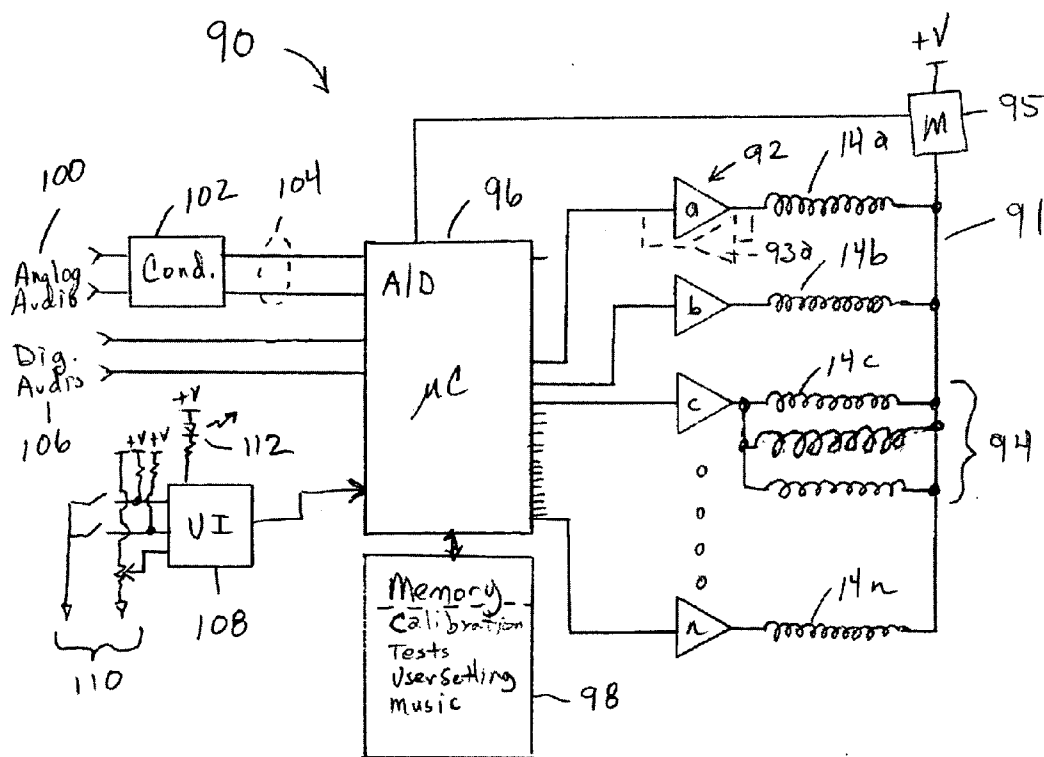
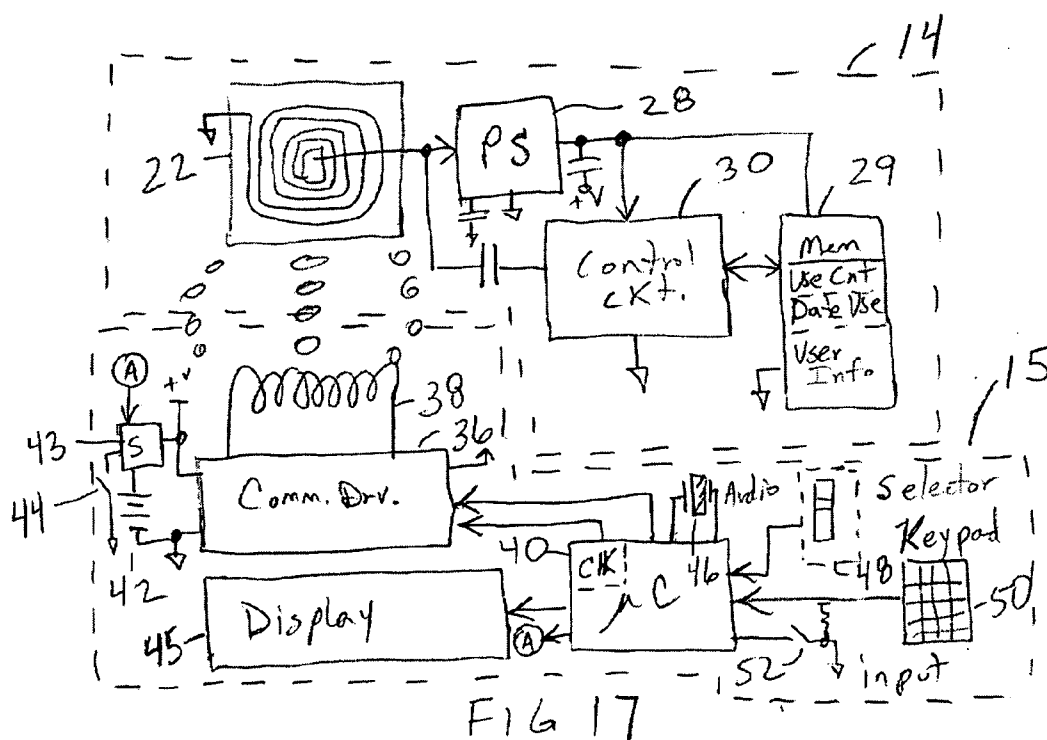
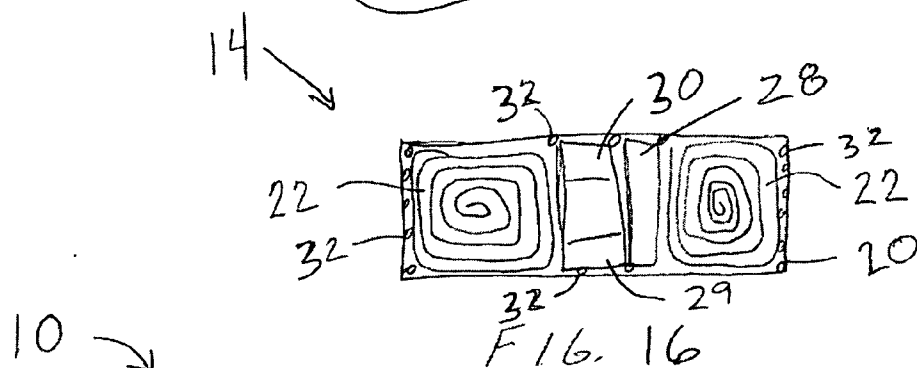
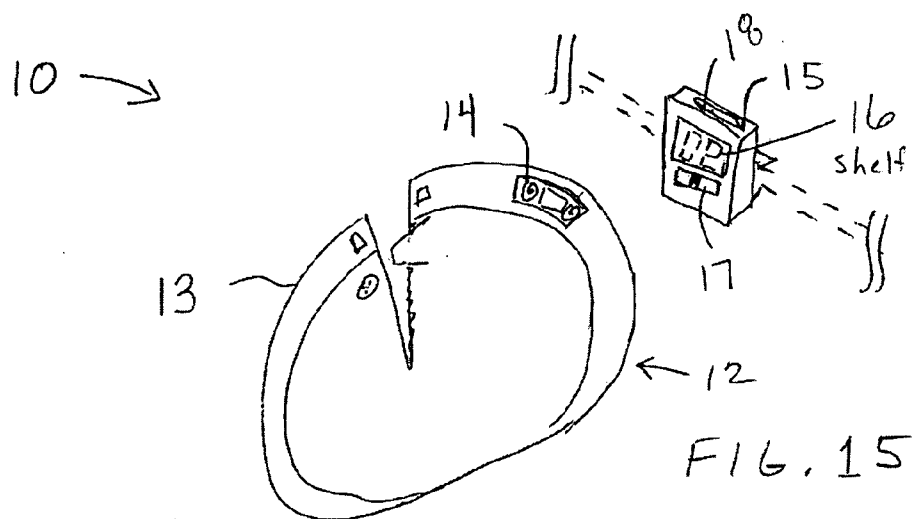


FIG. 14



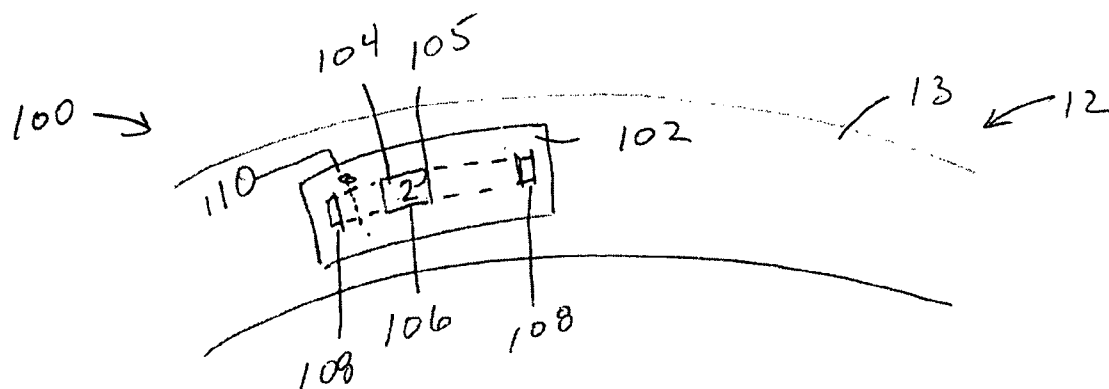


FIG. 18

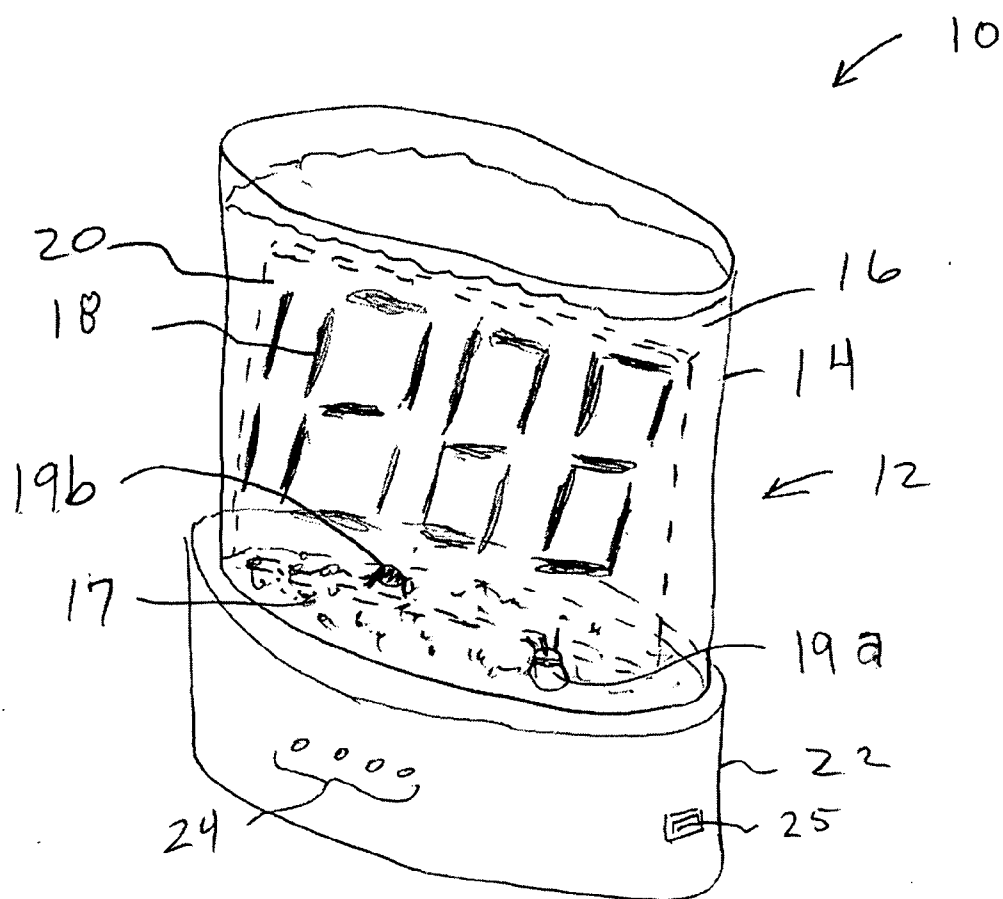
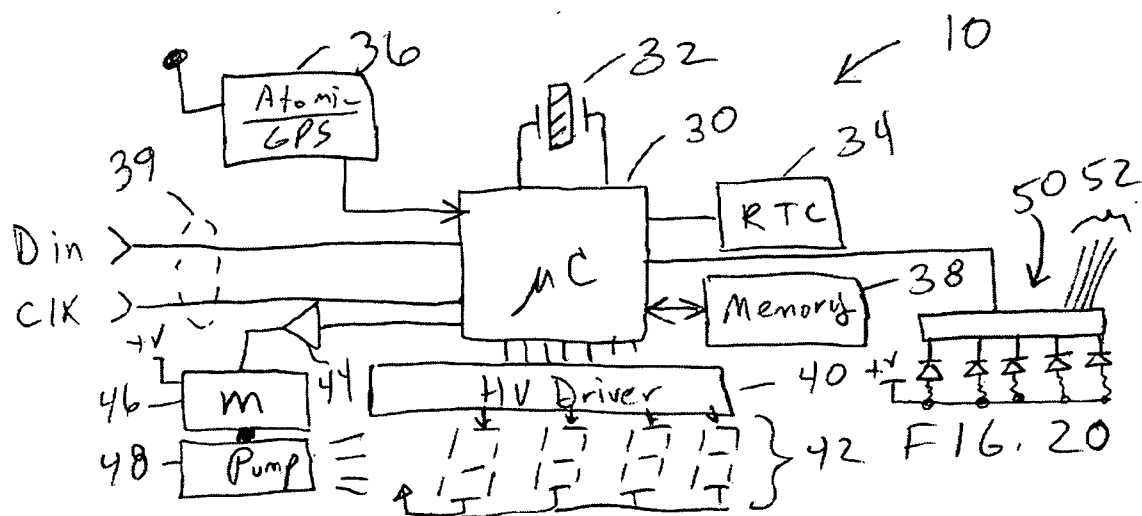


FIG. 19



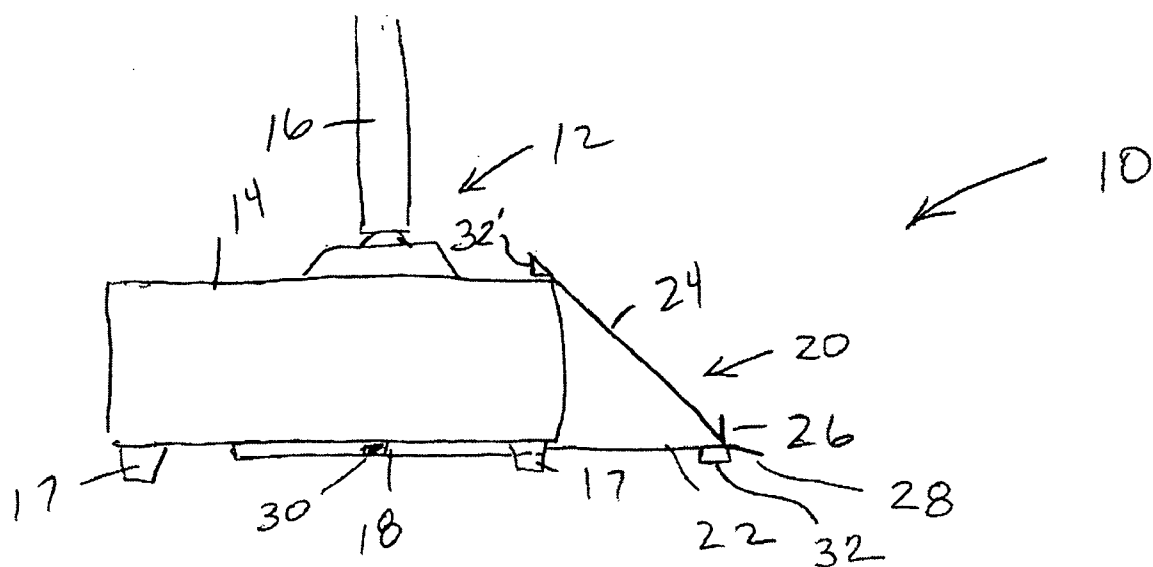


FIG. 21

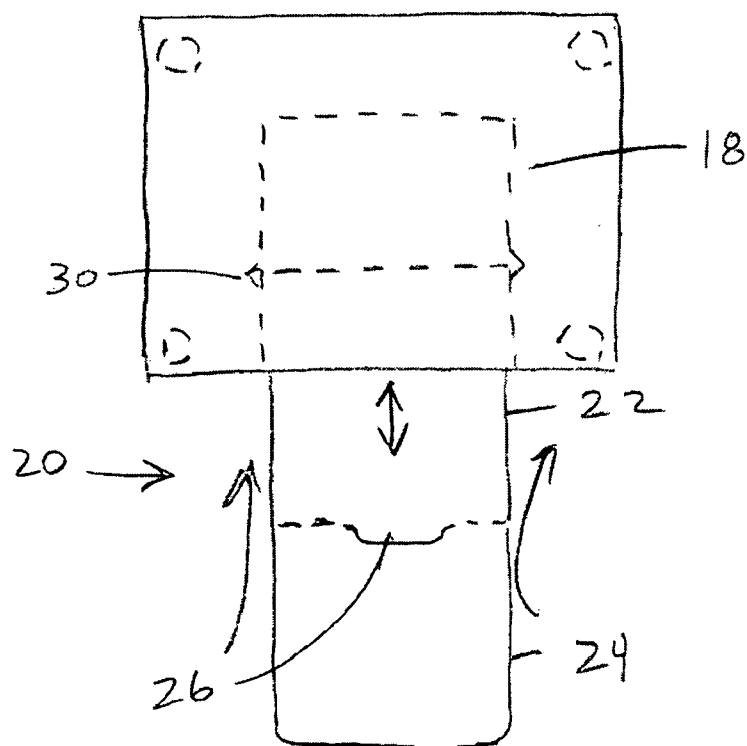
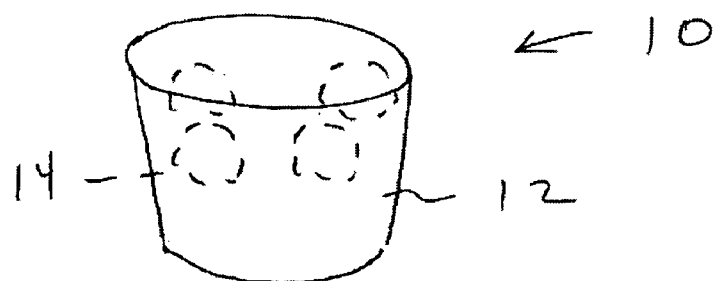
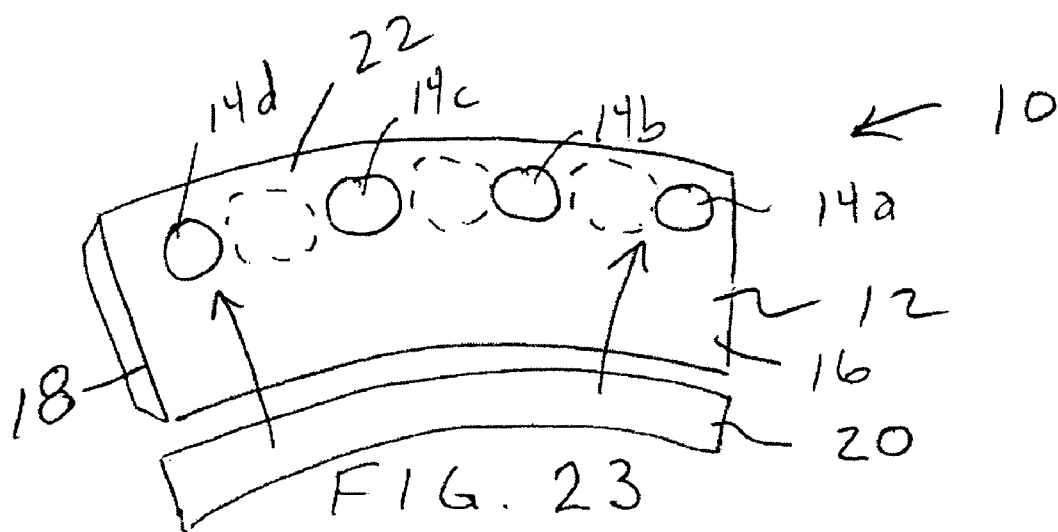
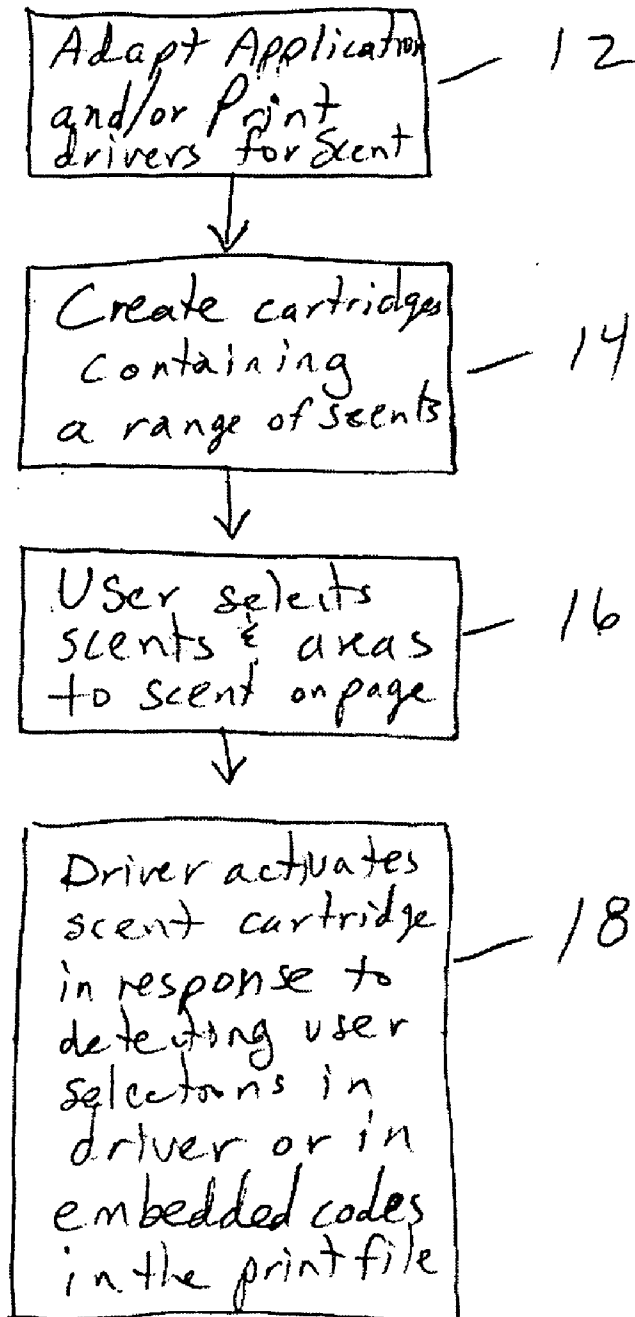


FIG. 22



10 →



F16.25

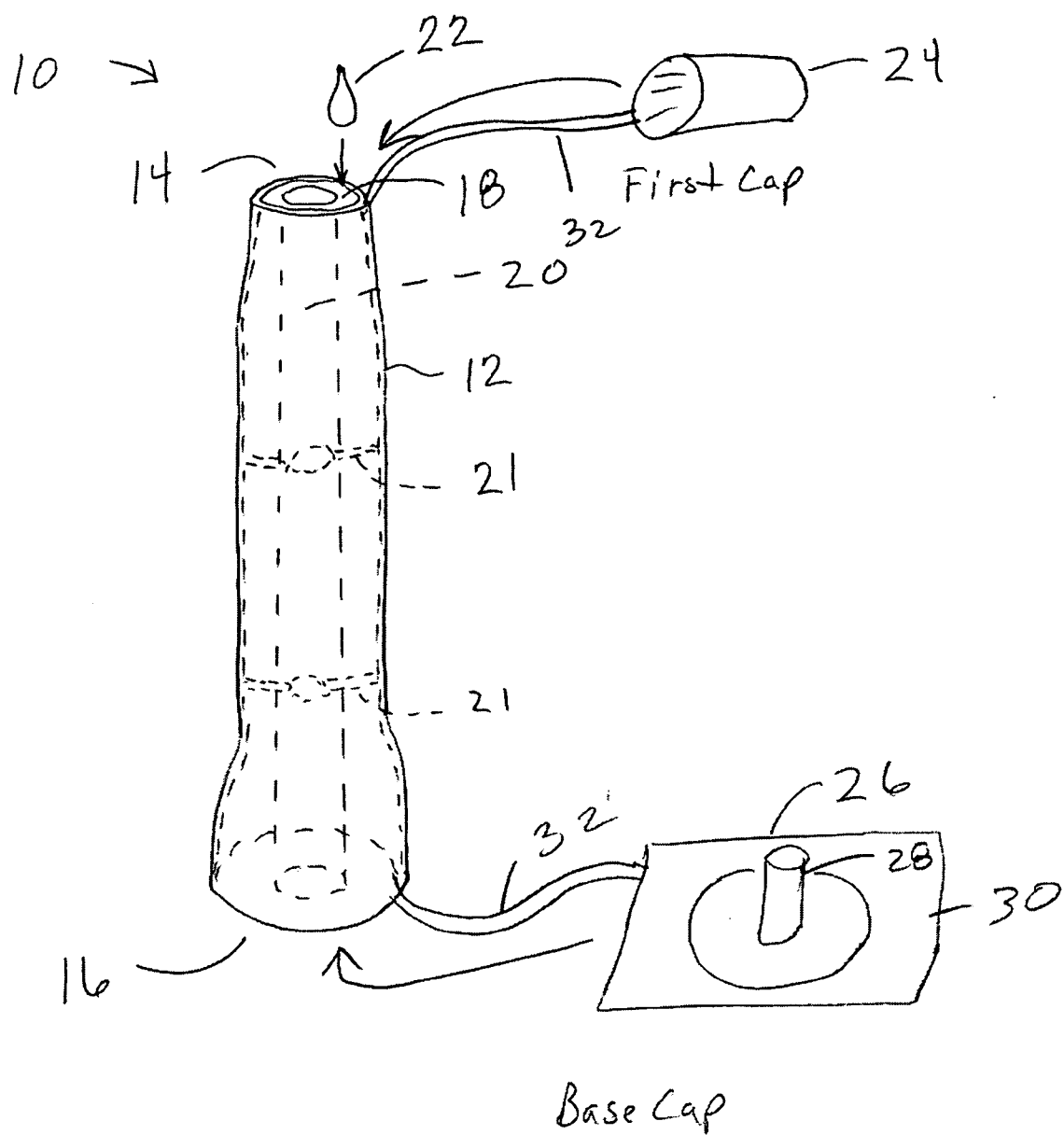
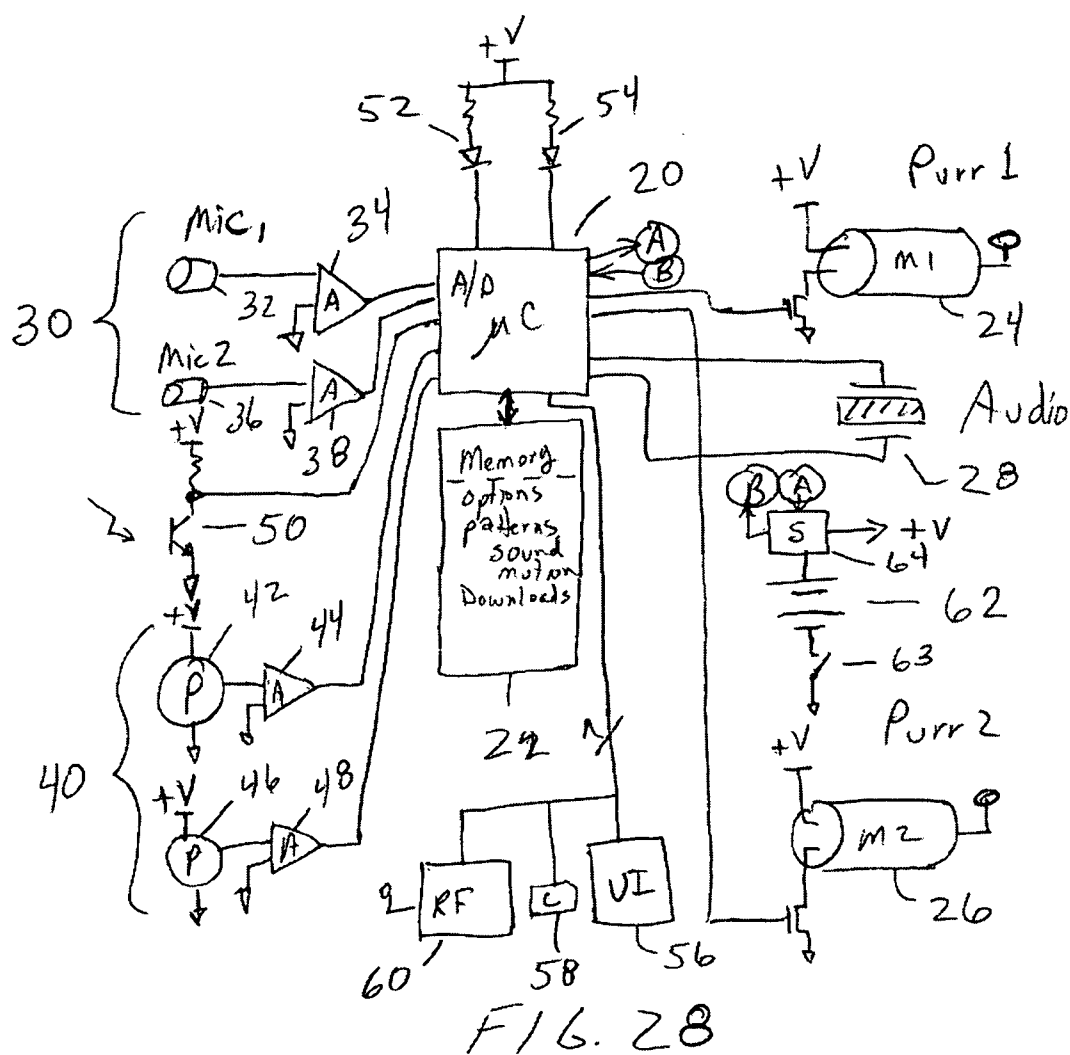
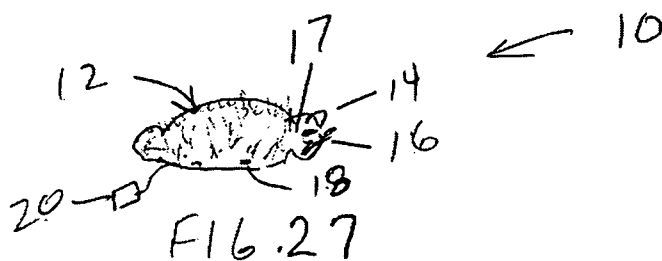
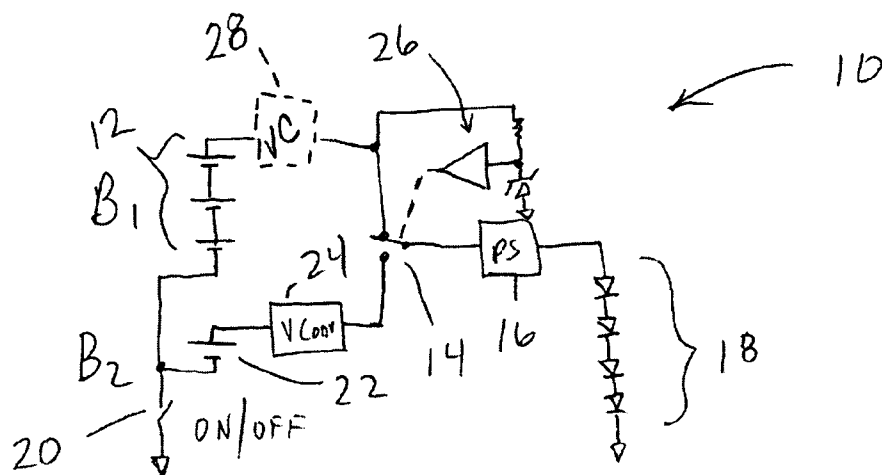


FIG. 26





F16.29

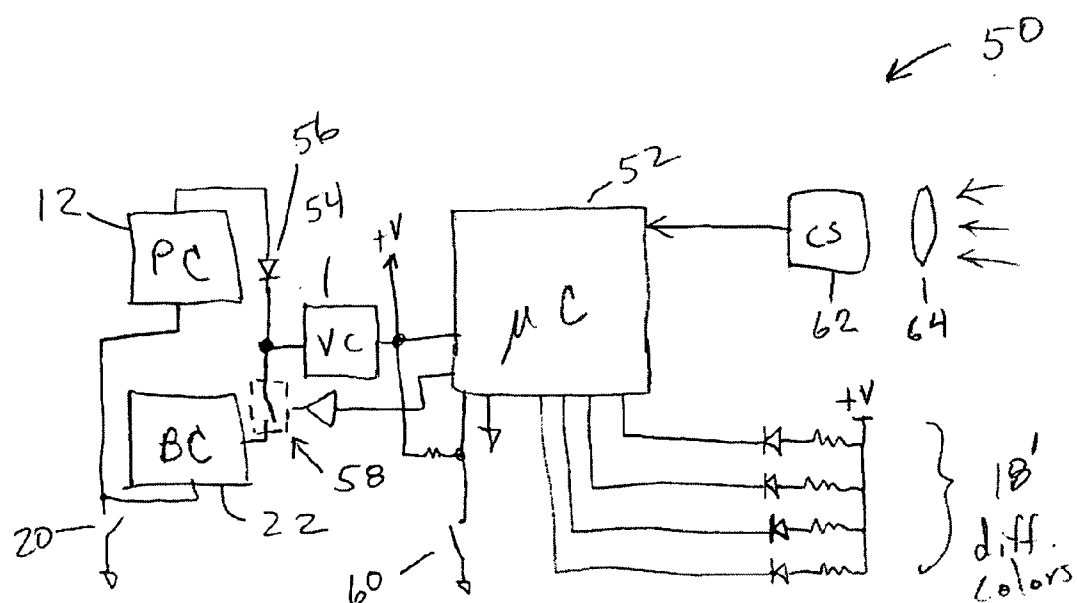


FIG. 30

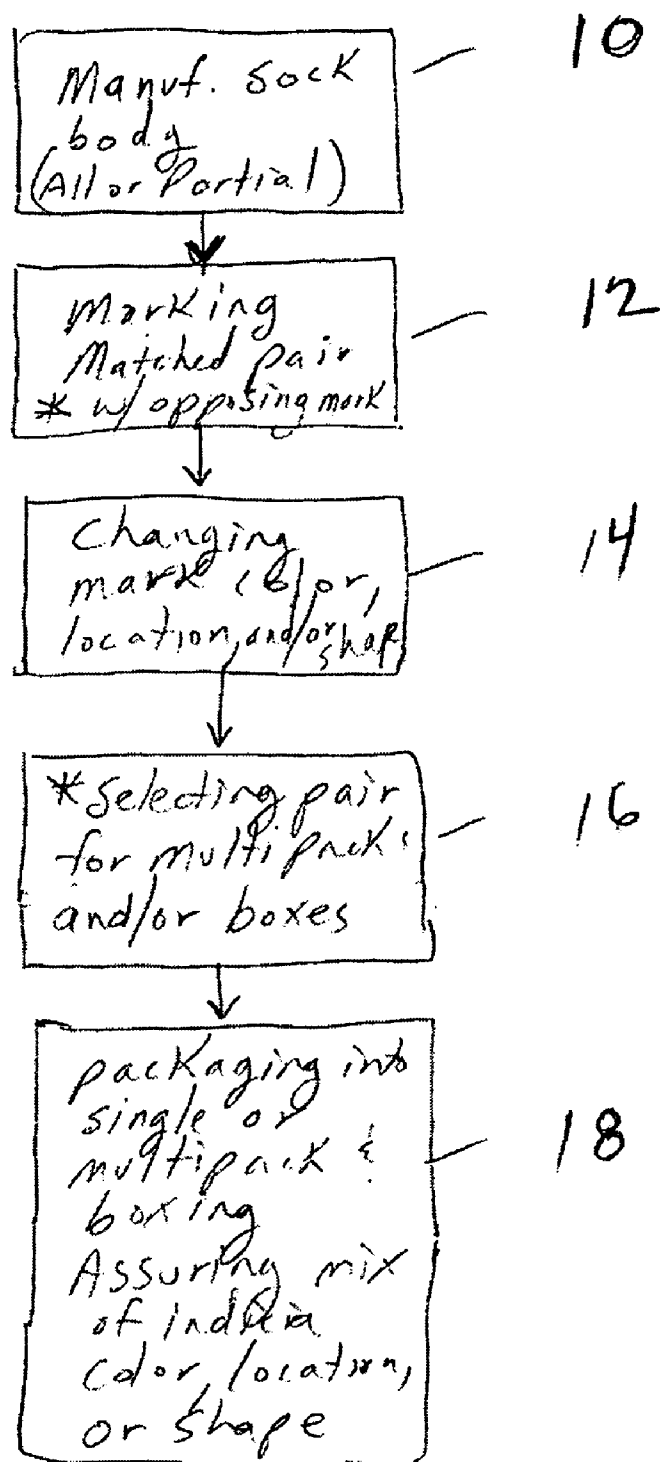
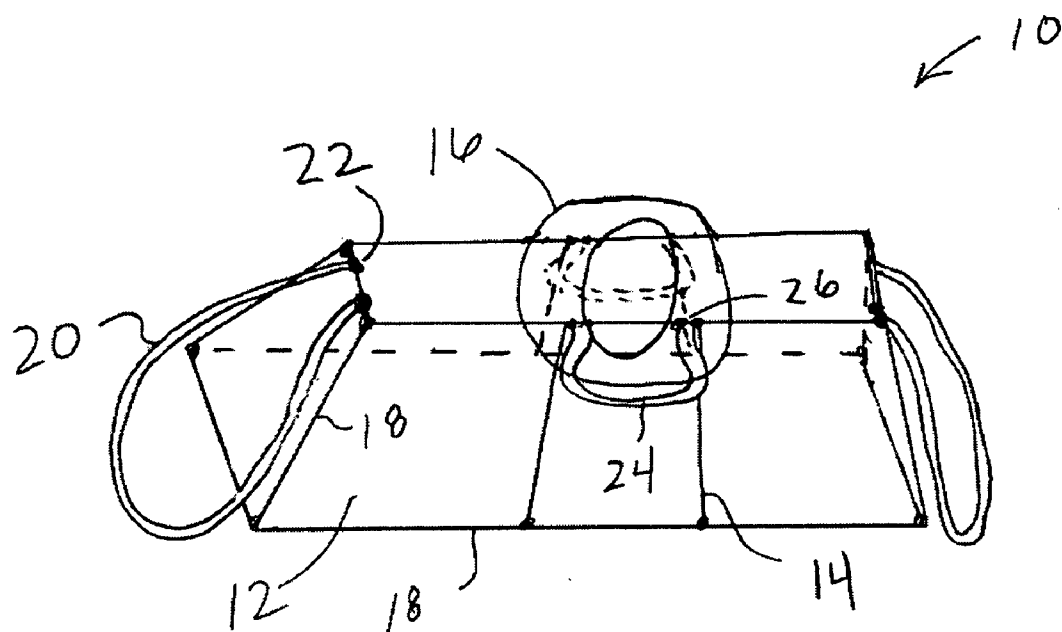
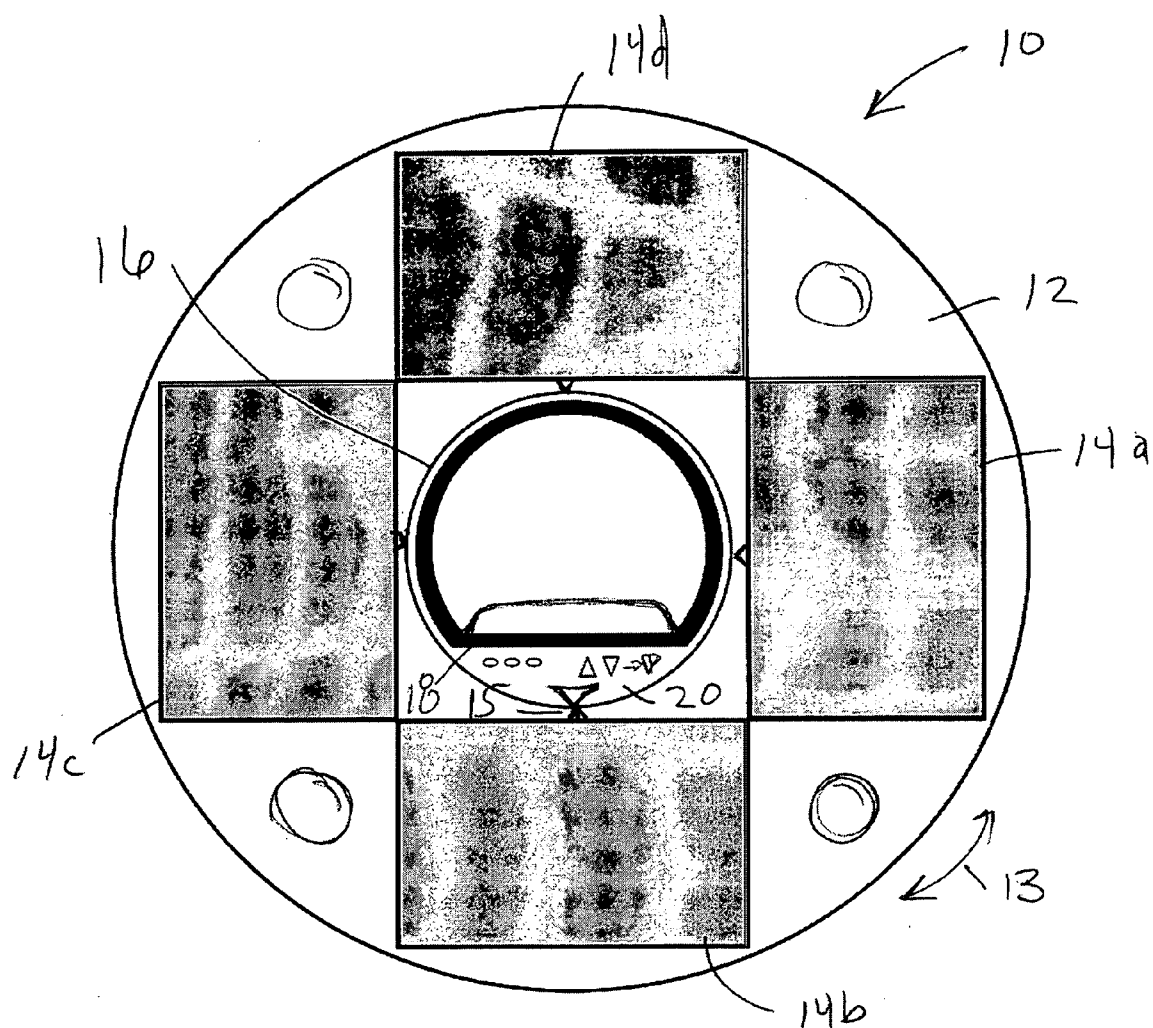


FIG. 31



F16.32



F16.33

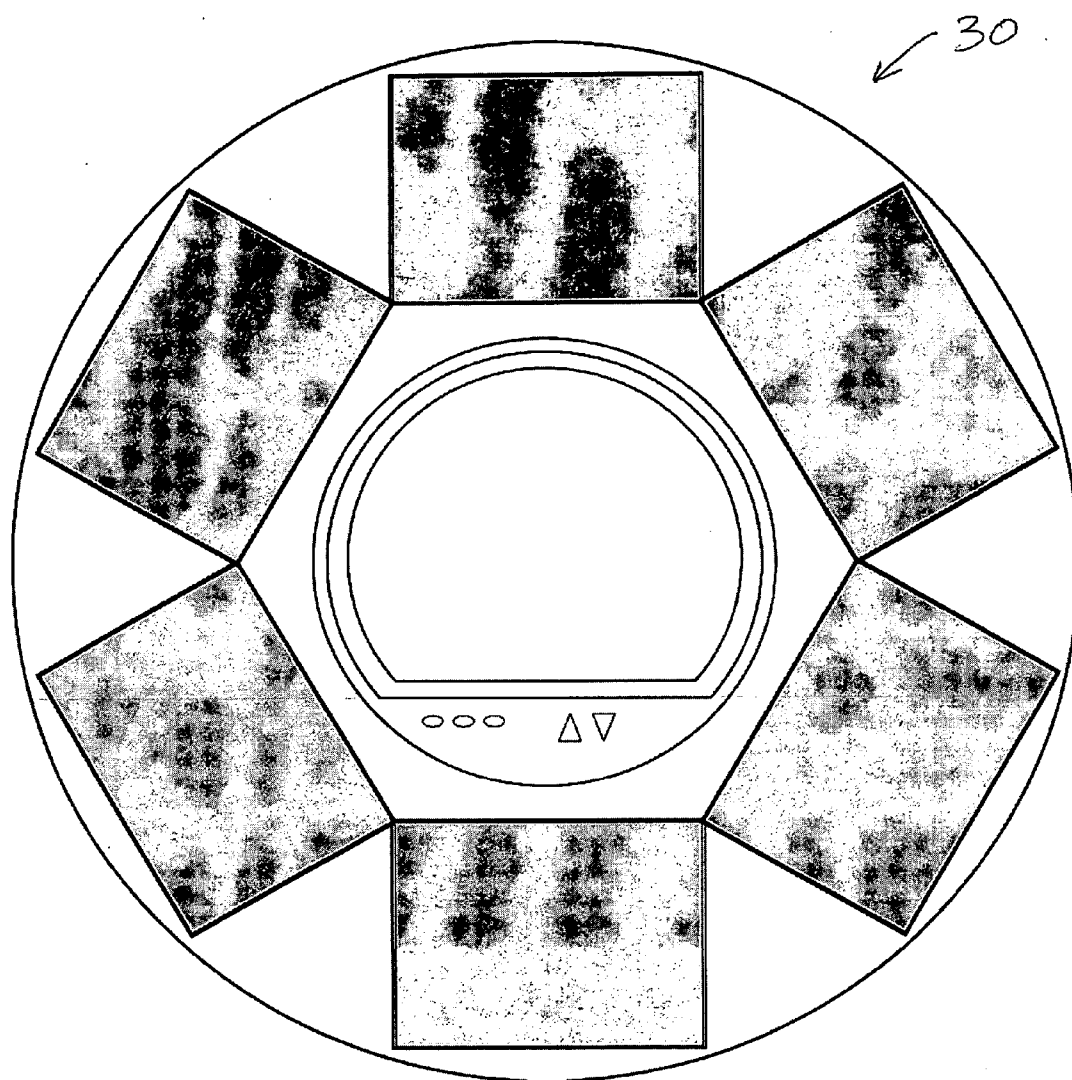


FIG. 34

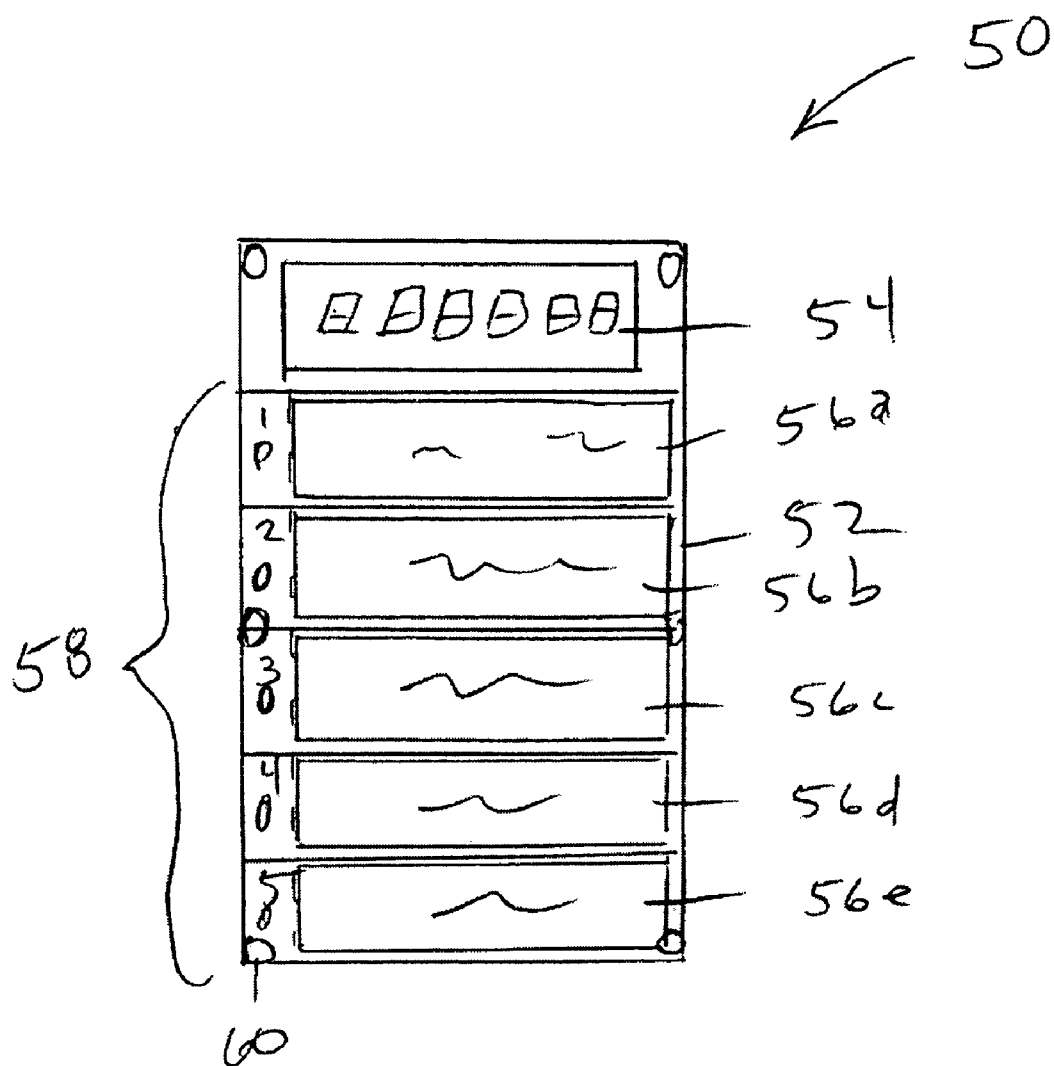


FIG. 35

APPARATUS AND METHOD FOR STATIC RESISTANCE TRAINING

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from provisional patent application Ser. No. 60/694,466 filed Jun. 27, 2005, incorporated herein in its entirety.

STATEMENT OF FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

REFERENCE TO A MICROFICHE APPENDIX

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] 1. Field of the Invention

[0005] This invention pertains generally to physical training devices and more particularly to a static resistance trainer apparatus.

[0006] 2. Description of the Background Art

[0007] It has been found that physical strength training can be sped up by the use of static resistance training. In this the user presses against a very high amount of weight to move it just the slightest amount and repeats the exercise. However, pressing against fully static devices and structures has a number of disadvantages.

[0008] Therefore, a need exists for a static training device that provides feedback to the user while encouraging use. The static training device in accordance with the present invention satisfies that need, as well as others, and overcomes deficiencies in previously known techniques.

BRIEF SUMMARY OF THE INVENTION

[0009] The invention provides a safe training device for static resistance training with numerous advantages. It should be appreciated that in a traditional weight training system movement is achieved in response to overcoming the weight of the free weight or the weight setting of the weight stack. In the present invention the machine is set for a static force. The device can have a fixed input, wherein user pressure does not cause the input handle(s), feet plate, or whatever form of input device group is utilized, to move in response to the pressure application (for example movement less than 2").

[0010] The device can be implemented in a configuration to allow training any desired muscle group in the arms, legs, neck or torso. The input on these devices is referred to herein as a body device group, for example the handle bar device in a lat pull machine is a body device group for the lat muscles. The invention comprises aspects for controlling and annunciating the static resistance and the specific forms into which these can be incorporated will be recognized by one of ordinary skill in the art.

[0011] The training is in response to a substantially static load—one that is not moved, wherein the pressure is sensed electronically by a force, pressure, or weight sensing means. The difference must be understood. Even in embodiments in

which the input device group is adapted for motion, such as to a starting point, to provide limited feedback and so forth; the pressure force is applied by the user over a short distance (such as on the order of a few inches) and a soft or hard stop is hit wherein pressure is registered electronically in response to the force applied to the soft or hard stop.

[0012] It should be noted that even though the body device group, or a portion thereof, is adapted to move over a distance (preferably a small distance, such as less than 6" and more preferably less than 3"). One embodiment allows the body device group to move from a ready position to a use position whose extent strikes the end point (no further movement—or restricted as with biasing device) at which pressure input is registered in the selected range.

[0013] A number of embodiments are described which can be practiced separately, or in any desired combination according with the present invention. The features include but are not limited to the following.

[0014] Electronic force sensing—static pressure applied is registered on a force registering means coupled to electronics for registering and conditioning the information and outputting annunciations (visual, audio, and/or haptic) on output devices.

[0015] Semi-static activation—the body device group input can be configured to move through small range to provide feedback—yet force applied is sensed through the sensors and not the extent of motion. A soft stop can thus be effected in an embodiment of the invention.

[0016] Controlled feedback pressure—system configured with adjustable biasing potential, wherein user can adjust the level of feedback received.

[0017] Vibratory Muscle Response Inducement (VMRI)—a small force displacement means at a frequency approximately equal to or greater than 1 Hz provides enhanced muscle training in response to automatic muscle force accommodation to train muscles faster.

[0018] Electronic selection of target weight—system allows user to set the target weight with an electronic control.

[0019] Electronic selection of time and/or reps—system allows user to set the target time for holding the weight, a number of reps in which pressure is applied to the target weight, or both.

[0020] Balance sensing and selector—the system can be configured with balance detection and annunciation.

[0021] Display—a display of the pressure setting value and numerous operational aspects of the invention.

[0022] Annunciation of targets. System is configured to output an audio or haptic feedback in response to a number of conditions. For example: reaching target weight; exceeding target weight by a fixed threshold (i.e., 5%, 10%, etc.); pressure-time output; goal on time, reps, or combination thereof; balance maintained; and other aspect registered by the system.

[0023] Add-on Implementation—The unit may be implemented as a separate training device, or according to an embodiment of the present invention it can be implemented as a feature (integrated or after-market) of a traditional

movement-based training device, for example one in which free or fixed weights are lifted, bows flexed, shock absorbers compressed and so forth, are modulated through a range of motions.

DIFFERENT EMBODIMENTS

[0024] The invention can be incorporated within a separate machine of the Incorporated with these devices according to one embodiment a position is selected, such as by insertion of a weight select value, which provides the static setting. By way of example a static "weight" setting is beyond the other weights in the stack (i.e., after 250 pounds on a cable-lift-weight machine (i.e., Nautilus® Brand)). When positioned on this setting the user can apply high levels of static force which are registered by the system and annunciated to provide the static workout benefits.

[0025] In another embodiment any weight setting can be locked to a desired endpoint position, such as by inserting a locking pin through a cable wheel into the housing. A force sensor is coupled along the cable for sensing the static pressure according to the invention. In this way the user can set the body device group to any position for performing static conditioning. Many of the force registration features of the present invention can be used for the static conditioning as well as for registering user activity when the lock is not in place and the user is moving the weights through a range of motion (i.e. force then limited to weight of weights or force of simulated weight of a traditional machine).

[0026] Alternatively or additionally, a lever, or similar static position selector can be utilized in place of a pin. In addition an electronic actuator can be used coupled to a mechanical device utilized for locking the device into a stationary position. One or more compliant members may be coupled to or along the power path of the device to dampen the response and provide slight motion feedback in response to static exercise.

[0027] It should be appreciated that aspects of the present invention can be integrated within a number of different forms of conventional strength training devices without departing from the teachings herein to provide the conditioning benefits of static resistance muscle training.

[0028] The present invention is an apparatus for personal strength training of a user, comprising: (a) an input means configured for receiving a static force application from a user during training; (b) a first static force registration sensor operable coupled to the input means for registering the level of force applied by the user; (c) a timing means; (d) a threshold selector configured for setting at least one target value of static force; (e) an audio or vibrational annunciator adapted for generating a first annunciation alerting the individual that the threshold has been reached or exceeded, and the time as registered by the timing means over which the user continues to apply force which has reached or crossed the threshold; and (f) a control circuit adapted for activating the annunciator in response to determining that the applied level of force registered by the static force registration sensor has exceeded the setting of the threshold selector.

[0029] Embodiments of the present invention can provide a number of beneficial aspects which can be implemented either separately or in any desired combination without departing from the present teachings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The invention will be more fully understood by reference to the following drawings which are for illustrative purposes only:

[0031] **FIG. 1** is a facing view of a static training device according to an embodiment of the present invention, showing a body device group in the form of a handled bar.

[0032] **FIG. 2** is a close-up view of an adjustable static input member according to an aspect of the present invention.

[0033] **FIG. 3** is a schematic block diagram of the static training circuit according to an aspect of the present invention, showing a first and second force sensor operating in combination and providing a differential sense signal.

[0034] **FIG. 4** is a perspective view of a static training device incorporated as a static mode of a conventionally non-static exercise device according to an aspect of the present invention.

[0035] **FIG. 5** is a perspective view of an electronically operated starter pistol according to an aspect of the present invention, showing electronic controls, audio annunciator output, structure for receiving a set of percussion devices, and a trigger.

[0036] **FIG. 6** is a top view of a percussion, or pyrotechnic device, strip according to an aspect of the present invention, showing a series of triggerable pyrotechnic elements, such as generating a sound similar to blank bullets.

[0037] **FIG. 7** is a schematic block diagram showing drivers for receiving user input, generating preparatory sounds, and for actuating pyro elements according to an aspect of the present invention.

[0038] **FIGS. 8 and 9** are percussion element blanks made for a pistol that is either electronically or mechanically activated according to an aspect of the present invention.

[0039] **FIG. 10** is a schematic block diagram of a starter pistol apparatus configured for both mechanical and electrical activation of percussion elements according to an embodiment of the present invention.

[0040] **FIGS. 11 and 12** are side and front views of a long-drive audio speaker mechanism according to an embodiment of the present invention.

[0041] **FIG. 13** is a facing view of a first speaker according to an aspect of the present invention, shown containing additional speaker elements of the same, or conventional construction.

[0042] **FIG. 14** is a schematic block diagram of a circuit for controlling slide woofer speakers according to an aspect of the present invention.

[0043] **FIG. 15** is a perspective view of a wear use system according to an aspect of the present invention, showing registering and displaying the number of times the slacks have been worn since their last laundering.

[0044] **FIG. 16** is a facing view of a garment wear tag according to an aspect of the present invention.

[0045] **FIG. 17** is a schematic block diagram of a garment wear controller according to an aspect of the present invention.

[0046] **FIG. 18** is a perspective view of a mechanical garment wear indicator according to an aspect of the present invention.

[0047] **FIG. 19** is a perspective view of a liquid and particle filled display apparatus according to an aspect of the present invention.

[0048] **FIG. 20** is a schematic block diagram of the liquid and particle filled display apparatus of **FIG. 19**.

[0049] **FIGS. 21 and 22** are side and facing views of a disposable document holder according to an aspect of the present invention.

[0050] **FIGS. 23 and 24** are views of an enhanced coffee-cozy according to an aspect of the present invention, shown during and after manufacture.

[0051] **FIG. 25** is a flow diagram of a scent printing method according to an aspect of the present invention.

[0052] **FIG. 26** is a perspective view of a scent/medicament dispensing inhalant according to an aspect of the present invention.

[0053] **FIG. 27** is a perspective view of a simulated pet apparatus according to an aspect of the present invention.

[0054] **FIG. 28** is a schematic block diagram of the simulated pet of **FIG. 27**, according to an aspect of the present invention.

[0055] **FIG. 29** is a schematic block diagram of a flashlight with reserve capacity according to an aspect of the present invention.

[0056] **FIG. 30** is a schematic block diagram of another flashlight with reserve capacity according to an aspect of the present invention.

[0057] **FIG. 31** is a flow diagram of a sock manufacturing method according to an aspect of the present invention.

[0058] **FIG. 32** is a perspective view a combination carry bag and flight pillow according to an aspect of the present invention.

[0059] **FIG. 33** is a top view of a multiplexing clock according to an aspect of the present invention, shown with four notepads associated with the multiplex intervals.

[0060] **FIG. 34** is a top view of another multiplexing clock embodiment according to an aspect of the present invention, shown with additional note pads and associated task positions.

[0061] **FIG. 35** is a top view of another multiplexing clock embodiment according to an aspect of the present invention, showing a linear arrangement of note pads and task selectors.

DETAILED DESCRIPTION OF EMBODIMENT(S)

[0062] Referring more specifically to the drawings for illustrative purposes, the present invention is embodied in the method generally described in **FIG. 1** through **FIG. 35**. The following description is presented to enable one of ordinary skill in the art to make and use the invention as provided in the context of a particular application and its requirements. Unnecessary technical details, which extend

beyond the necessary information allowing a person of ordinary skill in the art to practice the invention, are preferably absent for the sake of clarity and brevity. Furthermore, it is to be understood that inventive aspects may be practiced in numerous alternative ways by one of ordinary skill without departing from the teachings of the invention. Therefore, various modifications to the preferred embodiments will be readily apparent to those skilled in the art, and the principles defined here may be applied to other embodiments. Thus the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

[0063] These present invention described an automated static resistance system which provides a number of advantages over the current practice of stacking huge weights onto a conventional weight machine.

[0064] In a first embodiment of the machine a body group device, lat pull, bench press, leg press or other form of apparatus adapted for receiving a force applied by the user, is configured with the action device. The action device is defined herein as being the movable part on a standard weight machine, which is configured for static or semi-static retention on this apparatus.

[0065] **FIG. 1** is an example of the static training device **10**, having a base **12** upon fixed platform **14**. A body device group element **16** is shown with semi-static input element **20**. In this mode semi-static input element **20** is adapted for providing a limited compliance adjustment to control the feel when pressure is applied to the body device group **16**.

[0066] **FIG. 2** illustrates an embodiment of adjustable feedback mechanism. In this simple illustration body device group **16** contains a bar which is shown mounted with compliant elements **22a**, **22b** upon retention member **24** coupled to sensor **26**, which is adapted for sensing static force/pressure. It will be appreciated that the force registered by the sensor is a static force that is not substantially impacted by the compliant member, while these compliant members allow the user to obtain any desire level of feedback to encourage them toward applying the desired level of static force.

[0067] **FIG. 3** illustrates an example embodiment of a circuit **30** having a first force sensor **26a** coupled to a first amplifier/conditioning circuit **34a**, and a second force sensor **26b** coupled to a second amplifier/conditioning circuit **34b**. Signals from the first and second amplifiers/conditioning circuit (either analog or digital signals) are received by a processing means **32**, such as a microcontroller.

[0068] In this implementation, a means for registering a force differential is represented as a differential amplifier **36**, from which signals are received by controller **32**. Although represented as a hardware element, the differential force sensing can be alternatively implemented in the software/firmware of the apparatus, such as in controller **32**. A number of benefits arise from registering a differential force or pressure on the device. By way of example and not limitation, the unit can alert the user to differences in the applied force, or can direct the user to intentionally apply differential force levels, such as according to a desired training pattern, (i.e., predetermined, selected, programmed, random).

[0069] An input/output force device **38** is shown which can allow the user to select the desired input force and/or

display the information about the actual applied force, either in real time, and/or historical information (i.e., force instant, set force, program, variable program, average, force x time, differential force, and so forth and combinations thereof). By way of example, the input device may comprise one or more selector inputs, analog slider or wheel input, digital keypad selector input, up/down selector inputs, coded BCD wheels, and so forth.

[0070] The output device can comprise any desired forms of discrete elements (i.e., LEDs, LCDs, e-paper, and so forth), and displays. Another output is represented by audio transducer 40 adapted for generating audio feedback in response to controlling unit functions, and preferably for outputting audio in response to activities during static training, such as announcing the attainment or non-attainment of desired force levels, threshold levels of differential pressure (goal met or not met), directing user to change to another form of static force input (e.g., change level/direction of differential pressure), and so forth. A haptic output means 42 is shown for imparting motion/vibration to the device, such as to augment the audio output. A selector 44 is shown for selecting how the user desires to operate the static training apparatus, for example establishing a mode and number of repetitions. Another selector 46 is shown for receiving a workout time value 46, while a separate force (or weight, or pressure) level selector 48 is shown to allow the user to establish a static force level or range of force levels in response to certain variable static force modes.

[0071] In FIG. 4 an embodiment 50 of a static force registration device is incorporated within a conventional non-static training devices, such as those incorporating movable weights. In this manner the devices can be used for both static training and dynamic training. It will be appreciated that the system can be preferably “locked” at a given position for static training wherein the user can practice static force application at any desired position along the normal travel path of the machine. For example locked so as to apply force near the arms fully-extended position, or any desired position along the range of conventional motion.

[0072] By way of example and not limitation, a weight stack is 52 shown adapted for being conventionally displaced along track 54. A first weight plate 56 is shown selected, such as via a weight selection pin, and moved to a desired position for static training. In this example the first plate is moved in response to a cable 58, such as through pulleys, including a pulley 60. A latching means 62 is configured for locking the plate and/or cable or other means for inducing motion in the first plate, for example a sliding pin. An optional position sensor 64 is adapted for registering the static position to which the force is to be applied.

[0073] A force/pressure sensor 66 is shown coupled on the device, such as in line with the cable, to register the level of static force being applied against the locked weight plate, or plates. In addition, a compliant element 68 is shown for providing tactile feedback to the user as static force is applied. The cable 58 is shown being routed through a pulleys, such as pulleys 60 and 70 to a body device group. In the embodiment shown, pulley 60 has been locked in a static position, while pulley 70 is subject to limited movement according to the compliance of compliant element 68.

[0074] A control circuit 72 is shown for registering the levels of force/pressure applied and outputting information to the user according to how their workout is proceeding.

[0075] According to the above embodiments a number of features are described. It should be appreciated that these can be implemented individually or in any desired combinations.

[0076] Electronic force sensing—static pressure applied is registered on a force registering means, such as pressure transducer, strain gauge etc. A direct mechanical to electronic sensor may be utilized, or a pneumatic device whose fluidic output communicates pressure with a pressure sensor, wherein a slightly damped response may be provided.

[0077] Semi-static activation—the body device group input (where user input from hands, feet, buttock etc. upon which pressure is applied) is biased to a static point and user can thus make the bar move for effect although not in direct relation to the weight as with a standard machine. Most machines do not allow 500 to over 1000 pounds or weight to be added.

[0078] Controlled feedback pressure—system configured with adjustable biasing potential, wherein user can adjust the level of feedback received when slightly moving the body device group input.

[0079] Vibratory Muscle Response Inducement (VMRI)—It is the inventors belief that an unsteady pressure profile applied in conjunction with the static pressure should provide slightly improved training results, because of the additional muscle strain working to balance and stabilize. It has not been appreciated, but even though the user is not aware of “balancing” per se the forces, their muscles will automatically react to the changes in force and therein increase the efficiency of the workout. In this embodiment of the invention at least one actuator, or transducer is coupled to a portion of the body device group and activated in response to reaching the desired training weight. The VMRI is configured in one mode to provide increasing levels of unsteady force in response to the level of exceeding the target force threshold. For example at 500# a force of X lb/inches at frequency y; as target exceeded to 525# then X+n lb./inches are applied. The frequency can be slow, such as on the order of 1 Second, or very fast, even ultrasonic. At the faster frequencies the user is not aware of the adaptation of muscle contractions, although they would feel the vibration. In one mode this feedback provides the indication that the user has hit the desired threshold of pressure application, and subsequent over-range thresholds.

[0080] Electronic selection of target weight—system allows user to set the target weight with an electronic control (e.g., potentiometer, or other device capable of registering user input). A conventional weight machine requires a physical selection, wherein this device allows the user to set a desired force with just a slide switch, rotating knob, buttons, keypad or other known input device.

[0081] Electronic selection of time and/or reps—system allows user to set the target time for holding the weight. Alternatively, or additionally, the system can register a number of reps in which pressure is applied to the target weight. If both are implemented, then the user presses and holds for at x seconds, releases, presses and holds for x, releases and so forth. The system is configured for optionally including a control for registering the maximum rest periods can also be included.

[0082] Balance sensing and selector—the system can be configured with balance detection, wherein differential pres-

sure on different portions of the body device group input is detected and annunciated to the user. An optional selector allows the user to select whether or not they want balance feedback. Typically pressure on two opposing sides of most body device group inputs can be provided. This assures proper technique and balanced use since the bar itself is not moving in response to pressure (even with a biasing device it may be largely at its full extent so pressure may not effect position).

[0083] Display—a display of the pressure setting value (for example if the selector is not accurately marked) and the pressure being applied. In a preferred embodiment the same display is used for both. When the weight selector is changed (i.e., moved) the display goes into setting mode and displays the set pressure. Upon detecting over a selected threshold of force (i.e., 100 pounds) the system switches the display into registering the applied pressure.

[0084] In one embodiment the pressure applied to each side is display. In one embodiment the time is displayed. In one embodiment the number of reps are displayed. A single display may be utilized in a multiplexed mode, or multiple displays incorporated.

[0085] Annunciation of targets—System is configured to output an audio or haptic feedback in response to a number of conditions. Annunciation can be tones, voice, sounds effects which are generated singly or combinations. The user need not focus on shifting digits of a display. Haptic feedback may be used separately or more preferably in combination with audio to “vibrate” or otherwise cause movement to indicate that a particular condition exists. For example—haptic feedback vibrating the bar as the user reaches the target weight.

[0086] (1) Reaching target weight. Change in annunciation to signal at weight. For example no tone (or minor tone so you know it is working) when pressure below the level set.

[0087] (2) Exceeding target weight by a fixed threshold (i.e., 5%, 10%, etc.). In this way the user can ascertain (without looking at a display) how much they are exceeding the selected input weight. In one embodiment the tone output changes, such as from one note to another as each level of pressure is reached.

[0088] (3) Pressure-Time output. The time over which the minimum pressure (as set by user) has been applied is annunciated. Example outputting tick sounds for each period of time (e.g., every second, 5 seconds, 10 seconds, etc.). The time may even be stated using a speech synthesizer or similar.

[0089] (4) Goal on time, reps, or combination thereof. In this embodiment the system is configured for outputting annunciation in response to reaching a time goal, a number of reps goal, or a combination goal.

[0090] (5) Balance maintained. In this mode the system generates audio annunciation when the pressure is out of balance by at least a predetermined, or user selected, threshold amount (e.g., 3%, 5%, 10%, 10#, 20#, etc.). The audio is preferably generated differently depending on which side is out of balance, or in one embodiment the sound is generated stereoscopically, wherein the user hears the sounds coming associated with one side or the other. Imple-

mentation may use conventional audio or audio generated from directed audio system (i.e., overlapped ultrasonics with beat frequency=audio being conveyed directionally).

[0091] Add-on Implementation. The unit may be implemented as a separate training device, or according to an embodiment of the present invention it can be implemented as a feature (integrated or after-market) of a traditional movement-based training device, for example one in which free or fixed weights are lifted, bows flexed, shock absorbers compressed and so forth, are modulated through a range of motions.

[0092] Incorporated with these devices according to one embodiment a position is selected, such as by insertion of a weight select value, which provides the static setting. By way of example a static “weight” setting is beyond the other weights in the stack (i.e. after 250# on a cable-lift-weight machine (i.e. Nautilus)). When positioned on this setting the user can apply high levels of static force which are registered by the system and annunciated to provide the static workout benefits.

[0093] In another embodiment any weight setting can be locked to a desired endpoint position, such as by inserting a locking pin through a cable wheel into the housing. A force sensor is coupled along the cable for sensing the static pressure according to the invention. In this way the user can set the body device group to any position for performing static conditioning. Many of the force registration features of the present invention can be used for the static conditioning as well as for registering user activity when the lock is not in place and the user is moving the weights through a range of motion (i.e., force then limited to weight of weights or force of simulated weight of a traditional machine).

[0094] It should be appreciated that aspects of the present invention can be integrated within a number of different forms of conventional strength training devices without departing from the teachings herein to provide the conditioning benefits of static resistance muscle training.

Advanced Starter’s Pistol.

[0095] Background.

[0096] Starter pistols have not changed substantially in many decades, most are still formed as a conventional pistol, but use blank bullets. These devices have a number of shortcoming in relation to use in modern competitions.

[0097] Summary.

[0098] The present invention has recognized a number of drawbacks with existing starter pistols. First, these devices look just like guns and are suspect, or cannot even be carried in a number of circumstances, such as on flights and so forth. Secondly, these devices use bullets which are modified as blanks, but still have the pyrotechnics. These devices do not provide redundancy and thus can fail to fire. Thirdly the firing of the shot is in direct response to pulling the trigger and competitors are not provided timely warnings as to when the gun will fire. Fourth, the units are not adapted for communicating with other race related equipment for tracking entrants, timing and so forth. The present invention fulfills these needs as well as others.

[0099] Detailed Description.

[0100] The present invention describes a starter's pistol containing electronics for providing starting cadence and a number of selectable features which may be implemented separately or in combination thereof, including the following.

[0101] Features of present starter pistol (implemented separately or in combination):

[0102] Metronomic preparation sounds & fewer mechanical parts;

[0103] Cancellation feature of starting shot within the timing sequence;

[0104] Selectable level of randomization (delta T) to the preparation sounds;

[0105] Selectable level of sound output (depending on size of event);

[0106] Redundancy of starting sound output;

[0107] Operation always provides same cadence—does not rely on the starter;

[0108] Communication enabled and tested prior to starting shot;

[0109] Communication activated with shot to activate other devices;

[0110] Replaceable strip cartridges; and

[0111] Automated checking of undischarged devices on cartridge.

[0112] In one embodiment of the invention electro-triggered explosives are utilized, these can be pre-mounted on sheets inserted within the pistol. At least two are preferably discharged at a time for redundancy. More can be discharged simultaneously to increase sound levels.

[0113] FIG. 5 illustrates an embodiment 10 of the electroactivated starter pistol having a housing 12 that is not readily confused with a weapon and yet it has a handle 14 with a trigger 16, such that pulling the trigger activates the starting sequence of the device. A base 18 is shown into which a pyro strip 20 can be inserted. A user interface 30 is shown with selectors for setting the mode of operation, timing cadence, level of randomness, and other aspects of operation. A small display 32 is shown (e.g., electronic ink, LED, LCD, etc.) for displaying any desired status information. Alternatively, or additionally, discrete status indicators are utilized such as LEDs for indicating state, mode, and so forth.

[0114] FIG. 6 depicts an example of the percussion device strip, for example pyrotechnic (pyro) strip 20, having a base material 21 which forms a printed circuit for electrically establishing connections with each pyro element 22, (i.e., plastic, paper, phenolic, fiberglass, or similar low cost insulator material upon which conductive trace pattern is fabricated). Connections 24, 26 are shown on a first and second edge of the pyro strip; alternately these connections can be on the front or backsides of the strip, or less preferably on the ends. The strip can thus be moved within the starter pistol for selecting an unused set of pyro elements within the strip.

[0115] FIG. 7 illustrates by way of example a circuit 50 for operating the starter pistol with electrically fired pyrotechnics. A microcontroller 52 is shown having the trigger input 54 and interfacing with a user interface 56 which may contain any desired assortment of buttons, selection devices, displays, indicators and so forth. Also shown on the user interface is a security device 56, such as a key, for preventing unwarranted use of the device by unauthorized personnel.

[0116] A pyro activation interface 60 is shown comprising a set of high voltage drivers 62a-62d (although four are shown it is preferred that at least 8 be provided wherein more flexibility is provided as to the positioning and firing of the pyro elements). An opposing electrode 64 is shown coupled through a power selector 66, which can be set to two different power positions, a safe position and an active state. The power position is shown through a ground connection. The safe position, shown coupled to power through a resistor, preferably operates in combination with inputs 68a-68d to the controller 52 to allow sensing the state (used, unused) of the various pyro elements connected across the receiver strip contacts 70.

[0117] The device utilizes a user activated trigger 16 to activate timing 74 under the control of programming within the memory 72 of the control circuit. The control circuit is shown in a preferred configuration as a microcontroller, however, the device can be implemented using a combination of logic and analog circuitry whether discrete, or within a programmable logic type circuit or ASIC. The circuit preferably provides intermediate sound effects through piezoelectric audio annunciators 76a, 76b driven by audio drivers 78a, 78b (or directly by the microcontroller though typically lower dB output achieved) to get the competitors ready (selectable so they don't jump the gun). At end of time an intense sound output means is activated, for example the electrically activated charges, and/or powerful acoustic transducer 80 (or selectable either one or both).

[0118] For example a piezoelectric transducer 76a, 76b is coupled to a microprocessor which receives a trigger input to be sensed. The sound effects are preferably mounted to the device to provide proper dispersion in each direction. In response to receiving a trigger input, the audio transducer outputs "beep-beep-beep", then x-time (i.e., one second) later "beep-beep", and then x-time later activates the starting sound "bang" (explosively and/or acoustically). In one mode the x-time value can be set by the user. In one mode the user can select if the timing is to be subject to random variation, and in one aspect the user can select the level (i.e., in milliseconds), of the random variation to be introduced.

[0119] In one embodiment the starter pistol device is configured with a wireless triggering of a remote audio device and/or external visual device such as for alerting the visually impaired. The wireless interface may comprise an RF based circuit 82, an optical unit 84 (e.g., infrared, visible high intensity, UV, etc.). The optical interface may provide a local or remote flash strobe to aid in signaling of the start of the race. The electronic output signal can be used for triggering lap timing devices or other event related devices. A radio frequency or other detectable output can be generated in response to the activation of the pistol in response to sensing activation. The microcontroller may be adapted for modulating the piezoelectric output to provide the signal to

remote trigger units, wherein the remote units are not thus triggered by spurious signals and key off of the modulation encoded in the sound. Similar encoding of light or RF output is also preferably utilized.

[0120] In one embodiment somewhat conventional blanks are formed for use with either mechanical or electronic ignition. In this way a single form of blank can be used with both conventional starter pistol devices as well as this new form of starter pistol device.

[0121] **FIGS. 8 and 9** depict blanks **100, 110** made for a pistol which can be either mechanically OR electronically ignited. Each has a housing **102** with non-bullet first end **104** and a second end **106** adapted with a retention structure such as a flange. The blanks is configured so that the application of a sufficient kick of voltage, such as from a flash circuit, applied across two or more electrical contacts on the blank causes ignition.

[0122] **FIG. 8** depicts an inexpensive rimfire type shell wherein striking the second end **106** of the shell with the striking pin sets off the charge mechanically. A conductor **108** is provided over an insulating section **109**. Conductor **108** is connected to the internal charge, such as through the walls of the cartridge, so that the charge can be set off electronically by applying a sufficient voltage between conductor **108** and another non-insulated portion of the housing, such as base **106**.

[0123] **FIG. 9** depicts a shell with a primer in the second end. The primer is retained within an insulating ring **112** wherein the primer is electrically isolated from the remainder of the shell. The primer is thus used as the second contact for electrically igniting the blank. Therein the shell can be activated mechanically and/or electrically.

[0124] The starter pistol is preferably configured with a sliding strip for receiving a plurality of the blanks. The electronics can similarly test and ignite desired blanks separately or in combination. The sliding strip may be configured with contacts, such as for devices configured like **FIG. 8**, or separate contact may be made, such as from spring contacts from the electronics of the device.

[0125] **FIG. 10** depicts one embodiment **150** that incorporates mechanical and electronic mechanisms. This embodiment can be utilized with existing blanks and starter pistol structures as desired. Pulling trigger **152** activates through a mechanical linkage **154** a mechanical energy storage means **156**, such as any form of latchable spring (i.e., coil spring, flat spring, or torsion spring). The energy of the trigger activation is thus stored for later. The input to the energy storage means is sensed, such as a switch internal to the energy storage assembly. A timer **158** is activated in response to trigger activation which outputs audio through one or more transducers **160**, such as beeps or other sounds in the desired cadence, preferably selectable by way of optional user interface **161** as described earlier. Once the cadence timing has elapsed a signal is generated by the timer to an actuator **162** (e.g., solenoid, motor, muscle wire, etc.) which is mechanically coupled to the energy storage unit **156** to cause the stored energy to be released in the form of a mechanical output **162** to a firing assembly **164** to activate firing one or more blanks **166**.

[0126] In abstract, the present invention provides a starter pistol providing warning alerts prior to firing, and other beneficial features which can be implemented separately or in combination.

[0127] Detailed Description in Claim Form.

[0128] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0129] 1. A starter pistol apparatus, comprising:

[0130] a housing adapted for being held by a race official;

[0131] a trigger on said housing configured for being activated by said race official;

[0132] an annunciator;

[0133] a timer means;

[0134] a control circuit coupled to said trigger, annunciator, and timer means, said control circuit is configured for activating utilizing said timer means for generating a predetermined number of periodic annunciations in response to detecting the activation of said trigger;

[0135] wherein the last of said annunciations is configured for outputting a sound that is sufficiently loud so as to be heard by participants and spectators.

[0136] 2. A starter pistol as recited in claim 1, further including a pyrotechnic device adapted for being fired in response to activation by said control circuit at the end of said timing intervals to produce the sufficiently loud annunciation to be heard by spectators.

Woofers with Tubular Actuation.

Background.

[0137] Speakers are configured to move large volumes of air at frequencies typically from below about 10 Hz up to about 20 kHz (generally considered the normal range of human hearing). One of the challenges with moving large volumes of air to properly reproduce frequencies in the low frequency range, this is typically performed with "woofers". With traditional speaker design a woofer requires a very large surface area because the magnetic coil and magnets at the bottom of the cone can only drive the cone over a small distance. Furthermore additional speakers, typically of smaller size, must be mounted for outputting audio in other frequency ranges.

Summary.

[0138] The present invention is a new form of woofer which provides the ability to generate a large amplitude low frequency response from a relatively small device. The unit can be configured to provide the functions of both woofer and a midrange, or mid-to high in smaller installations. Typical speakers fix the edges of a circular, or oval, membrane and move the center of the membrane in response to the level of signal applied and the compliance of the membrane.

[0139] The speaker according to the present invention reproduces the base sounds by moving the entire membrane forward or backward in a carrier into which it is slidably engaged. The surface of this membrane is then driven

conventionally to reproduce hi-bass, midrange, or even treble range sounds, and it may be fitted with coaxial speaker elements as well.

[0140] A speaker “cone” or “cones” is fitted within a first cylinder that rides within a second cylinder. Interaction between magnets along the walls of the first cylinder and a series of coils along the outer walls of the second cylinder allow the first cylinder to be driven anywhere along the second tube at a desired rate. A controller within the device receives the analog signals (i.e. Class A etc.) or digital signals (i.e. Class D) and converts these for driving the series of coils appropriately.

Detailed Description.

[0141] FIG. 11 and FIG. 12 illustrate an example speaker embodiment 10 with a cylindrical housing 11 of a material 12. The cylinder is shown in a preferred circular arrangement, although it may be constructed with any desired cross section. Electromagnets are distributed on housing 12, which are represented as circular coils. It should be appreciated that the electromagnets may be formed according to any convenient technique which provides sufficient drive, speed and efficiency.

[0142] Hidden lines depict a sliding assembly 16 with circumferential magnet 18, or magnets. In response to a correct pattern of activating electromagnets 14, the a bias is applied against magnets 18 (e.g., permanent magnets, rare earth magnets, ring of magnetic material, and other forms of magnet material) therein moving slide-woofer assembly 16. Slide woofer 16 is seen in the facing view of FIG. 12.

[0143] A means for driving a plurality of electromagnets is exemplified as a controller 20 which is either directly coupled for driving the magnets, or more preferably operates through an interface, such as one providing high voltage output drives, to provide power to the electromagnets. A source of power is received which is preferably regulated by power supply 22. More description of a circuit embodiment is described later.

[0144] In this embodiment the membrane over sliding assembly 16 comprises a generally conventional speaker 26 having a semi-rigid to rigid membrane 28 attached between a circumferential compliant ring 30 (e.g., ridges in a single material, or use of other material, or combination) and a center core 32. It should be appreciated that the membrane may comprise one or more separate elements, or may be formed as a portion of the slide-assembly.

[0145] In use, the sliding woofer 16 is operated which moves the entire surface of speaker 26 in a sliding motion to produce low frequency components. Speaker 26 shares the same front surface (in this embodiment) but its movement from the center core is performed in a conventional manner wherein it reproduces higher frequencies than sliding woofer 16. It will be appreciated that a cross-over unit (or a digital equivalent for D-class amplification) is preferably utilized for separating out bands of audio frequency for driving each of the different frequency range speakers.

[0146] FIG. 13 illustrates an example embodiment 50 of a sliding woofer in which the membrane which moves with the sliding assembly provides a platform upon which other speakers are mounted. It will be appreciated that the frontal area of the sliding woofer is equal to the frontal area of the

platform, with no loss in response to the addition of the other speakers, because of the additive effect of the audio output using this technique.

[0147] Shown in this embodiment, the sliding woofer is shown in an elongated housing 52 of material 54, sliding assembly 56 (not visible) with its peripheral magnets. Platform 58 is attached across sliding assembly 56. The sliding woofer can be sold with additional integrated speakers or the user may add speakers as desired. In this embodiment, a low-midrange (or bass) 60 is shown with midrange speakers 62, 64 and a plurality of tweeters 66, 68, 70 and 72. It should also be appreciated that the entire face of platform 58, or any desired portion thereof, can comprise a flat speaker, for example what were referred to at one time as Magneplaners (a flat speaker that is especially good at reproducing mid to high frequencies).

[0148] FIG. 14 illustrates by way of example, a drive circuit 90 for the slide woofers above. It should be appreciated that this circuit is adapted only for controlling the operation of the slide woofer and not other circuits, for example a cross-over device or network is not shown as these are known in the art for splitting frequency ranges.

[0149] A plurality of drivers 92a-92n are shown coupled to a plurality of drive coils, or coil segments 14a-14n. It will be appreciated that a portion of these coils may comprise compound coils as depicted by coil 14c which has three interconnected elements 94, shown in parallel, although series configurations can be utilized as well.

[0150] The drivers are shown in a pull down configuration, wherein a first end of the coil 91 is held at a high voltage and the second end is subject to being pulled down to ground or at least a lower voltage than the first end. In this embodiment a modulator 95 is shown coupled to the common line, allowing the controller to regulate what is applied to the common line. In one mode, the modulating can apply an AC waveform to, or superimposed over a DC voltage, to allow sensing of the exact position of the magnets 18 and as a result of slide-woofer assembly 16 by using an input of the microcontroller, either directly or through a buffer 93. The inductance of coil 14a is altered in response to the proximity of magnets 18, such that the AC signal (or portion which is AC) is met by a coil reactance which responds to magnet proximity. By analyzing information for a number of coils the exact position of the slide-woofer assembly can be determined. Determining the position allows the controller to accurately generate the signals for inducing movement of the slide-woofer assembly 16. It should be appreciated that position feedback can be provided in alternative ways as well, such as potentiometers (i.e. linear), encoders, optical sensors, electromagnetic field detection, fiber optics (according to a sensing device of the inventor), and so forth.

[0151] A control means is depicted as a processing element, such as the microcontroller 96 as shown, that operates under the control of program instructions from a memory 98 (separate or integrated with uC). The memory can retain the instructions as well as calibration data, test processes, user settings, as well as storing patterns or actual music—such as for demos, background sounds and so forth. It should be appreciated that other forms of control circuits may be utilized, such as microprocessors, networks of processors,

digital signal processors (DSPs), neural nets, programmable logic, application specific integrated circuits and combinations thereof.

[0152] It should also be appreciated that a controller may be coupled to each separate slide-woofer in the system, such as for stereo, quad, surround sound, and so forth. Alternatively, the controller may be configured to handle two, or more channels and control that number of slide-woofers. In addition, the slide-woofers may provide some interface circuits to which a controller are coupled. One of ordinary skill in the art will appreciate that combinations of the above may also be implemented without departing from the teachings of the present invention.

[0153] The firmware is configured to maintain position information about the slide-woofer **16** within the housing, then to activate select electromagnets **14** in either direction relative to the current position in response to the audio signal being reproduced. It is preferable that the above sequence be carried out at least once every 1 mS and more preferably approximately every 100 uS. This rate would be too slow for reproducing higher frequencies within the audio range (i.e., high treble is ~20 kHz, requiring updates at >40 kHz (25 uS)) but it should be remembered that the woofer is only reproducing sounds on the order of 0-100 Hz maximum.

[0154] The incoming audio signal **100** is conditioned **102** into the analog signal being received by the microcontroller. In this embodiment the microcontroller digitizes the incoming waveform (i.e., samples it), such as using an internal A/D converter. The conversion allows the uC to digitally control slide-woofer movement. Optionally, digital audio inputs **106** are shown which can be used by the microcontroller. If the digital inputs are pulse-width modulated (PWM) digital then the microcontroller can use interrupts and timing to extract frequency and amplitude information from which to drive the slide-woofer.

[0155] An optional user interface **108** is depicted shown with a variety of inputs, depicted are binary (i.e., switch) and analog input (i.e., potentiometer). Status outputs are represented by LED **112**, although any desired form of indicator or display may be supported. In addition, the controller can provide outputs for driving high intensity LEDs or other illumination sources in relation to the music. Similarly, outputs from the controller can be used for synchronizing other apparatus, such as the electric shocks on a vehicle and so forth.

[0156] Alternate Embodiments.

[0157] In an alternate embodiment magnets **18**, as shown in FIG. 11-14, can alternatively comprise electromagnets which are themselves being driven by an electrical activation signal from a controller. In one embodiment of this variation, the received analog audio signal (or D-Class digital signal) which is used by the controller for activating selected electromagnet, is fed to the electromagnet **18** within the slide-assembly **16**, wherein the speed of movement is in direct response to the audio signal without processing, and the controller need only activate the electromagnets in the housing at fixed levels thus creating a movable base upon which the displacement of the slide-assembly takes place. Magnet **16** could for example comprise a single coil having a sufficient number of turns. The electrical connection to an electromagnet version of magnet **18** may be received

through low friction wipers between the slide-assembly and housing, or by providing a compliant fixed wiring (i.e., coil of light wire behind the slider).

[0158] In another embodiment, the housing may contain the permanent magnets while the slide-assembly contains the electromagnet, or more preferably a plurality of electromagnets.

[0159] In abstract, the present invention provides a low frequency audio speaker using a sliding core driven by a plurality of electromagnets within the housing. The face of the speaker can additionally support integration of additional speakers of any convenient technology for reproducing higher frequencies.

[0160] Detailed Description in Claim Form.

[0161] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0162] 1. An apparatus for reproducing low frequency audio signals, comprising:

[0163] a housing configured with a cylindrical portion;

[0164] a plurality of electromagnets coupled within the cylindrical portion of said housing;

[0165] a slide assembly slidably retained within the cylindrical portion of said housing in proximity to said plurality of electromagnets;

[0166] one or more magnets coupled to a circumferential portion of said slide assembly;

[0167] a facing member covering the open end of said slide assembly in the form of one or more separate elements or formed integral to said slide-assembly;

[0168] a control circuit configured for selectively activating said electromagnets within said plurality of electromagnets in response to received audio information; and

[0169] whereby the activation of the electromagnets is operable to drive the movement of said magnets and attached slide assembly as well as the facing member which operates to push a volume of air in reproducing the received audio information.

Apparatus and Method for Indicating Garment Usage.

[0170] Background.

[0171] Everyone that wears nice clothing, especially which requires dry cleaning or other Laundromat treatment is faced with the decision to launder with each wear or wear it a while before laundering. This has been the situation for many decades.

Summary.

[0172] The inventor has appreciated this dilemma and arrived at a solution to aid in the deciding of whether to wash or wear. It will be appreciated that some will launder every item, every time it is worn, however, this practice is very inefficient and costly with regard to suits, suit jackets, dresses, and the like, both in terms of laundry costs and wear and tear on the garments being laundered. However, unless the user chooses to wash the item each time, they will be

unsure how many times it has been worn—leading to uncertainty as to whether it is clean, or even concerns that it might have an odor.

[0173] The present system provides a solution to that dilemma by providing a garment-retained means of tracking the wearing of articles of clothing.

[0174] In one embodiment an tag is attached to the clothing which contains a memory and a communications interface. The information in the memory may comprise simply the number of times worn, or it may comprise additional data including, date last laundered, owners name, phone number, address, email, information about garment history (i.e., when purchased, date of each use, and so forth), the Laundromat used and so forth. One embodiment utilizes passive communication, wherein the tag receives power from an external source generating RF, inductive, or other signal within which the communication is embedded.

[0175] A display-reader device is used for reading information from the memory of the tag. In one embodiment the reader can be set to automatically (1) advance use count by one; (2) read use count; (3) decrement use count by one; or (4) reset use count. In addition the reader may have a mode to allow entering additional data, such as user identification—to assure the garment is properly identified at the laundromat. User information may be entered by typing it into a keypad, connecting the device, such as via USB connection to a computer or other device allowing data entry, purchasing the device with the information pre-loaded and so forth.

[0176] First, the wear-tag must be attached to each garment to be tracked, such as by the manufacturer, or by the laundromat as an inducement or value-added service. Then the user upon pulling the item from their closet to wear it will hold the garment, or the tag portion of the garment adjacent the tag-reader, wherein the number of previous uses is displayed and the use count within the tag is incremented by one (presuming the reader-display is set for incrementing use count). Then the user either puts on the garment, or dumps it for being laundered. Alternately, the user can increment use count at the end of the day, and decide whether to re-hang or to launder. At any time the user may also elect to increment use count by two, such as for a long day, or they may reset the count when the garment is laundered, or decrement use count for example after an in home steaming of the garment.

[0177] The invention may be embodied in a number of alternative ways a few of which are described.

Detailed Description.

[0178] The present invention describes a system for aiding users in determining whether to wear or launder a garment item.

[0179] Garment Tag Maintaining use Count.

[0180] In this first embodiment a passive electronic tag is attached to the garment in which a use count is maintained.

[0181] Particularly well suited for indicating how many times a garment has been worn since it was last laundered, and additional information relating to the cleaning of the garment, or the owner so that the garment is returned. The device provides additional information to the user to

increase their comfort about the laundered state of the garment, as typically the cost of laundering many types of garments makes it impractical to have then laundered after each use. The device may be incorporated or added to specialty garments, such as fire suits, and the like or to garments of a general purpose nature (i.e. dress suits, coats, slacks, dresses, etc.).

[0182] FIG. 15 illustrates by way of example an embodiment 10 of the wear tag 14 attached to a portion 13 (i.e., waistband) of a garment 12 (pair of slacks shown). A wear use coder 15 is shown for modifying the stored wear count, for reading the wear count, and for performing other wear related functionality. The wear use coder 15 is shown with a display 16 and a mode selector 17, (depicted is a slide switch with four positions) any convenient form of input device can be utilized. A button 18 on the top of the device is touched to activate the unit for a period of time, such as for two minutes. For example the user touches this location with the garment in hand to initiate the communication between the garment wear count tag and the wear use coder device.

[0183] FIG. 16 illustrates an example embodiment 14 of the wear use tag shown with a flexible base material 20 and dual antenna/inductive loops 22 through which both operating power and communication signals are communicated to and from the wear use coder 15. It should be appreciated that any convenient techniques can be implemented for providing very short range communication within a distance of less than three feet and preferably with a range that less than two feet, and most preferably with a range of less than one foot. The short range allows the communication to be easily restricted to the garment selected by the user without interaction with other garments that may be in close proximity. It should be recognized that although a dual use power and communication interface is provided, these can be separately implemented, for example using inductive element for receiving power and an RF antenna for communicating signals. In addition, a power source may be provided within the wear use tag—for example a battery (i.e., isotope based radioactive), or more preferably a power source means responsive to user stimulation such as a piezoelectric layer or portion, of said tag which generates a voltage in response to user flexure.

[0184] A first circuit area 28 is shown, such as a power regulator, a second circuit area 29 such as a memory, and a third circuit area 30 such as control circuitry which preferably comprises an application specific integrated circuit (ASIC), although other forms of digital and analog circuits may be used. A small microcontroller may be utilized as well which includes all desired circuitry. The tag may be formed by bonding a conventional silicon-based circuit to a flexible matrix containing the antenna elements. In one embodiment the wear use tag can be formed using polymeric circuit techniques in which the circuit is applied as layers, in a process similar to inkjet color printing. This technique is known in the art for producing circuits. In either case the resultant tag is configured to be substantially flexible, able to withstand shock, moisture, detergents, cleaning solvents, and static cling (no joke—static can damage integrated circuits). As techniques for providing this weather and shock resistance are known they are not discussed further. In one embodiment the wear use tag is configured for bonding with the material of the garment, such as with adhesives. In one

preferred embodiment the wear tag has a heat activated adhesive on its backing which allows the tag to be ironed onto a garment. Alternatively, or preferably additionally, small apertures 32 about the periphery allow the wear tag to be sewn into a garment. These tags may be installed by a manufacturer that for example could use fixed data retained in the tag for tracking the garment moving through the manufacturing and sales processes.

[0185] FIG. 17 illustrates by of example a schematic block diagram of the wear tag system 10 shown with a wear tag 14 shown in communication with wear use coder 15. Upon receiving a signal of sufficient strength through antenna/inductor 22 the output of a power regulator 28 is activated to power on the static memory 29 as well as control circuit 30. Control circuit 30 receives a commands, such as by decoding a serially encoded signal within the AC superimposed on the power coupled to the antenna/inductor 22, for example as received through DC blocking capacitor. Once the command is decoded and sufficient energy stored for transmitting, the unit communicates information back to the wear use coder, for example over the same antenna/inductor, another antenna/inductor, other communication mechanism, on the same or more preferably at a different frequency than that received. The memory 29 is configured for retaining a wear use count and any other desired information regarding when the garment was worn, when cleaned, information about the user to aid in return of garment and so forth.

[0186] Wear use coder 15 is shown having a communication/power interface 36 with antenna/inductive loop 38 coupled to a controller 40, such as a microcontroller circuit. Power is shown supplied by battery 42 although a solar cell, or other form of energy can be utilized. If the unit is to remain off until activated, an optional power controller 43 is shown for controlling power being supplied to the unit in response to activation of switch 44, such as a push-button normally open switch (PBNO). Signal A from the microcontroller then can select to deactivate power if the unit has been inactive for a sufficient period of time.

[0187] A display 45 is shown for displaying the wear count, and other desired information from controller 40. In one embodiment, when controller 40 has not been activated to communicate with a garment tag it displays the time of day, and optionally the date—which are often good to see when one is selecting ones garments for the days efforts. An optional audio annunciator is shown 46 to allow audio annunciation of condition count and so forth. Various user interface forms can be incorporated. Shown are a selector 48, such as a slide switch, for selecting mode of operation. A keypad 50 is shown if the user is to be allowed to enter more complex data, this for example can be retained on the back of the device, which is otherwise unused. A telephone style keypad with multiuse buttons can be provided as the frequency of entering data is typically low. If the unit is to remain in an operational state, such as for running a clock, then switch 52 can be used to activate the wear use functionality of the device, for example to activate the communication drive to communicate with the tag.

[0188] To prevent inadvertent repeated increments of use count, the firmware of controller 40 is configured to limit such behavior, such as in response to elapsed time periods. To differentiate different garments, an code may be main-

tained within each tag, this code may be generated when the tag is manufactured insofar as it is sufficient length to prevent undue duplications of codes within the wardrobe of a user. Example a code length of at least 16-32 bits would generally suffice.

[0189] In one embodiment the power and communication connection between the wear use coder and the tag can be established in response to a wired connection instead of the wireless connection described. In this case, at least two contacts are provided on the tag with activate the tag in response to making contact with electrical connections (i.e., at least a plus and minus electrode having sufficient voltage therebetween for operation of said tag) of the wear use coder.

[0190] In one embodiment the system can be configured in a mode for use by the blind, wherein information is entered into the tags about the type, color and characteristics of the garment, and preferably as well as the wear count. Upon bringing the garment sufficiently near the wear use coder 15, the information about the garment is output as an audio string to the user wherein it aids them in identifying clothing.

[0191] Self-Contained Tag with Display.

[0192] In this second embodiment the tag includes its own display, such as in the form of electronic ink display controlled by a display grid coupled to a control circuit, which is preferably a small microprocessor. Power is provided from an internal storage means (i.e. battery, or capacitor), from an external source (i.e. inductively coupled), generated in response to ambient conditions (i.e. flexure, received light, heat differential, etc.).

[0193] In use the wearer can flex the apparatus, such as between the thumb and index finger of each hand, to indicate that they want output from the device. By incorporating a piezoelectric element or similar, wherein the flexure generates operating power for the device. The memory within the device is configured for retaining the information about wear and laundering for extended periods of time without being flexed, or otherwise receiving power or input from which power is generated.

[0194] In one embodiment additional information can be loaded into the device, such as an owner name, customer number, address, phone number, and so forth. In addition the tag can be loaded within information from the manufacturer, such as information about the specific garment (i.e. model, size, material, and laundering instructions).

[0195] The device can incorporate readability features described above if desired.

[0196] Electronic Coded Garment Wear Indicator.

[0197] In this embodiment a simpler wear tag is provided on each garment with a substantially unique identification code, such as should at least be unique within the set of garments found in the closet of a given individual. Each garment can thus be uniquely identified by a control device which maintains information about each garment. In this system the user brings a garment near the control device at any time, such as before or after wearing, and registers a wear factor for that garment. For example a button may be pressed for a wear unit, two presses to indicate more than usual wear, hot day, and so forth. The control unit maintains

a wear count for each garment ID and can display this count at any time. When being sent off to the cleaner or after returning, the user resets the use count for the garment, indicating its clean condition.

[0198] One mode of the invention tracks allows tracking of garments which are at the cleaners. For example, the garments are registered on their way to the cleaners, such as pressing a reset button when the garment is held adjacent the controller. The control unit can then track which items are at the cleaners, how long they have been there, and in response to user settings generate information, alerts, or warnings so that the user will pick up the garment. This mode can be implemented on any of the electronic wear registration embodiments discussed.

[0199] One mode of the invention allows the control unit to store an image or video of each user garment, wherein information about each piece can be correlated with a photo, such as indicating which pieces remain at the cleaners.

[0200] The simplicity of this arrangement should be appreciated, in that tags containing substantially conventional RFID electronics can be utilized within the system with less modification.

[0201] Simple Non-Electronic Garment Wear Indicator.

[0202] In this embodiment a simple non-electronic wear use indicator is described. Although this wear use indicator lacks many of the features described above, it could provide some utility to users.

[0203] **FIG. 18** illustrates an embodiment **100** of this mechanical wear use device **102** attached to a portion **13** (shown as waistband) of a garment **12** (shown as trousers). A sliding element **104** containing indicia **105**, preferably use count, is retained within the garment itself (if so adapted) or a tag configured with sliding element. The slide element containing indicia, numbers, is retained at a fixed position within a carrier material housing, or a portion of the garment itself. The sliding element is configured to not be subject to moving under conditions of wear but only in response to manual intervention by the user. In this embodiment carrier **102** is shown (affixable label) with a window **106** to view the indicia, and double slots, or slots with retention pins **108** about which the material loop of material is rotated by the user to move the use count value. Although the fabric strip will not easily move along the path by itself, a locking means **110**, such as an elastic constriction section or any other convention means of restricting movement, can be incorporated.

[0204] The sliding element can also be replaced by a wheel containing indicia on its periphery, wherein the user rotates the wheel to change the use count. The wheel would benefit more from the use of the locking device to assure that it does not move during use.

[0205] Tracking Garment Wear based on Garment Characteristics.

[0206] In this embodiment the clothing is not tagged. The wear use coder is adapted with sensors for registering sufficient characteristics of a garment to identify it in relation to other garments. For example a camera sensitive to color, pattern and texture can be used, such as a camera having a light source and stereoscopic imaging to render depth. Additionally, other sensors can be coupled to the device. The

unit identifies each piece of clothing based on the characteristics of the fabric, viewed close up and/or at a distance. The unit retains information about use count for each such garment within its memory and announces the information on a display or with audio upon user activation.

[0207] In another embodiment the wear use coder can contain a sensor for sensing biological elements, particular nitrates, bacterium, and so forth which would be pre-indicative of the garment having an odor to other party's' (as the user cannot sense their own biological scents). The unit thus gives direct reading of cleanness of garment to the user, in particular if certain portions of the garment are held to the sensor, such as under the arms. This aspect can be implemented separately or in combination with other aspects described herein.

[0208] In abstract, the present invention provides a wear use indicator for garments is described to allow users to more readily track the number of times the garment was worn since it was laundered.

[0209] Detailed Description in Claim form.

[0210] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0211] 1. An apparatus for indicating garment usage, comprising:

[0212] a tag device configured for permanent attachment to a garment;

[0213] a memory within said tag device adapted for retaining a garment use count value;

[0214] a power receptive means within said tag device adapted for generating power to said device in response to receipt of a sufficient level of signal;

[0215] a first communication means within said tag device for communicating between said tag device and an external communication device held in sufficient proximity to establish a communication path;

[0216] a wear use coder device adapted as an external device for communicating power and data to and from said tag;

[0217] a mode selector on said wear use coder device allowing the user to select the operating mode from incrementing use count, reading use count, and resetting use count;

[0218] a second communication means configured for communicating power and data with the first communication means in said tag device;

[0219] an annunciator configured for announcing the use count value to the user; and

[0220] a control circuit adapted for registering the mode selection on said mode selector and communicating via said second communication means with said first communicator means of said tag to perform the selected operation defined by said selector and to read back and output on said annunciator the garment use count value received from the memory within said tag in response to the communication.

[0221] 2. An apparatus for indicating garment usage, comprising:

[0222] means for detecting when a garment is worn;

[0223] means for detecting when a garment is laundered; and

[0224] means for displaying the extent the garment has been worn since it was last laundered.

[0225] 3. An apparatus as recited in claim 2, wherein said means for detecting when a garment is worn comprises a heat sensor, motion sensor, or combination of heat and motion.

[0226] 4. An apparatus as recited in claim 2, wherein said means for detecting when a garment is laundered comprises a liquid sensor, chemical sensor, conduction sensor, or any combination thereof.

[0227] 5. An apparatus as recited in claim 2, wherein said means for displaying the extent to which a garment has been worn since it was last laundered is configured to display a count of the number of times the garment has been worn, or a cumulative amount of time that the garment has been worn, or a combination thereof.

[0228] 6. An apparatus as recited in claim 2, wherein said means for displaying the extent to which a garment has been worn since it was last laundered comprises a low power display.

[0229] 7. An apparatus as recited in claim 6, wherein said means for displaying the extent to which a garment has been worn since it was last laundered comprises a low power display.

[0230] 8. An apparatus as recited in claim 2, wherein said means for displaying the extent to which a garment has been worn since it was last laundered comprises:

[0231] a means for generating operating power in response to flexure; a low power display; and

[0232] a microprocessor executing instructions stored in memory for, generating display signals to update said low power display in response to detecting a user input on said flexure means.

[0233] 9. An apparatus as recited in claim 2, further comprising means for registering the amount of time the garment has been worn.

[0234] 10. An apparatus as recited in claim 2, further comprising means for detecting odors on said garment.

[0235] 11. An apparatus as recited in claim 2, further comprising means for tracking actual dates and times, wherein said displaying means is configured for displaying actual dates and times of wear, or laundering.

[0236] 12. An apparatus as recited in claim 2, wherein said means for displaying the extent the garment has been worn is configured for displaying the date said garment was last laundered.

[0237] 13. An apparatus as recited in claim 2, further comprising means for generating operating power in response to flexure.

[0238] 14. An apparatus as recited in claim 2, wherein said means for generating operating power in response to flexure

comprises a piezoelectric material coupled to a charge storage circuit including at least one charge storage capacitor.

Particle Display Apparatus.

[0239] Summary.

[0240] A liquid filled display apparatus providing a useful output which is highly decorative as well. The embodiment describes a time clock with a 3½ digit seven segment display, although the system can be utilized to display any desired number of seven segment numeric characters, 15 segment alphanumeric characters, or with arrays of electrodes to support graphical display applications.

[0241] Detailed Description.

[0242] FIG. 19 illustrates an example embodiment 10 of the invention showing a housing 12 having an upper portion 14 configured for retaining a quantity of liquid 16 (i.e., water, colored water, or any other desired liquids), and particulates 17 (i.e., plastic beads/flakes or other shape on the order of 1 mm in diameter) or other materials (bubbles, fluids, etc.) for interacting with the elements of the display. A number of different materials can be chosen for the particulates depending on the effects desired, type of liquid can be Upper housing portion 14 is transparent or has open and/or transparent portions through which materials in the liquid may be viewed. A lower housing portion 22 is shown for retaining the power supply, control circuit, pump, lights and so forth. A user interface 24 is shown for allowing the user to set the modes and perform other operations with display 10. An optional data interface 25 can be provided, herein depicted for wired connectivity (i.e., USB) although a wireless data communication can be adapted alternatively/ additionally.

[0243] Electrodes 18 (or electrode pairs or combinations) are shown for a graphic or segmented display (e.g., seven segment or similar) as immersed in the liquid of upper housing portion 14. In this example the electrodes are formed on a piece of transparent plastic (preferably having numerous apertures to reduce flow restriction. Alternatively the electrodes may be free standing from the base.

[0244] In this embodiment upper housing 14 contains particles 17 which are substantially neutrally buoyant particles (or only slightly positive or negatively buoyant so their resting position is known). Alternately entrained gasses of sufficiently small bubble size so that surface tension effects sufficiently neutralize buoyancy.

[0245] Preferably a slow flow is induced in the fluid, such as between at least one pump output 19a and a pump input 19b, to keep the liquid with its entrained particles flowing over the electrodes. When an electrode is activated the particles begin sticking and build up to where they are quickly visible. When power is removed from the electrode segment of the display, the particles are carried away again in the flow.

[0246] In one embodiment, to assure that the particles are released the polarity of the electrode is temporarily reversed for a short duration before being turned off to assure that the particles are not left with a charge, and to aid in repelling them from the electrode.

[0247] FIG. 20 illustrates an example embodiment of circuitry for the liquid particle display shown in FIG. 19.

The circuit is described for use in displaying hours and minutes, although one of ordinary skill will recognize that it can be extended to display any desired forms of information.

[0248] A microcontroller 30 is shown with a timebase 32 for maintaining the clock time. Preferably either a real time clock circuit 34 is including to more accurately retain the time, or external signals received from a communication circuit 36, such as over a radio link from an atomic clock, or from GPS satellites. Optional memory 38 and data input 39 would mainly be used for more complex implementations in response to receiving and displaying data from the user or another source, . . . items more complex than the time or date (although a few bytes of memory is required in the uC even for retaining the time). A driver is shown for activating the array of elements 42 in the display, such as a high voltage driver 40. A pump means is also implemented, such as driver 44 controlled by the microcontroller which drives motor 46 to operate pump mechanism 48. The pump may alternatively run continuously. Actuators may be incorporated to alter the position of the pumps, and/or change the state of valves for varying the flow of liquid. Alternatively/additionally moving blades, paddles or other elements may be incorporated for keeping the proper movement of the water past the electrodes.

[0249] A lighting source 50 is shown for illuminating the display. By way of example, a series of LEDs can be utilized which are always active or controlled by the controller. In addition, to increase aesthetics LEDs can drive fiber optics 52 extending into the liquid to enhance the appearance of the display.

[0250] Although the display is not very practical in terms of functionality versus cost—at least not in comparison with conventional displays. It does provide benefits with regard to being attractive and a conversation piece. A clock display for example showing hour and minute as seven segment displays. One can see the particles build up over time as the new minute commences. Other forms of the display can be utilized, such as linear segments, for example 4 columns having respectively 2, 10, 6, 10 rows in each column allow displaying 12 or 24 hour format with minutes. Circular arrangements and others can also be created, as well as displays which are adapted for displaying more complex information and data. The unit can be adapted for use in a layer within an aquariums as well, either within the water itself or more preferably as a sealed unit retained in the back of the aquarium providing added visual interest as well as information.

[0251] In abstract, the present invention provides a display providing particles formations on the display elements to outline the characters.

[0252] Detailed Description in Claim Form.

[0253] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0254] 1. A display apparatus, comprising:

[0255] a housing adapted for retaining a quantity of particles within a liquid;

[0256] a plurality of electrodes retained within said housing;

[0257] fluid flow inducing means configured to create a flow of the liquid and particles over said electrodes; and

[0258] a control circuit configured for activating said electrodes in desired patterns wherein said particles are selectively attracted or repelled from the electrodes.

[0259] 2. A display as recited in claim 1, wherein said control circuit is configured to display the time of day by activating selected of said plurality of electrodes.

[0260] 3. A display as recited in claim 1, wherein said control circuit is configured to apply a reverse voltage to repel particles prior to turning a display segment from active collection of particles to an off state.

Inexpensive/Disposable Document Holder.

[0261] Background.

[0262] Numerous forms of document holders are available for those that consistently use a document holder, these devices attach to the terminal and typically have a swiveling arm, a plate for holding the documents against, and a clip for retaining the document. However, these items are unsightly and may be in the way for occasional use. In addition the current devices are too expensive for use in many situations.

[0263] Summary.

[0264] The inventor has recognized that there is a class of users that occasionally have use for the document holder. For their use the holder must be very cheap and it must not be in their way once they have finished with the document. The present invention fulfills that needs as well as others. The invention can be produced from low cost materials and sold directly, or sold with advertising on it to further reduce user cost. The device can be made as an advertising specialty for companies to give to prospective customers. One benefit as an advertising specialty is that the large surface area and printed material of the device allows a great deal of material about at least one advertiser can be contained on the device.

[0265] Detailed Description.

[0266] FIG. 21 and FIG. 22 illustrate side and top views of a disposable document holder by way of example embodiment 10 of the present invention coupled to a computer station device 12. Depicted is a small desktop PC 14, or power center, upon which sits a display monitor 16. Alternatively, the apparatus can be implemented for attachment beneath display terminals.

[0267] An optional base 18 is shown configured for attachment underneath the desktop PC, power center, display monitor, and so forth for retaining a foldable document holder 20, which in one embodiment is fabricated from cardboard and can be printed with advertising and other information. Conventional feet 17 are typically attached to the underside of the computer station device 12 and provide separation within which is stored the document display board. These feet can alternatively be added to the computer station device. Document display board 20 comprises a first section 22 and a second section 24 which folds in relation to the first section. In this embodiment, in folding element 24 back over element 22, projective tab 26 then protrudes toward the vertical. The movement of tab 26 can be constrained for example by laminating another material on the underside of tab 26 overlapping section 22, for example an adhesive tape material.

[0268] A projective means, such as tab 26, is adapted for preventing documents from sliding from the document holder when it is in a folded position as shown in FIG. 1. The document holder is configured for at least two positions. In a first position it is stored beneath computer station device 12, and is substantially out of sight except for a graspable portion of the document holder, or a separate graspable tab 28 extending therefrom.

[0269] The document display board can be stored unfolded, or with section 24 folded down on top of section 22 before inserting the combination beneath computer station device 12.

[0270] A slide resistant means is preferably provided for stabilizing the position of section 22, thus preventing it from sliding farther out from under computer station device 12 in response to the weight of a document placed on section 24 when in the extended position as shown in FIG. 21. This means may be implemented in a number of ways. By way of example and not limitation, the slide resistant means may be implemented as an optional stops, or resists, 30 coupled to document display board 20 or base 18. Alternatively, and preferably a slide resistant material 32, such as a foam pad with non-slip lower surface can be coupled to an underside portion of element 22 near where it joins section 24. Slide resistant means may also comprise a stop 32' to prevent sliding of section 24. It will be appreciated that the slide means may comprise any or combinations of these elements, or similar elements.

[0271] It should be realized that instead of tab 26, that the projective means can be alternatively embodied, such as from compressible foam, a plastic projection, a separate piece of cardboard attached to the document holder and so forth.

[0272] Alternatively, base 18 can be attached to the desktop beneath the desktop PC, power center, display monitor, and so forth; or the base can be eliminated and the display board itself configured for

[0273] In abstract the present invention provides a document holder device which is configured for only occasional use and is otherwise stored under a computer station device such that it is largely unseen (for example only the front edge showing, or a tab portion). The document holder folds into use position with the computer station forming the back support. The unit can be inexpensively produced and is well suited for manufacture as an advertising specialty item.

[0274] Detailed Description in Claim Form.

[0275] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0276] 1. An apparatus for occasionally retaining documents for viewing at a computer station device and being otherwise stowed away substantially out of sight, comprising:

[0277] a first planar section of material of sufficient width to support letter-sized paper;

[0278] a second planar section of material of sufficient width to support letter-sized paper and joined to said first planar section at a foldable hinge;

[0279] a projective means configured for extension from the upper surface of said second surface when folded back for receiving a document to be viewed;

[0280] wherein said first and second planar sections are adapted for being stored as a single planar section, or with said second planar section folded back over said first planar section;

[0281] wherein said second planar section is configured for being folded back to a desired angle to rest against a portion of the computer station device, said second planar section in combination with said projective means thus adapted for retaining a document on its upper surface;

[0282] a slide resistant means configured for preventing the movement of said first planar section out from beneath said computer station in response to the weight of a document placed upon said second planar section.

[0283] 2. An apparatus as recited in claim 1, further comprising a base element, into which said first planar section or the combination of said first and said second planar sections are slidably received toward a storage position.

[0284] 3. An apparatus as recited in claim 1, wherein said first and second planar sections are printed with advertising.

[0285] 4. An apparatus as recited in claim 1, wherein said first and second planar sections are cut from a cardboard material.

[0286] 5. A method of advertising a business, comprising:

[0287] fabricating a folding document holder having at least first and second planar sections joined at a hinge and adapted for hidden storage beneath a computer station device or extension and folding back onto a portion of said computer station device for receiving a document to be viewed; and

[0288] printing substantial portions of said folding document holder with advertising for a business;

[0289] wherein said document holder can be manufactured at sufficiently low cost and provide a sufficient advertising inducement that it may be given away by a company, or included within promotions.

Enhanced Coffee Cup Cozy.

[0290] Background.

[0291] Presently the standard coffee cup cozies provide a means for holding a cup of coffee without being burned. However, these simple hoops of material just as readily fall from the cup onto the table when the cup is set down

[0292] Summary.

[0293] An enhanced coffee cup cozy is described which once slid up onto the cup is retained in place.

[0294] Detailed Description.

[0295] FIG. 23 illustrates the enhanced cozy 10 incorporating a heat sensitive adhesive within the insulating wrap. An inexpensive insulating material 12 is cut to form a tapered cylinder after joining its first side 16 to a tab section 18. A thermally responsive adhesive 14 is applied to the insulating material at locations 14a-14f. It will be appreciated that the thermally responsive adhesive may be applied

in a number of various patterns without departing from the teachings of the present invention.

[0296] In addition a non-stick material **20** may be overlaid on the adhesive prior to assembly if desired to assure that the units do not stick to one another during transport, or other conditions being encountered. Alternatively, the sections of adhesive applied to the material can be alternated with non-stick regions, which are offset, wherein if the cozy is folded flat after the assembly into a loop, each thermally responsive dot or section of adhesive is positioned upon a non-stick region on the opposing surface in the folded configuration.

[0297] **FIG. 24** depicts the unit after the ends are joined in manufacture, or in response to assembly at the customer location. When slid upon a cup of hot coffee and sufficient pressure applied the heat sensitive adhesive enters a plastic phase and sticks to the cup surface. The adhesive does not get so loose as to allow the cozy to slip from the cup, but retains a paste consistency. Other adhesives may be utilized which operate in response to the heat, such as a resin that cures in response to the heat.

[0298] It will be appreciated that the use of peel-n-stick sorts of adhesive, would not provide the benefits derived by the present invention. Using an adhesive which is initially tacky, such as a peel-n-stick variety could result in the cozy becoming stuck when only partway slid up the cup, therein resulting in it not insulated the cup near its top from where it must be held for the purposes of stability.

[0299] In abstract the present invention provides an improved coffee cup cozy that once slid up on a hot cup of coffee, or other beverage will not then slip back off.

[0300] Description in Claim Form.

[0301] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0302] 1. A cup insulator for use on disposable cups for use with hot beverages, comprising:

[0303] an insulating material configured for being formed into a tapered sleeve for receiving a tapered cup containing a hot beverage; and

[0304] a thermally activated adhesive retained in the interior of said insulating material; and

[0305] wherein once the hot cup is received in the tapered sleeve, the heat causes the adhesive to activate and thus sufficiently adhere the sleeve to the cup so that the sleeve will not fall once the cup is set down.

[0306] 2. A cup insulator as recited in claim 1, wherein said thermally activated adhesive melts in response to the application of heat to stick to the sides of the cup that has been received in said sleeve.

[0307] 3. A cup insulator as recited in claim 1, further comprising non-stick material adhered to other portions on the interior of said sleeve, wherein upon said sleeve being folded in half the thermally activated adhesive only contacts non-stick material therein preventing the folded sleeve from sticking to itself even in response to being stored in a hot environment.

[0308] 4. A cup insulator as recited in claim 1, further comprising a strip of non-stick material temporarily retained over the thermally activated adhesive to prevent activation of the adhesive; wherein said strip is configured to be removed before a hot cup is inserted into said sleeve containing the thermally responsive adhesive.

Method and Apparatus for Personal Scented Printing.

[0309] Background.

[0310] Printers provide a myriad of colors for conveying a message, and a number features to simplify creating and conveying the message. However, it has not been possible to easily provide various scents on the printed page, except for a well chosen cologne splashed on by the user.

[0311] Summary.

[0312] A system and method for printing scents while printing the visual aspects of the page. The present system can be integrated as a feature into new printers or as an add-on to existing printers. The system is particularly well-suited for use with ink jet style printers having multiple ink supplies.

[0313] In one embodiment scents are loaded into a non-colored base for application onto the page. The scents can be applied to the page on the same pass as the page is visually printed if sufficient ink cartridge slots exist. Otherwise, the scent cartridges can replace the ink cartridges and the scents printed to the page afterward.

[0314] It should be appreciated that the technique allows different scents to be printed to different areas of the page. For example words, sentences, paragraphs, or graphics can be selectively scented in keeping with the mood of the piece.

[0315] When multiple scents are to be mixed, the system is configured with software which allows the user to select from a palette of pre-defined scents, whose mixing values are known to the program for the particular scent cartridges available.

[0316] Detailed Description.

[0317] A printer, such as coupled to a personal computer, can be configured according to the invention for printing scents onto the printed page. By way of example the scents are described as being loaded into conventional, or substantially conventional, ink jet cartridges. The viscosity of the scents can be adjusted to match that of the inks for which the cartridges are normally used, or the apertures sizes on the cartridge may be configured for dispensing the scents.

[0318] In all embodiment the software of the printer drivers is modified to provide control of scent dissemination. Preferably, the printer is configured to register the type of scent loaded in each ink jet cartridge slot, or allow the user to indicate which slots contain which scents. The driver provides selections for choosing what part of the page and to what strength the scent is to be "printed" (amount of scent dispensed per unit area).

[0319] In addition, additional control codes can be added to editing programs, such as word processors, drawing programs, photo printing applications, even spreadsheets and other programs. These control codes are added in response to activating a scent feature. The control codes are selected by the user in a similar manner that bolding, or color

choices are currently selected. The text and graphics selected to be printed with the scent is shown on the screen marked in a manner that will not be confused with the current color choices. For example an animated wave pattern of color overlying the text-animation is though to be indicative of the aromatic nature of the scents applied.

[0320] In one embodiment of the invention the scents can be selectively introduced by the user when selecting printout parameters, wherein a single scent is dispersed on the page.

[0321] One embodiment describes utilizing scents within the ink cartridges themselves. The user can either add the selected scents, or purchase the cartridges, such as over the internet which are already loaded with the desired scents.

[0322] One embodiment describes user selection of one scent from multiple scents, or selecting a combination of desired scents. An additional embodiment describes including the scent within the ink, or constituents of the toner cartridge for printing at any time.

[0323] In this embodiment the system

[0324] One embodiment describes a fillable reservoir within the printer cartridge, or the use of a separate scent cartridge, wherein the user can select the scents to be utilized during printing (i.e. printing all items (non-user selectable), or selected items according to the use of a user selective mechanism.

[0325] One embodiment describes utilizing scent techniques described with a “scented” OR “unscented” substance containing recognizable traces (i.e., molecules, particles, etc.) to provide a form of substance/molecular watermarking on documents. For example mixing a source of marker molecules with the ink being printed provides a form of watermarking which allows the source of the document to be readily ascertained. In particular if the marking substance is registered for each corporate or personal user by a centralized organization that tracks the dissemination and checking of printing with the differently “marker scented” inks. The marker compounds can comprise any recognizable combination of compounds which are substantially stable over time. The markers may also comprise genetic forms of markers, or even human genetic material, even saliva to provide a real personal marking, if desired.

[0326] One embodiment provides a cartridge of material containing a sealant which can be scratched off. To indicate that this portion of the text contains a scent the application or printer drivers can be configured to print additional indicia about the area, such as dotted lines, or other visual indications which are do not substantially detract from the printed message. The sealant itself may be tinted to indicate the scratch-n-sniff nature. Although scratch-n-sniff printing has been known in professional printing (undoubtedly using far different technology to provide mass production capability), the present invention allows the user to print anything with their own selected scent in the desired area over their own text or graphics.

[0327] FIG. 25 illustrates an example embodiment 10 of printing process utilizing the present invention. In block 12 the application program (e.g., word processor, or other user controlled application), and/or the driver software for the printer is adapted to allow the user to select if and how scents

are to be “printed”. For example: what scent or combination of scents, over what areas, and to what intensity. Before the system is used print cartridges are created in block 14 containing the desired scents. These can be created by the user with fillable cartridges, and/or by a manufacturer offering the scented cartridges for sale. During use after the user has installed the scented cartridge, or cartridges, they can select as per block 16 how the scents are printed when activating the print dialog box, or the selection may be contained in a document that is being drafted or edited by the user, or a file that already exists into which scent information was already encoded. During printing as per block 18 the printer driver selectively activates the scent cartridges in the proper positions and at the proper droplet density in response to the user selection which were made in block 16.

Nose Pens Inhalant Devices.

[0328] Detailed Description.

[0329] A pen shaped device for retaining a scent, or an herbal remedy preferably applied to the device in a liquid or oil form. The user can sniff the device and a portion of the liquid is entrained in a vapor which is inhaled. The device does not require pressurization and is much simpler than pharmaceutical inhalers, and can be made inexpensively.

[0330] FIG. 26 illustrates a nose pen vapor inhaling device 10 having an outer housing 12 with a first end 14 and second end 16. In one embodiment the two ends are configured with different dimensions, such as shown with a small and large end, to readily accommodate the nostril apertures of different persons. The housing may be rigid, or flexible, although in either case it should be non-permeable (or substantially so) wherein the liquid cannot escape from the housing, except through the open end(s). For example a soft or hard plastic can be used for the housing.

[0331] A porous membrane 18 is retained within the housing into which a liquid may be retained. The porous membrane may be formed from any porous, preferably compressible material, capable of retaining the liquid. Examples, include porous flexible foams, felts, or other materials.

[0332] A passage 20 through the porous membrane may be straight or according to a circuitous routing. The circuitous routing is preferred as more area is provided for interfacing between material and the airflow. A plurality of apertures may be provided as well. A spiral aperture can be created by twisting each membrane element and holding it in a particle position as a laser, water jet, electrical discharge machining (EDM), or similar cutter is directed to cut through the material. Rather than cutting a hole, a number of apertures may be created having a diameter equal to the laser, water, EDM, or other beam used for cutting. In one embodiment the porous membrane is adapted with non-porous blocks 21 along its length to reduce the amount of pooling of liquid material at the bottom of the device after a period of time without use. These blocks can be formed by alternately layering the porous membrane with a non-permeable, or only semi-permeable membrane, prior to cutting the shape of the porous membranes for fitting within the device, and for cutting the apertures through the porous membrane. The porous membranes may also be used without any form of aperture—depending on the type of material selected and the application.

[0333] The device is configured to retaining a liquid inhalant 22 material, such as herbal oils or essence, fragrant oils, and so forth; preferably natural ingredients found at a health food store. The user can load the device readily with the desired elements for being inhaled during the day. If the housing is flexible the user can squeeze the housing to move the material around in the porous material making more of it available for inhaling.

[0334] To prevent the liquids from drying out, caps can be included with the device. For example a top cap 24 shown for slidable engagement over the end of the device. A similar cap be provided for the other end in which a portion of the cap cover the exterior of the device. However, in the figure the bottom cap 26 comprises a pin 28 adapted to insert into an aperture within the device and a base 30 which allows retaining the device in an upright position. Optionally, the caps may be joined by a segment of elastic material wherein they are not readily lost, the caps are held under tension of the elastic and only can be removed in response to stretching the elastic. It is preferred that a single piece of elastic connect to each cap and run through the device wherein the caps are more readily removed.

[0335] Preferably the device is roughly from one to four inches in length and has a diameter of from ¼ to 1 inch, although the aperture ends are preferable sized for being retained on the periphery of the nostril.

[0336] A small version of the device, with a single or with dual adjacent cylinders, can be created to allow the user to breath in a vapor continuously (generally when not in a public place—as it could look rather silly). The device would similarly have caps or more preferably have a small sealed container into which it is stored.

Bio-Feedback Stress Relieving Pet Device.

[0337] Background.

[0338] Many person can be comforted by a pet, although a pet is often troublesome to maintain. Therefore, a need exists for a device that can mimic certain comforting aspect of pet ownership without the need of being responsible for the life of another creature.

[0339] Summary.

[0340] A pet-like apparatus that provides sounds and purring like rumbling in response to breathing and/or heart rate of the person holding the device, or upon which the device is sitting. When held by an individual it generates a sounds and/or a rumbling that is similar to the purring of a cat, in response to characteristics of the user/wearer. In one embodiment, the unit can change its response based on detecting the level of lighting and sounds. In one embodiment the mode of operation of the device and the features can be set by the user.

[0341] Detailed Description.

[0342] FIG. 27 depicts (poorly) an example embodiment 10 which is shaped as a small little fur ball type creature, having a body 12, such as similar in form to a chinchilla. A head 14 and slight features 16 may be discernable if desired. Respiration sensors are preferably located in the head area or portion generally held more to the head of the user. Sensors on the underside of the unit are adapted to register user pulse, or a separate pigtail unit 20 can be attached to the user

to register pulse data. The device can, however, be housed within any desired animal like body size shape and furriness.

[0343] FIG. 28 illustrates an example of the circuitry with a microcontroller 20 and memory 22, having portions for retaining the operating program as well as data for the execution of options, response patterns of sound and rumbling, and for retaining downloads. At least one actuator 24 is provided for generating rumbling vibrations of the unit in response to microprocessor control. In this embodiment two motors 24, 26 with offset weighted shafts (such as used for pagers and the like) are adapted for control the microprocessor, which can generate any desired intensity of rumbling and speed of rumbling by using pulse-width modulation of the power to the motor. Other forms of actuators may be used—these are inexpensive and readily available in large quantities. An audio output device 28 is represented as a piezoelectric transducer, although small high efficiency speakers provide improved frequency range.

[0344] A breathing sensing means is shown by way of example configured for detecting audio 30, such as using a first microphone 32 with amplification and conditioning circuits 34, and a second microphone 36 with conditioning circuits 38. These are coupled to analog to digital inputs of the uC (or are converted to digital by external circuit).

[0345] A pulse sensing means is shown for sensing changes in pressure or other mechanisms that are indicative of pulse rate. It should be appreciated that a number of techniques are currently available within pulse rate checking meters and so forth. In this embodiment pressure sensing 40 is used with a first and second pressure sensor. Pressure sensor 42 coupled to amplification and conditioning circuitry 44, and pressure sensor 46 with conditioning circuit 48. The resultant signals are received by the processor on A/D ports.

[0346] Although not absolutely necessary the use of dual inputs for sensing provides a substantially improved ability to register these metrics regardless as to which side of the device is facing the user/wearer.

[0347] An optical output means can be provided such as LEDs 52, 54, which may be positioned as eyes of the device. In addition these may be multicolor LEDs wherein the controller can change the color and intensity in response to the user, status, or other factors.

[0348] Various interfacing can be provided to allow the user to establish and/or control the unit. By way of example a user interface 56 is shown which can provide selector inputs and status outputs, a connector 58 (i.e., USB etc.) or a wireless circuit 60, allowing the unit to establish a wired connection for receiving downloads on functionality.

[0349] Power is preferably provided by batteries 62 with an on/off switch 63. The device is shown configured to activate in response to movement detected by sense switch 64. A movement sensor, such as a small conductive ball in a cage of electrodes can activate an electronic switch like a Bipolar or MOSFET transistor into conduction to provide output voltage. A signal (A) from the uC is used to turn off the unit after an elapsed time with no motion detected in the signal (B) being received by the microprocessor.

[0350] The firmware of the uC is configured for registering the breathing and/or pulse of the user when available,

and in response generating synchronized sound patterns and rumble patterns, which are intended to soothe the individual, such as the heartbeat and breathing of a mother soothes the baby held up to her breast. The firmware can generate single beat responses or responses with sub-beats between each breath or heart beat, which are demarked, such as according to varying the intensity of the sound. Once "locked on" to the rate of the user it attempts to slow their breathing or heart rate by slowly extending out the cycles of the user as long as the user adapts to the new rate. The user is therefore calmed by the pet device. If the breathing and/or pulse can not be registered, the unit can generate the outputs in response to historical settings stored from a previous use of the device, preferably these responses are somewhat altered, such as slightly muted, so that the user recognizes a problem exists with how the unit is held if they want the full output.

[0351] The synchronization is superimposed on audio and rumble patterns stored in the device, such that the rate at which these patterns are meted out by the controller depends on the rate of the breathing and/or pulse rate. The unit is configured with default patterns for rumble and sound and may contain additional ones in its memory which can be selected by the user. In addition the user can download more patterns, such as by connecting the device (i.e., by wired connection such as USB 58, wireless connection and so forth) to a network-enabled computer and accessing the web site of the manufacturer. The user can thus select the types of sounds and rumbles generated, as well as the type of synchronization rhythm (simple, multi-beat, wide dynamic range, musical, and so forth). User configuration setting allow aspects of the patterns to be altered, such as intensity, tone frequency range, as well as other metrics of operation.

[0352] Optical outputs, such as 52, 54 can be utilized for augmenting the sound the rumbling with light outputs. The light output can also be used to indicate status conditions.

[0353] An optical input means 50, depicted as a phototransistor, is adapted for detecting the level of ambient lighting. In one embodiment the controller modulates the intensity of the sounds generated, and preferably to a lesser extent the rumbling generated in response to average light intensity. It will be appreciated that one is typically more sensitive to stimulus in the quiet of the evening or when attempting to sleep at night. In one mode of the invention, the user can select whether this feature is active and the extent to which the outputs are reduced in response to lowered lighting levels.

[0354] Similarly, in one embodiment the ambient noise level over time is registered by the microphone(s), and can be used to modulate sound the rumbling intensity as more intensity is required in noisy environments and less in quiet environments.

[0355] The invention can be implemented in a number of alternative ways without departing from the teachings above.

Bike Flashlight with Reserve.

[0356] Background.

[0357] Bike lights provide necessary light in the dark and can be key to safety. The light from current bike lights can quickly drop off as the battery voltage drops. Some lights can provide a warning that the battery is losing its charge,

but that will not help the person on the road. Accordingly, an apparatus and method is needed for enhancing the safety of bicycle lights.

[0358] Summary.

[0359] A bicycle light is described that includes a reserve power source, wherein when the primary power source is losing its charge the user can select the reserve power source. This can be implemented for flashlights with primary batteries, rechargeable batteries or the like.

[0360] Detailed Description.

[0361] The present invention is exemplified with a number of embodiments these include implementations using primary batteries and secondary (rechargeable) batteries.

[0362] Primary Battery Flashlight w/Battery Reserve.

[0363] FIG. 29 depicts a preferred embodiment 10 of the invention in which a flashlight using primary batteries 12, such as comprising three primary battery cells (i.e., AA, or any other) is configured for operating a light output means 18. In the embodiment shown the flashlight utilizes a plurality of high-efficiency LEDs 18 which are preferably driven by a temperature compensating power supply 16 (although simple current limiting device may be utilized, such as a resistor). It should be appreciated that the light source can comprise any convenient device configured for converting electrical energy to light output, such as incandescent lights, halogen lights, LEDs, OLEDs, and so forth. An on/off switch 20 is shown for preventing any power dissipation from the batteries. The switch may comprise a mechanically actuated switch or a switch which can be automatically powered off in response to an elapsed time without usage, and preferably when no movement is sensed.

[0364] A second battery, comprising a reserve battery 22, having a much smaller total size than the principle battery, is shown with an optional voltage converter 24, reducing the need for additional battery cells to produce the desired voltage.

[0365] A switching means 24 is shown for selecting between the primary battery source 12 and the reserve battery source 22 whose voltage is received after up-conversion. The switch may be a manual switch, although its state can be preferably controlled in response to detection of power source condition. For example a relay, MOSFET transistor, or other transistor may be utilized for switching the power with or without a manual control.

[0366] Optional annunciation of switching is preferably provided by the system, such as flashes of the light, a light pattern on an indicative LED, an audio annunciation, or other means of annunciation and combination thereof.

[0367] In one embodiment a battery condition sense circuit 26 is configured for detecting that the primary battery is low and activating the secondary battery circuit. Although a simple analog circuit such as buffer with zener thresholding, a preferred embodiment utilizes a small microcontroller circuit which can provide for switching from one state to another. The microcontroller (as seen in FIG. 30) is adapted with programming for detecting after switching, if the reserve can at least sustain a higher active voltage than the primary source, if not then it preferably switches back to the primary source and can optionally provide an indication of the problem.

[0368] When the system is first powered on the microcontroller is preferably adapted to check both battery systems under the light load by cycling through switch and registering the output voltages under load. In the case that either battery is low, the system is configured to annunciate a warning, such as flashing one or more separate LEDs, or the LEDs which comprise the output element itself (which can be driven separately, such as by the output lines on the microcontroller).

[0369] It should be appreciated that a capacitor may be utilized, however, this would drain a large amount of power from the battery for any use due to the self-discharge characteristics of the capacitor. For example presuming the capacitor is of sufficient capacity to operate the light for 1 hour, then each time the light is switched on after not being used for a day or more, then the capacitor would draw power from the battery corresponding to an hour of operating power. A capacitor may be used with a solar cell to provide backup power, however, this requires that the bike light be stored in a lighted area when not in use—this does not lend itself well to assuring that light will be available when needed.

[0370] In one mode of the device, the controller tests the both the reserve battery and primary battery for operation when the light is first activated. For example, operating the reserve battery first for a period of time (i.e., 2 seconds) and then switching to the main battery for power. In this way the status of each power source is confirmed. The circuit is preferable configured with a means for indicating status so that the user is informed of the actual status. For example, the light output can be modulated, such as turned on and off in a desired pattern, for a period of time to indicate that the power source is weak. No light output during the first period of time after switch on indicates a lack of power in the reserve battery, while no light after the first period indicates that the main batteries are low.

[0371] In another mode of the present invention, a voltage converter is in line with the primary power source, wherein the upconversion is selectable in response to the input voltage, such that the input voltage can vary over a wide range before the output voltage is significantly impacted. In this way the power from the primary cells can be more completely utilized even after the output voltage of each cell drop below what would be required without conversion to properly drive the light output. When the voltage of the primary cells falls below what is necessary for driving the light elements, for example below 3.8V (nominal voltage being 4.5V) then typically the remaining battery power is wasted as the cells are then tossed. However, according to the present mode of the invention, this remaining power is the first source from which the reserve power is drawn. The flashlight first draws power from the main power source as it has a voltage in excess of that used for the reserve battery. The small power supply circuit converts the incoming voltage at high efficiency and drives the light output. Once the combined voltage of the main battery drops to that of the reserve battery voltage then power is drawn from both, however, due to discharge characteristics the power will readily be drawn from only the reserve battery itself. This mode provides that the reserve can be activated for short periods of time without running down the capacity of the reserve battery—thus giving a longer reserve battery life and less hassle.

[0372] In another mode of the present invention, the main batteries are coupled into the reserve control circuit, such as through a diode (not shown), so that the remaining power from these cells can be made use of.

[0373] Secondary Battery Flashlight w/Battery or Capacitor Reserve.

[0374] In this embodiment the battery can be recharged. In this embodiment the reserve capacity can comprise either additional rechargeable battery cells or more preferably a high density capacitor. It will be appreciated that the use of a single high density capacitor can be charged to any desired voltage, such as up to 5 V, and takes up little space and has a very long service life. Rechargeable batteries, however, are somewhat less reliable.

[0375] Flashlight with Lighting Correction.

[0376] FIG. 30 illustrates a microcontroller controlled bike flashlight 50 having a reserve capacity and a color adjustment mechanism to compensate for lighting conditions. First primary power source 12 is shown with a secondary (reserve) source 22. Both primary and reserve are coupled through a variable voltage converter circuit 54. One or more diodes 56 (preferably with low Vdrops such as Germanium) can be utilized for preventing one battery from unduly loading the other battery. In this example a diode 56 blocks power load on the reserve. A switch 58 controlled by the uC is shown for allowing selection of the reserve source automatically, or under user control, such as by sensing of switch 60.

[0377] In this embodiment the light output elements 18' comprise a plurality of elements, some of which provide different color outputs. A color sensing input 62 is shown with lens 64 for registering the ambient lighting conditions, including intensity and COLOR. The uC is configured with programming for adjusting the intensity of each light output device to achieve a desired output color in response to the sensed color from the ambient conditions. In a simpler device, the user can be allowed to manually set the desired color output. The color change is accomplished by modulating the activity of LEDs having different color outputs in response to the setting of the color control. It will be appreciated that the use of two different color values of LEDs allows a limited range of color change while the use of three or more colors of LEDs (e.g., red, green, blue) can allow for a full range of LED colors.

Sock Manufacturing Method.

[0378] Background

[0379] Presently people struggle in households all over the world in trying to match up socks that have been washed. This is particular difficult when all the socks are of the same color and design, such as arises with what are termed "sports socks" which are typically all-white for easy cleaning. Accordingly the present invention provides a solution in the way of a manufacturing system which is capable of producing socks that are more readily matched.

[0380] Detailed Description.

[0381] The present invention describes a sock, a sock assembly machine, and a business method for selling socks. The problems with matching washed socks into compatible pairs has not been fully appreciated. Even less appreciated

is that when socks are worn they stretch to match the foot, wherein the right and left socks no longer match one another. This can be readily seen by looking at one's socks after removal; wherein it is typically easy to discern on which side of the toe box the "big toe" resided. When the sock is worn next, if it is placed on the opposing foot, the fit will not quite be correct and extra material will exist on the "small toe" side which can cause discomfort. Readily both sides of the toe box are stretched out and the sock is not as comfortable.

[0382] In recognizing this problem the present invention provides markings on one side of each side sock (preferably "big toe" side) allowing the user to quickly ascertain on which side foot the sock is to be placed.

[0383] Outline—stitching patterns on the socks. The use of different colors. For example, run machine with color 1 and go through all patterns, then shift to color 2 and again go through all patterns and so forth. The socks are created in matching pairs by the machine and then these are preferably intermixed with socks from other color batches to provide a range of outputs. It is preferred that a particular consumer would never receive another pair of socks with the same indicia in the same color as in a previous purchase. The system is also configured for changing the set of patterns created on a periodic basis to further reduce the chances for consumers getting another set of socks with the same indicia and color.

[0384] The semi-unique pattern is defined as being sufficiently non-repeating to reduce chances of one consumer getting same indicia, such as a repeating pattern that spans at least 25 pairs, and more preferably 50 pairs, and most preferably at least 100-500 or more pairs. The larger the number of patterns the more unique the sock patterns are with better ability for consumer to tell them apart as it will be less likely they would own multiple pairs with the same pattern. It should be appreciated that a runner, or other sports enthusiast may easily own a few dozen pairs of similar sports socks. The following are a few possible pattern types which may be used singly or in combination according to the present invention.

[0385] (A). Pattern with stitching in semi-unique pattern—single color.

[0386] (B). Color pattern varies. Stitching color transitions, preferably slowly, along the spool wherein colors of adjacent socks are nearly the same color, but the farther apart two pairs are in the production sequence the more different their colors will be. This allows a single pattern to be used with a slow color variation to distinguish socks. More preferably this aspect is utilized with a plurality of patterns to increase the uniqueness of each pair increasing the ability to distinguish the various socks.

[0387] (C). Color changing indicia. The color of the indicia changes in response to use, and/or in response to each washing. The color change can be in response to a loss of pigment from normal processes (i.e., fading), or in response to chemical reactions, or other known mechanisms by which colors change.

[0388] (D). Dye indicia. The semi-uniquely patterned indicia may be fastened on the socks using dyes, paints, or other pigments. The socks may be formed with this material, have the material adhered to sections of the socks, or more preferably have an indicia stamped, or otherwise adhered to the material of the sock.

[0389] (E). Post Processed indicia. The semi-unique indicia may be created after it has been adhered to the sock. For example a patch of the same material adhered to each sock, such as on the interior side of the big toe, followed by a processing step, such as laser exposure to create a semi-unique mark in the material. Laser selectable pigments are currently available.

[0390] In addition, different pairs of socks can be discerned in relation to the location of the indicia. For example one pair may have the indicia 1" from the top of the sock and another with the indicia 2" from the top of the sock, or at the bottom of the sock and so forth.

[0391] FIG. 31 illustrates an embodiment of a sock production process. In block 10 the socks are manufactured, or partially manufactured with a marking step that is incorporated in the assembly process, such as the use of stitching which is part of the marking process. The socks are marked in matched pairs in block 12, preferably having indicia on opposing inside and outside directions so wearing direction of each pair can remain consistent from one use to another. The indicia color, shape, location, or other visible change to the marking is made in the manufacturing equipment, preferably in response to a program selection of a marking head, or programmatic means of marking (i.e., computer controlled stitching). A selection process may optionally take place if the indicia is not changed for each sock pair, wherein a proper mix of indicia, with minimum local duplication with a given sock multi-pack or box of socks is performed in block 16. The socks are then packaged in the single into boxes, or in multipacks into boxes as per block 18.

[0392] A method is described by the following. A plurality of socks are manufactured, and during or at the end of creating the sock itself, the sock are marked to determined matched pairs. Marking is thus performed either both insides, or both outsides, of a pair of socks with a first indicia having a shape and color. Marking can be by printing, embroidering, staining, laser marking, or other convenient techniques for providing a shape and/or color of indicia. The indicia (color and/or shape) is then changed either for each pair of socks or each known batch of socks. The socks are then packaged for sale. Individual socks are preferably organized (selected) so that boxes of the packaged socks will contain an even mixture of all known markings—in this way reducing the likelihood that a consumer would purchase multiple socks with the same marking. If packaged with multiple pairs of socks per pack, which is typical for sport socks, the socks are selected by batch, or more labor intensively by inspection (e.g., manual or automated) to select the socks to assure that no two pairs in the same pack have the same shape and color of indicia. Although the marks are described as being on the inside edge (such as along the big toe side of the sock) or the outside edge (along the little-toe side of the sock as worn), the indicia can be otherwise located, without departing from the teachings of the present invention.

[0393] In abstract, the present invention provides a method for producing socks that are readily matched by the consumer/purchaser.

[0394] Detailed Description in Claim Form.

[0395] The claims, and/or claim portions below comprise additional disclosure of the invention and are to be considered as such for all purposes.

[0396] 1. A method of manufacturing socks to facilitate consumer sock-matching, comprising:

[0397] manufacturing a plurality of socks;

[0398] marking either both insides, or both outsides, of a pair of socks with a first indicia having a shape and color;

[0399] changing the color and/or shape of the indicia; and

[0400] packaging pairs of socks with the matching color and shape indicia on either both insides or outside edges of the sock for consumer purchase.

[0401] 2. A method as recited in claim 1, wherein said color and/or shape of indicia is changed with each pair of socks produced.

[0402] 3. A method as recited in claim 2, wherein a multiple pair pack of socks can be packaged by including sequential pair of sock as the marking has been altered with each sock manufactured.

[0403] 4. A method as recited in claim 1, wherein said color and/or shape of indicia is changed after a predetermined number of pairs of socks have been produced.

[0404] 5. A method as recited in claim 4, wherein a multiple pair pack of socks can be packaged by further comprising a selecting process in which pairs of socks are selected for inclusion within the multiple pack in response to having differently colored and/or shaped indicia, either determined by sensing, or in response to knowledge of the batch from which the socks are selected.

Visual Vector Gen. of V-Fast Movers (VFMOVs) Elements—Enhancements.

[0405] Summary.

[0406] Features are described for the application describing “Visual Vector Display Generation of Very Fast Moving Elements”. Specifically the capability to discern non-projectile objects, such as those items which are subject to distinctly non-linear motion.

[0407] Detailed Description.

[0408] In one embodiment the software can readily discern bugs or other close range viewable items from projectile objects due to their distinctly non-ballistic, non-missile, type trajectories. Ballistic objects are extremely fast and follow linear or paths of slight curvatures with speeds that are either relatively constant within the field of view or are increasing or decreasing smoothly. The need to discern “bugs” and similar non-projectiles may at first seem odd, however, it should be realized that a bug moving slowly at close range in some instances could appear to the device as a projectile moving fast at long range. It is preferred that system imaging be performed stereoscopically wherein a rough distance estimation to the very fast moving target can be readily determined. This alone can provide discernment of ordinance. In addition to this the movement profile of the moving element can be checked against the characteristics of ordinance, wherein this assures that bugs and flying debris are eliminated.

[0409] Another embodiment describes the use of calculating coordinates when first registering ordinance

[0410] Another feature is that of providing a direction indicating means on the vector, such as an arrow on the end or along the length of the arrow.

[0411] Another feature is that of indicating a starting point for the ordinance if the camera is able to discern a muzzle flash at the point of origin of the element. In this way the user can discern whether the end of the vector is where the shot originated, or is a segment of travel along the flight path. Furthermore, if the flight path is broken the system can correlate other segments to determine if they are associated with the same projectile. The speed and direction are computed between a first and second segment to determine if the timing, speed and direction are consistent with ordinance passing along the two segments. First the software determines if an imaginary vector between the two segments is continuous (no major discontinuity), which is consistent with a projectile traveling on a single path with characteristic very slight curvature but no discontinuous motions. Next the timing is checked from the earlier segment to the later, to determine if the speed and timing extrapolated from the earlier segments meets up with the later segment. If so then the vector is displayed to the user, preferably in a manner that indicates that the path was actually hidden, such as with a dashed line.

[0412] Another method of correlation that can be performed is that of correlating the receipt of a muzzle sound with a projectile. Obviously, the images are collected before the sound reaches the unit, wherein the unit computes a time of ballistic origination and checks this against recent collected ballistic vectors. If a match can be made, then a rough origination distance can be determined, so that vectors estimated to a point of origin even if no muzzle flash point, or other characteristic of firing was detected.

Anti-Abrasion Motorcycle Garment—Additions.

[0413] References.

[0414] Incorporates by reference copending application(s): Utility patent application describing Motorcycle garments.

[0415] Detailed Description.

[0416] One of ordinary skill in the art will appreciate that UHMW polyethylene is but one form of polyethylene which provides a sufficient level of abrasion-resistance. Other forms of polyethylene (PE) can be utilized as well as other plastics and materials which can provide the desired level of abrasion resistance.

[0417] Incorporation within garments as abrasion resistant sections which provide abrasion-resistance while allowing air flow through the highly-permeable material of the invention. In one embodiment this is implemented as a section over which a less permeable material is overlaid, for example as a zippered covering, or other configuration to selectively cover the anti-abrasion matrix.

[0418] In one embodiment the cords interconnecting the “beads” can comprise straps, such as being substantially flat, or with multiple independent strands which form a structure similar to a strap.

[0419] Instead of being attached to a matrix of cords or straps, the beads may be attached to a fabric matrix adapted with open areas, or areas of less tear resistance surrounding

portions of the bead. In this way the matrix between bead is maintained even though open areas, or tear away areas are provided in the fabric. A fabric may be reinforced with a matrix of overlying cords upon which the beads are attached. Removing additional material at the locations where the cords cross one another (node) prior to attaching a bead, allows the bead to be formed without the fabric keeping. Consider a fabric with an open mesh or cut about the intersecting cords (easier to fabricate).

[0420] In another embodiment the beads can be formed from two or more pieces which are assembled onto the matrix material, or cord matrix. For example a two piece bead may be formed with a first element having a combination of projections and recesses with mate with complementary projections and recesses on another bead piece. These pieces may be adapted to snap together so that are not easily removed. In addition, the pieces can be glued at the time of being snapped together.

Flight Forward Pillow—Enhancements.

[0421] References.

[0422] Incorporates by reference copending application(s) entitled flight forward pillow.

[0423] Detailed Description.

[0424] Embodiment of a soft-sided carry bag which has an internal frame for supporting the face rest of the device.

[0425] FIG. 32 illustrates an example of a carry bag 10 having sides 12, such as of a cloth material, surrounding an internal frame 14 for supporting a face support ring 16, which is preferably soft and compliant. Constructing the flight forward pillow within a carry-on bag is advantageous in that the traveler need not carry a separate element for the flight forward pillow, it is within their carry-on bag, and can be used at their discretion.

[0426] Although the internal frame need only provide support for face ring 16, it can be connected to a frame which supports other portions of the bag, the embodiment shown is for a wire frame 18 that support the exterior dimensions of the bag. In this example additional vertical elements are provided beneath the face ring to increase the weight-bearing capacity. It will also be appreciated that the support can be articulated, wherein its shape is altered to create the configuration in which the face support ring 16 is to be utilized. By way of example the vertical support elements can lock into position as being telescoped, pivoted, or assembled into the proper support position. It will be appreciated that the supports for the ring can be assembled within the bag at the time of use, therein eschewing the need for rigid perimeters of the bag.

[0427] Face support ring 16 is preferably configured for being stored within the interior of the carry-on bag (or left behind when it will not be needed). By way of example, the face ring can be hinged onto a portion of the bag, such as the wire frame structure, wherein it can be rotated between an operating position (i.e. substantially horizontal on the top of the carry bag) and a non-operating position (i.e. vertical within the storage cavity of the bag). In another embodiment face ring 16 is configured for being attached into one or more operating positions when needed. For example snap clips on the backside of the face ring can be configured for engaging the bag support system, such as wire frame 18.

These embodiments, or other embodiment capable of retaining the face ring in an operating position, can be configured to provide a number of positions for the face ring, such as providing desired horizontal planar positioning (forward to rearward), and vertical tilting of the face ring to increase comfort.

[0428] Handles 20 for supporting the hands (Hangles™) are attached at the ends of the bag and when draped on the exterior of the bag hang down providing support for the hands of the traveler. In this embodiment the hangles can be stuffed into the bag itself when not in use. By way of example the hangles 20 are attached at pivots 22 attached to frame 18. A set of conventional handles 24 is also shown to provide for convenient carrying of bag 10. By way of example handles 24 are also coupled at pivots 26 attached to frame 18.

EVR Headsets Accuracy Recognition Control.

[0429] References.

[0430] Incorporates by reference copending application(s) entitled Environmentally Responsive Headsets.

[0431] Detailed Description.

[0432] In this enhanced version a selector (control) is provided to the circuit (DSP, processor, etc.) for user selection of desired recognition accuracy (i.e. low, medium, high).

[0433] In another optional control a selector (control) is provided for selecting a desired level of external signal companding, preferably in response to sound recognition.

TMux Clock—Additional Embodiments.

[0434] References.

[0435] Incorporates by reference copending application(s) entitled Time Multiplexing Clock.

[0436] Detailed Description.

[0437] Additional embodiments are described for the time multiplexing clock. These embodiments provide different ergonomics and therefore may be more suited for certain applications than those provided in the preceding patent application.

[0438] FIG. 33 illustrates a top view of embodiment 10 with a base 12 configured for rotation 13. The base is configured with a plurality of notepad retention means, such as wells 14a-14d. The note pads can be loose leaf or bound on one edge or using temporary adhesive, such as provided in Post-It® Brand notes. Although four notepad retention means are shown any number may be provided without departing from the teachings of the present invention. A mark 15 is shown for registering the rotatable position of base 12 about a fixed portion 16 is shown configured with a display 18 for displaying mux time and other desired aspects, and user controls 20 for controlling how mux timing is performed.

[0439] It should also be appreciated that modes of the invention can allow for any desired number of tasks to be associated with a portion of a notepad, for instance 2-4 marks along the length of the pad would allow task information for up to 4 tasks to be tracked on the single notepad. In this way users with few tasks could adopt a use mode,

such as with only one task per notepad, while other users may desire more tasks per notepad. In addition, a user may desire an entire notepad for select tasks and sharing the notepad on others. Modes of the present invention allow configuring these aspect according to user preferences.

[0440] In one embodiment fixed portion 16 comprises a pencil holder adapted with a display retained in a vertical, flat facet portion of an element rising from base 12. The base 12 is thus rotated about fixed portion 16, ostensibly facing the user location, wherein the user selects the task to be timed. Electronics within the unit detect the positioning of base 12, such as using switch contacts or any other convenient sensing means.

[0441] FIG. 34 depicts a similar embodiment as shown in FIG. 33, although it is configured for holding additional notepad sections.

[0442] FIG. 35 illustrates another embodiment 50 of a TMux clock which has a housing 52 and display 54 and a plurality of aligned notepad holders 56a-56e. In a preferred embodiment the notepad holders are configured for holding small Post-It notes. A plurality of task selector buttons 58, at least one for each notepad, are shown on one edge.

[0443] The unit can be configured for use separately or incorporated within other equipment. In one embodiment the housing is adapted with standoffs 60 on both sides and the opposing side is configured with another TMux device, or more preferably a calculator. In this way the user need not have two different items taking desk space.

Scrollster: Enhancements.

[0444] References.

[0445] Incorporates by reference copending application(s) entitled scrolling toy display.

[0446] Detailed Description.

[0447] (1) Blank scrolls, or at least partially blank scrolls—that allow children to rewrite on the surface. Optionally, the scrolls can have the magnetic strips allowing children to record information, such as voice registered by the microphone, onto the scroll. Optionally, the strip can be loaded with data on movement, other lighting effects, sounds effects and so forth.

[0448] The scrolls can be of a conventional material that once sufficiently written over is replaced, or a material that can be erased, such as with dry eraser (like whiteboard) a solution, peeling back a front ply, or other erasure means. The data stored with each scroll is saved with the kids drawings on the magnetic strip (or other form of encoding device utilized).

Electronic Ink Media: New Embodiment

[0449] Detailed Description.

[0450] The present invention provides additional details for embodiments described within the above patent application.

[0451] Hub-Centered Electrode.

[0452] Contact for the background electrode is provided within or about the circular hub, therein electrical contact is established when placing the media on the hub of the programmer/player device.

[0453] Auto-Print onto Media.

[0454] Auto print a new date stamp (optionally with time) whenever (if option selected) the disk is written to. The stamp may be over the previous date stamp or in a sequence, such as around a circular ring on the disk, or according to other sequence on other media. The auto printing may also list info added, although then one would perhaps create a normal label. The advantage is that users can then readily determine what the write times were to a disk, and need not go into the label creation routine to perform a label creation and writing process.

Electronic Ink Enhancement

[0455] Detailed Description.

[0456] Elnk Device with Energy Generating Layer.

[0457] Another application by the inventor describes an electronic ink device with a photoresponsive surface layer that converts optical energy to electrical power. One embodiment of producing such as device utilizes a layer of a-Silicon (a-Si) (amorphous) which is relatively inexpensive in relation to single-crystalline silicone. The a-Si configured in the electrode matrix over another layer is configured to convert optical energy to an electric field.

[0458] Elnk Device with Photoresponsive Layer

[0459] In this embodiment the Elnk was coated with a photoresponsive covering. The material that the Elnk is on has a fixed resistance while the photoconductive material above is configured for changing resistance in response to lighting. In this way the voltage applied across the elnk changes in response to the light intensity. The photoresponsive surface can be made using conductive polymerics, amorphous Si (i.e. a-Si) or any other convenient method of generating a signal in response to the intensity of light being received.

Web Enabled TV—Additional Aspects.

[0460] Detailed Description.

[0461] This aspect relates to a pending application on Web TV by the inventor. If not already appreciated from studying the former application, it should be appreciated that music content can be similarly modified using the same technique to change the output, for example warp songs, include additional information lyrics and so forth. Lyrics can be generated automatically by the system in response to beat of the music. A vocal file can be metered out in cadence with the instrumental content. The user could create text file of the lyrics from which the vocals are generated following the music.

Trademark Based Search Engine.

[0462] Detailed Description.

[0463] The present invention describes an additional/alternative aspects of the above related TM based searching.

[0464] Round Robin and Nested Ranking Options.

[0465] Problem: Sites creating nnnn numbers of pages and at high rank chokes out all other sites.

[0466] The present invention overcomes that problem by the following.

[0467] (1) Ranking method utilizes round robin approach of best fit sites. Therefore user gets through sites having different domain bases before each group of same site pages.

[0468] (2) Nested ranking option. #Additional hits listed on sep. line as link—allows user to go there if desired.

[0469] (3) User-Selectable depth in establishing domain base.

[0470] (4) Hi hit dropout filter—those sites returning inordinate number of hits (obviously because they are spoof sites and the like are dropped from results or put at the back of the list.

[0471] (5) Pragmatic site data modulation—information about select sites can be used to modify the above criterion because a few select sites may have more hits.

[0472] (6) TM, Copyright Notice tie in—The above criterion may be utilized in conjunction with the TM, Copyright notices.

[0473] (7) Post hit processing—typically all params are input prior to search commencing, wherein output is formatted according to input params. Sometimes user can refine search within the results of the prior search. However, it has not been recognized that a number of benefits can be derived by allowing the user to select how the list is to be displayed, organized, ordered and such based on the actual results. Therefore, this aspect of the invention provides a means for interpreting various characteristics of the set of results and providing the user with options based on those characteristics. In this way the user can decide how they want the data after it has been determined. When working with list of files a user can select whether to organize by date, size, name, and so forth; which is done after results generated. If only a couple results generated then no need—time saved. But in cases where large number of results then this allows the user to zero-in on the right sites faster.

Chameleon Soap—Packaging Label & Business Model.

[0474] Summary.

[0475] Liquid soap packaging, in particular the chameleon soap described. The Chameleon soap changes color when it is sufficiently rubbed during use. To demonstrate how the soap works, the label includes a label with a color changing means in response to rubbing.

[0476] Detailed Description.

[0477] The present invention describes a color changing label, such as for liquid soap that changes color in response to rubbing. In one embodiment the label is constructed with a layer of liquid crystal material, wherein upon the user touching and/or rubbing this portion of the label it changes color. This can be part of a business plan for packaging and marketing the color-changing soap.

Tension Control for Headset.

[0478] Detailed Description.

[0479] The present invention related to headsets and headphones and allows changing the tension adjustment. These headsets can be used for aircraft operations, sound dampening, listening to music, and other applications where it

desirable to be able to readily and continuously change the tension of the headset without first removing the headset.

[0480] Presently tension in most headsets and headphones is not able to be adjusted for pressure. In the very few that do provide a tension adjust it is not readily changed while the headset/headphone is being worn, and does not provide a continuous adjustment.

[0481] In a similar manner as the related visor invention, the tension adjustment may be rotated into the vertical plane for adjusting the tension on headsets and headphones and the like. The same adjustment knob may be utilized, or the knob may rotated so that it is directed to the side for changing the cable path. The knob can provide for changing the amount by which the two sets of cables overlap, or distance between them, in response to knob tension adjustment.

[0482] In one embodiment the headset/headphone band is configured with a hinges to fold in the middle for storage. The tensioning cables in this embodiment are disengaged and the two halves separate. It is preferred that the cable is what retains the open headset configuration, wherein once the cables are disengaged that two halves immediately fold together. In one embodiment loops are provided on each end of the cable and simply unhook before folding. Preferably steel cables are used for tensioning, although Kevlar, or other high-strength materials may be used. In one embodiment the material and construction of the tension cable is adapted of a material having a temperature coefficient matching the desired application. For example, if the earpieces got soft and lose pressure under elevated temperatures, then the tensioning cable can be adapted to increase tension an according amount in response to the temperature shift. The structure of the headset may also be of a construction that is temperature dependent wherein the design can provide for automatic adjustment of the tension in response to tension thermal expansion and contraction.

Conclusion—Interpretation of Specification.

[0483] The aspects, modes, embodiments, variations, and features described are considered beneficial to the embodiments described or select applications or uses; but are illustrative of the invention wherein they may be left off or substituted for without departing from the scope of the invention. Preferred elements of the invention may be referred to whose inclusion is generally optional, limited to specific applications or embodiment, or with respect to desired uses, results, cost factors and so forth which would be known to one practicing said invention or variations thereof.

[0484] It should be appreciated that each aspect of the invention may generally be practiced independently, or in combinations with elements described herein or elsewhere depending on the application and desired use. Modes may be utilized with the aspects described or similar aspects of this or other devices and/or methods. Embodiments exemplify the modes and aspects of the invention and may include any number of variations and features which may be practiced with the embodiment, separately or in various combinations with other embodiments.

[0485] Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this

invention. Thus the scope of this invention should be determined by the appended claims and their legal equivalents. Therefore, it will be appreciated that the scope of the present invention fully encompasses other embodiments which may become obvious to those skilled in the art, and that the scope of the present invention is accordingly to be limited by nothing other than the appended claims, in which reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more." All structural, chemical, and functional equivalents to the elements of the above-described preferred embodiment that are known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the present claims. Moreover, it is not necessary for a device or method to address each and every problem sought to be solved by the present invention, for it to be encompassed by the present claims. Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the claims. No claim element herein is to be construed under the provisions of 35 U.S.C. 112, sixth paragraph, unless the element is expressly recited using the phrase "means for."

We claim:

1. An apparatus for personal strength training of a user, comprising:

an input means configured for receiving a static force application from a user during training;

a first static force registration sensor operable coupled to said input means for registering the level of force applied by the user;

a timing means;

a threshold selector configured for setting at least one target value of static force;

an audio or vibrational annunciator adapted for generating a first annunciation alerting said individual that said threshold has been reached or exceeded, and the time as registered by said timing means over which the user continues to apply force which has reached or crossed said threshold; and

a control circuit adapted for activating said annunciator in response to determining that the applied level of force registered by said static force registration sensor has exceeded the setting of said threshold selector.

2. An apparatus as recited in claim 1, wherein said control circuit comprises a programmable circuit element which executes a series of programmed instructions; wherein said timing means is incorporated within said programmable circuit element.

3. An apparatus as recited in claim 1, wherein said control circuit is further configured for generating a second annunciation in response to a registration of force by said static force registration sensor which exceeds said target value by a predetermined amount or an amount as selected by the

individual; wherein the characteristics of said second annunciation are discernable from said first annunciation.

4. An apparatus as recited in claim 1, further comprising a second static force registration sensor coupled to said control circuit; wherein said control circuit is configured to activate said audio or vibrational annunciation in response to a difference between the force registered by said force registration sensors which exceeds a predetermined percentage of the target force value, a fixed level of force differential, or a force differential as defined by the individual.

5. A starter pistol apparatus, comprising:

a housing adapted for being held by a race official;

a trigger on said housing configured for being activated by said race official;

an annunciator;

a timer means;

a control circuit coupled to said trigger, annunciator, and timer means, said control circuit is configured for activating utilizing said timer means for generating a predetermined number of periodic annunciations in response to detecting the activation of said trigger;

wherein the last of said annunciations is configured for outputting a sound that is sufficiently loud so as to be heard by participants and spectators.

6. A starter pistol as recited in claim 5, further including a pyrotechnic device adapted for being fired in response to activation by said control circuit at the end of said timing intervals to produce the sufficiently loud annunciation to be heard by spectators.

7. An apparatus for reproducing low frequency audio signals, comprising:

a housing configured with a cylindrical portion;

a plurality of electromagnets coupled within the cylindrical portion of said housing;

a slide assembly slidably retained within the cylindrical portion of said housing in proximity to said plurality of electromagnets;

one or more magnets coupled to a circumferential portion of said slide assembly;

a facing member covering the open end of said slide assembly in the form of one or more separate elements or formed integral to said slide-assembly;

a control circuit configured for selectively activating said electromagnets within said plurality of electromagnets in response to received audio information; and

whereby the activation of the electromagnets is operable to drive the movement of said magnets and attached slide assembly as well as the facing member which operates to push a volume of air in reproducing the received audio information.

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