Apparatus for surrounding an exerciser with cooling air having manual local control of air outlets built into a stationary exercise device

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Related U.S. Application Data

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Figure 9C
APPARATUS FOR SURROUNDING AN EXERCISER WITH COOLING AIR HAVING MANUAL LOCAL CONTROL OF AIR OUTLETS BUILT INTO A STATIONARY EXERCISE DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS


FIELD

[0002] The invention generally relates to stationary exercise machines, and more specifically to apparatus for cooling individuals while using stationary exercise machines.

BACKGROUND

[0003] Exercise is generally known to have many benefits for individuals of all ages. These benefits include improved cardiovascular health, reduced blood pressure, prevention of bone and muscle loss, maintenance of a healthy weight, improved psychological health, and many others. However, exercise is generally accompanied by a certain degree of discomfort, including overheating, sweating, fatigue, etc., and this leads to a significant reduction in the amount of exercise undertaken by many individuals, thereby reducing the health benefits derived from exercise.

[0004] Because of weather variability, convenience, and time constraints, exercise often takes place indoors using a stationary exercise machine, such as a stepper, stationary bicycle, elliptical, treadmill, etc. Attempts are sometimes made to increase the comfort of exercising individuals in these environments by optimizing the surrounding temperature. But this can be largely unsatisfactory, because exercisers generally require different degrees of cooling depending on individual physiology and on how long and how vigorously they have been exercising. If the surrounding air is warm enough to be comfortable for individuals just beginning an exercise session, it will likely be too warm for individuals well into a vigorous session. And if the surrounding air is cool enough to be comfortable for an individual who has been exercising vigorously for a significant amount of time, it will likely be too cold for individuals just beginning to exercise.

SUMMARY

[0005] Preferred embodiments provide a number of advantages over prior systems. For example, as recognized by the invention, preferred embodiments employ cooling air to improve the exerciser’s experience. Humans generally perspire so that perspiration evaporates off of the skin, removing heat from the exerciser. In some cases, however, excessive perspiration fails to sufficiently evaporate, and thus fails to remove sufficient heat from the exerciser. Excessive perspiration can be uncomfortable for the exerciser, unsanitary, and generally undesirable. Moreover, if sufficient heat is not removed from the exerciser, serious heat-related illnesses can develop, such as heat stress, heat stroke, and nausea.

[0006] Generally, in similar temperature conditions, the presence or absence of air flow, or the particular flow rate, can be the determining factor as to whether the exerciser perspires. In typical exercise environments, such as the common gym, for example, the environment is designed to regulate the temperature of the gym as a whole. Sometimes, free-standing fans are included to help improve the air circulation within the gym.

[0007] However, as described in more detail below, preferred embodiments offer an exerciser a significant improvement in comfort, thereby tending to increase the amount of exercise and the benefits derived therefrom, while also reducing risk of heat-related illnesses and/or excessive sweating. For example, in preferred embodiments, cooling air flow is directed to mostly surround an exerciser, for example a well-conditioned exerciser exercising at maximum aerobic capacity, and this reduces the propensity of the exerciser to perspire by a significant amount. The exerciser does not overheat, and perspires much less, and consequently the exercise is limited primarily by the amount of work the exerciser can do, and not by the discomfort of overheating and the risk of heat-related illness.

[0008] Additionally, preferred embodiments help reduce excessive sweating as well as the symptoms of heat-related illness, or its onset. For example, preferred embodiments tend to reduce nausea while exercising, decrease perspiration dripping over the exercise machine and floor, and reduce nausea after exercising.

[0009] Additionally, for certain exercisers, preferred embodiments eliminate the tendency to perspire entirely. For example, preferred embodiments prevent an average exerciser of modest aerobic capacity, who is not working near their maximum, from any perspiration at all. Eliminating perspiration can provide a number of additional benefits.

[0010] For example, perspiration typically causes body odor. As such, typical exercisers tend to bathe after exercise. But without perspiration, bathing is less necessary, which reduces hot water consumption as exercisers take fewer showers, and shortens the total time required to visit the gym and engage in a workout. Additionally, certain gyms do not have bathing facilities. Eliminating perspiration eliminates the need for an exerciser to exercise hard, get soaked in perspiration, and then drive home. Consequently, gyms could generally maintain higher exercise room temperatures thereby reducing energy costs.

[0011] Additionally, overweight people generally have a body mass relative to surface area that makes heat loss particularly difficult. Preferred embodiments can greatly reduce heat stress in the obese during exercise. Reducing the risk of heat-related illness, and generally making exercise more comfortable, could be the difference that allows and/or encourages certain obese people to exercise effectively, helping them to lose weight.

[0012] Preferred embodiments incorporating the SurroundCool™ effect, described in more detail below, affect a greater surface area of an exerciser than known approaches to
cooling an exerciser, thereby improving the transfer of heat away from the exerciser. Additionally, because the SurroundCool™ effect operates upon a greater surface area than known approaches, preferred embodiments provide superior perspiration evaporation.

[0013] In a general aspect of the invention, an apparatus is provided for cooling an exerciser while the exerciser uses a stationary exercise device. The apparatus is built into the stationary exercise device, and includes at least one cooling air input that is connectable to a cooling air source, the cooling air source being capable of supplying a flow of cooling air. A plurality of air outlets are built into the stationary exercise device, each air outlet being in airflow communication with the at least one cooling air input, at least one air outlet being manually and independently adjustable in direction over a range of directions, and the plurality of air outlets being arranged so as to mostly surround the exerciser with cooling air.

[0014] In a preferred embodiment, the range of directions is bounded so as to ensure that each air outlet remains directed toward at least a part of the exerciser. In another preferred embodiment, the cooling air being at least one of fresh air, chilled air, filtered air, and dehumidified air. In another preferred embodiment, the apparatus includes an air characteristic controller able to control at least one characteristic of at least some of the cooling air supplied to the plurality of air outlets, the characteristic being at least one of: fresh air content, temperature, flow rate, and humidity.

[0015] In still another preferred embodiment, the plurality of air outlets is divided into at least two groups, and the air characteristic controller is able to independently control the at least one characteristic of the cooling air for each of the at least two groups. In one embodiment, at least one of the air outlets includes a flow rate adjuster that enables manual adjustment of the flow rate, within a range of flow rates, of the cooling air flowing out of the at least one air outlet. In one embodiment, the range of flow rates includes zero airflow. In one embodiment, at least one of the air outlets includes a shut-off mechanism that is able to prevent cooling air from flowing out of the at least one air outlet.

[0016] In another preferred embodiment, the range of directions is bounded so as to allow a range of directions shaped like one of: a rectangle, an ellipse, a diamond, a hexagon, an octagon, a square, a circle, a polygon, and an outline of a person. In another preferred embodiment, the cooling air source is one of: a fresh air conduit, a dehumidifier, a window air conditioner, a free-standing room air conditioner, and a central air conditioner. In another preferred embodiment, the cooling air source is built into the stationary exercise device.

[0017] In still another preferred embodiment, the plurality of air outlets are built into at least one extended member of the stationary exercise device, the extended member being extended so as to enable the air outlets to contribute cooling air towards mostly surrounding the exerciser with cooling air. In one embodiment, at least one air outlet is a directable nozzle having a rotatable ring that can be rotated to control the air flow rate, including being able to completely stop airflow from the nozzle. In one embodiment, at least one air outlet is a cooling air outlet with two sets of mutually perpendicular and independently moveable louvers, and a tab for directing both sets of louvers.

[0018] In yet another preferred embodiment, the apparatus further includes a mechanism for closing the cooling air outlet. In another preferred embodiment, the air outlet is a cooling air outlet having a rotatable ball with an array of square air channels, the cooling air outlet also having a central joystick that can be used to direct the rotatable ball and to shut off the cooling air outlet by rotating the joystick.

[0019] In still another preferred embodiment, the plurality of air outlets are arranged to suggest that the exerciser is within a vehicle cockpit. In another preferred embodiment, each air outlet can be manually and independently adjusted using only one hand.

[0020] In another general aspect of the invention, an apparatus is provided for cooling an exerciser while the exerciser uses a stationary exercise device. The apparatus is built into the stationary exercise device and includes at least one cooling air input that is connectable to a cooling air source, the cooling air source being capable of supplying a flow of cooling air, the cooling air being at least one of fresh air, chilled air, and filtered air. A plurality of air outlets are built into the stationary exercise device, each air outlet being in airflow communication with the at least one cooling air input, at least one air outlet being manually and independently adjustable in direction over a range of directions, the range of directions being bounded so as to ensure that each air outlet remains directed toward at least a part of the exerciser. At least one of the air outlets includes a flow rate adjuster that enables manual adjustment of the flow rate, within a range of flow rates, of the cooling air flowing out of the at least one air outlet. At least one of the air outlets includes a shut-off mechanism that is able to prevent cooling air from flowing out of the at least one air outlet. The plurality of air outlets are arranged so as to mostly surround the exerciser with cooling air.

[0021] In a preferred embodiment, at least one of the plurality of air outlets is built into at least one extended member of the stationary exercise device, the extended member being extended so as to enable the at least one air outlet to contribute towards mostly surrounding the exerciser with cooling air.

[0022] In certain preferred embodiments, the cooling air source is ably to supply cooling air to a plurality of stationary exercise devices, the cooling air being supplied at a pressure and flow rate that enables each exerciser to meet individually-selected cooling requirements and/or preferences.

[0023] In preferred embodiments, cooling air outlets are supplemented by at least one conductive cooling apparatus, the conductive cooling apparatus capable of providing cooling by thermal conduction due to a flow of cooling air flowing within the conductive cooling apparatus, the conductive cooling apparatus being in airflow communication with the cooling air source. In further preferred embodiments, the conductive cooling apparatus is included in at least one of: a handle, a seat, a backrest.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The invention will be more fully understood from the following detailed description, in conjunction with the following figures, wherein:

[0025] FIG. 1 is a perspective view of a preferred embodiment that includes an air conditioner attached to a stationary exercise device, the air conditioner being connected to a heat exhausting duct, the embodiment further including a built-in cooling air outlet with a fan.

[0026] FIG. 2A is a perspective view of a preferred embodiment that includes an air conditioner separate from a station-
ary exercise device, and a cooling air outlet with a fan, which is attached to the stationary exercise device;

[0027] FIG. 2B is a perspective view of a preferred embodiment that includes an air conditioner separate from a stationary exercise device and a built-in cooling air outlet with a fan;

[0028] FIG. 2C is a perspective view of a preferred embodiment that includes an air conditioner separate from a stationary exercise device, a plurality of cooling air outlets built into the deck of the stationary exercise device (here, a treadmill), and an air characteristic controller that allows the exerciser to adjust the flow rate and temperature of the cooling air;

[0029] FIG. 3 is a perspective view of a preferred embodiment that includes a cooling air source located outside of an exercise room, the cooling air source being able to supply cooling air to a plurality of stationary exercise devices within the exercise room;

[0030] FIG. 4A is a functional diagram illustrating flow of cooling air through cooling air outlets having adjustable louvers;

[0031] FIG. 4B is a functional diagram illustrating an air conditioner that includes a thermally conductive pipe cooled by a cooling liquid, cooling air being cooled by flowing past the thermally conductive pipe;

[0032] FIG. 4C is a functional diagram illustrating injection of cooling mist into a flow of cooling air through the cooling air outlet of FIG. 4A;

[0033] FIG. 5A is a perspective view of a preferred embodiment in which the back of an exerciser is cooled by a flow of cooling air directed onto the exerciser from a cooling air outlet attached to the rear of the exercise device;

[0034] FIG. 5B is a perspective view of a preferred embodiment in which an exerciser is cooled by conduction through contact with a seat, a backrest, and handles, each of which is cooled by a cooling fluid;

[0035] FIG. 5C is a cross-sectional view illustrating cooling of the handles by the cooling fluid in the embodiment of FIG. 5B;

[0036] FIG. 5D is a perspective view of an embodiment in which the back of the exerciser is cooled by a plurality of flows of cooling air from a plurality of cooling air outlets of an extended multi-vent rear member;

[0037] FIG. 6A is a perspective view of a preferred embodiment that includes a plurality of cooling air outlets built into an elliptical exercise device and arranged so as to mostly surround an exerciser within a plurality of flows of cooling air, including a plurality of cooling air outlets of an extended multi-vent rear member;

[0038] FIG. 6B is a perspective drawing of an embodiment similar to FIG. 6A, instead using a single-vent rear cooling air outlet configuration;

[0039] FIG. 6C is a perspective drawing of the embodiment of FIG. 6B, omitting the exerciser for clarity of illustration, and schematically representing cooling zones created by cooling air being projected from each cooling air outlet;

[0040] FIG. 6D is a perspective drawing of the embodiment of FIG. 6B, omitting the exerciser for clarity of illustration, and schematically representing cooling zones created by cooling air being projected only from the front cooling air outlets;

[0041] FIG. 6E is a perspective drawing of the embodiment of FIG. 6B, omitting the exerciser for clarity of illustration, and schematically representing cooling zones created by cooling air being projected only from the rear cooling air outlet;

[0042] FIG. 7A is a perspective view of a cooling air outlet having mechanically adjustable air-directing louvers, the louvers being adjusted by manipulation of a central tab;

[0043] FIG. 7B is a perspective side view of the embodiment of FIG. 7A with the louvers being shown tipped upward;

[0044] FIG. 7C is a perspective side view of the embodiment of FIG. 7A with the louvers being shown tipped downward;

[0045] FIG. 7D is a perspective side view of the embodiment of FIG. 7A with the louvers being shown tipped to the right;

[0046] FIG. 7E is a perspective side view of the embodiment of FIG. 7A with the louvers being shown tipped to the left;

[0047] FIG. 8A is a perspective view of a preferred embodiment that includes a plurality of cooling air outlets arranged so as to mostly surround an exerciser within a plurality of flows of cooling air, the cooling air outlets being built into upright members positioned in front of and behind the exerciser (not shown);

[0048] FIG. 8B is a perspective drawing of an embodiment that includes cooling air outlets built into a pair of extended horizontal members, which are located on both sides of the exerciser (not shown);

[0049] FIG. 8C is a perspective drawing of an embodiment similar to FIG. 8B, in which the cooling air source is included within the stationary exercise device;

[0050] FIG. 9A is a perspective view of a preferred embodiment that includes a plurality of cooling air outlets arranged so as to mostly surround an exerciser within a plurality of flows of cooling air, the cooling air outlets being built into upright members positioned in front of the exerciser and rear outlets below the exerciser (not shown);

[0051] FIG. 9B is a perspective drawing of an embodiment similar to FIG. 9A, which includes additional rear cooling air outlets below the exerciser;

[0052] FIG. 9C is a perspective drawing of an embodiment similar to FIG. 9B, in which the cooling air source is included within the stationary exercise device;

[0053] FIG. 10 is a perspective view of two stationary exercise devices, showing cooling air supplied by a cooling air output of one of the stationary exercise devices to a neighboring stationary exercise device;

[0054] FIG. 11 is a perspective view of a stationary exercise device having a room air conditioner adaptor, showing the room air conditioner adaptor collecting cooling air from a room air conditioner, and driving the collected cooling air to the stationary exercise device; and

[0055] FIG. 12 is a perspective view of a plurality of stationary exercise devices located in an exercise room, the exercise room having a cooling air source able to supply cooling air to the plurality of stationary exercise devices, each stationary exercise device having a plurality of built-in cooling air outlets.

DETAILED DESCRIPTION

[0056] With reference to FIG. 1, in a preferred embodiment, the apparatus includes an air conditioner 100, or other cooling fluid source, that is attached to a stationary exercise device 102. The air conditioner 100 supplies air that is cooler than the ambient air surrounding the stationary exercise device 102 to a cooling air outlet 104. In the illustrated embodiment, cooling air outlet 104 includes a fan. One skilled in the art will understand that cooling air outlet 104
can be configured with or without a fan, or with additional or alternate features, as described in more detail below.

[0057] Cooling air outlet 104 serves as the applicator of the cooling air by directing a flow of cooling air toward the front of an individual (not shown) using the device. Warm air resulting from the air cooling process is exhausted from the air conditioner 100 through an air duct 106.

[0058] In the preferred embodiment of FIG. 2A, the apparatus includes an air conditioner 200 that is not attached to the stationary exercise device 102. Air conditioner 200 supplies cooling air thorough a hose 202 to a cooling air outlet 104, which is attached to the stationary exercise device 102. In the illustrated embodiment, cooling air outlet 104 includes a fan that can be used to control the flow rate of the cooling air leaving cooling air outlet 104. FIG. 2B illustrates an embodiment similar to the embodiment of FIG. 2A, except that cooling air outlet 104 is built into stationary exercise device 102.

[0059] FIG. 2C illustrates a preferred embodiment that includes an air conditioner 200 that is not attached to the stationary exercise device 102. Air conditioner 200 supplies cooling air thorough a hose 202 to a conduit (not shown) in the body of stationary exercise device 102. The conduit directs the received cooling air to a series of cooling air outlets 204A-H, which are located along the back of the stationary exercise device 102. Cooling air outlets 204A-H direct cooling air upward from below toward an exerciser using stationary exercise device 102. Cooling air outlets 204A-D direct cooling air upon the exerciser from the right side of stationary exercise device 102. Cooling air outlets 204E-H direct cooling air upon the exerciser from the left side of stationary exercise device 102. An air characteristic controller 206 on the front of the stationary exercise device 102 allows the exerciser (not shown) to control the overall flow rate and temperature of the cooling air.

[0060] The preferred embodiment illustrated in FIG. 3 is similar to the embodiment of FIG. 2B, except that the cooling air source is located outside of the room. Cooling air is supplied through a connection 300 in the wall of the room to a manifold 302, and from the manifold 302 to a plurality of stationary exercise devices 304. Each exercise device 304 has a cooling air outlet 305 that directs the cooling air toward the face, neck, and upper torso of an exerciser using stationary exercise device 102.

[0061] FIG. 3A illustrates an embodiment similar to that of FIG. 3, except that cooling air outlet 305 has been replaced by a plurality of cooling air outlets 306. In a preferred embodiment, each cooling air outlet of the plurality of cooling air outlets 306 is independently directable so as to collectively direct cooling air toward a plurality of respective portions of the exerciser, consistent with the SurroundCool™ concept described above.

[0062] FIG. 4A and FIG. 4B are functional diagrams that illustrate cooling air outlets in two respective preferred embodiments. In FIG. 4A, cooling air 400 flows through a duct 402 and exits from a cooling air outlet 404 through a set of air directing louvers 406. The direction of the louvers 406 can be controlled by rotating a wheel 408 located below the louvers 406. In FIG. 4B, cool water flows through a pipe 410 to a heat exchange device 412, having a large surface area. Fan 416 pulls cooling air 414 across the heat exchange device 412, thereby cooling the cooling air 418, which is then directed toward an exerciser.

[0063] FIG. 4C illustrates the injection of a cooling mist 420 into the cooling air 400 of FIG. 4A. Water travels through a hose 422 to a spray nozzle 424, which transforms the water into mist droplets 420. The mist droplets 420 enter a mixing chamber 426, where the mist droplets 420 mix with the flow of cooling air 400, and are carried through cooling air outlet 404 by the cooling air 400.

[0064] In the preferred embodiment of FIG. 5A, a cooling fluid source 500 supplies cool liquid through a set of hoses 502 to a heat exchange device and fan 504 similar to the device and fan shown in FIG. 4B. The heat exchange device and fan 504 is attached to the back of a stationary exercise device 506, on which an individual 508 is exercising, and directs a flow of cooled air 510 onto the exercising individual 508 from behind. In this embodiment, the source of cooling fluid 500 is a closed loop liquid chiller and circulator with a self-contained cooling liquid reservoir that is accessible through a hatch 512 on the top. Typically, a mixture of water and anti-freeze with anti-corrosion properties is used as the cooling liquid. In other embodiments, the cooling fluid is freon.

[0065] The preferred embodiment of FIG. 5B uses a liquid chiller 500 similar to the chiller of FIG. 5A, but the chilled liquid is supplied to a plurality of conductive cooling applicators, such as the handles 514, the seat 516, and the backrest 518 of the stationary exercise device 506. The exerciser 508 uses the stationary exercise device 506 cooled by direct conductive thermal contact with the cooled handles 514, seat 516, and backrest 518. In some situations, it may be desirable to have only conductive cooling applicators, without any cooling air outlets and/or fans to provide convective cooling. The exerciser 508 can manually control these conductive cooling applicators by rotating the handles 415 thereby controlling the flow of the cooling liquid to the conductive cooling applicators. For example, by rotating the left one of the handles 514, the flow rate of cooling fluid to the seat 516 can be adjusted. By rotating the right one of the handles 415, the flow rate of cooling fluid to the handles 514 can be adjusted. The exerciser 508 can adjust the cooling effect of the backrest 518 simply by leaning forward so as to reduce thermal contact with the backrest 518.

[0066] Of course, one of ordinary skill in the art understands that air is a fluid, just as water is a fluid, and therefore, a flow of cooling air can be used to cool the plurality of conductive cooling applicators, such as the handles 514, the seat 516, and the backrest 518 of the stationary exercise device 506. Using air as the cooling fluid is particularly advantageous for use with cooling air outlets that direct air convectively towards an exerciser. Thus, the same cooling air that is provided by the cooling air outlets can be used to cool the conductive cooling applicators by flowing through the conductive cooling applicators.

[0067] FIG. 5C illustrates the cooling of the handles by the chilled liquid in the preferred embodiment of FIG. 5B. The chilled liquid flows into and up supporting arm 518, which supports the two hand grips 514, through the two hand grips 514, and then down the other supporting arm 520. In this illustrated embodiment, the two hand grips 514 are metal and provide good thermal contact with the chilled liquid. The interiors of the supporting arms 518 and 520, and the cross brace 522 between the two hand grips 514 are thermally insulated so as to avoid warming of the chilled liquid as it
flows up to and down from the handles, and to avoid water condensation on the supporting arms 518 and 520 and the cross brace 522.

Various preferred embodiments include both cooling air outlets which provide flows of cooling air 504, and conductive cooling applicators 514, 516, 518 which provide cooling by thermal conduction due to a flow of cooling fluid (such as cooling air) flowing therewithin, whereby the exerciser can select and control which types of cooling are to be applied, and how much of each. Of course, it is also possible to include only the conductive cooling applicators 514, 516, 518 which provide cooling by thermal conduction due to a flow of cooling air or water flowing therewithin, whereby the exerciser can select and control how much conductive cooling is desired.

The embodiment of FIG. 5D uses a liquid chiller 500 similar to the chiller of FIG. 5A, but the chilled liquid is supplied to cooling air outlets 504A-D, wherein air is cooled by the chilled liquid in a manner similar to the outlet of FIG. 4b, the cooling air outlets being part of the backrest 510 of the stationary exercise device 506. Cooling air outlets 504A-D directly cool cooling air from backrest 510 toward the head, and neck of the exerciser 508.

In the embodiment of FIG. 6A, air conditioner 608 supplies cooling air through an input hose 606 to stationary exercise device 600. A plurality of cooling air outlets 610A-H directly cool cooling air to mostly surround an exerciser 602. An upward extension 612 is coupled to a rear section 604 of stationary exercise device 600. Upward extension 612 includes cooling air outlets 610A-B, which direct air toward the rear of exerciser 602.

Similarly, front extension 616 is built into a front section of stationary exercise device 600. The front section of stationary exercise device 600 includes conduits (not shown) internal to the stationary exercise device 600 that carry air from hose 606 through to front extension 616 and out through cooling air outlet 610D, which directs cooling air toward the face, neck, and upper torso of exerciser 602. The front section of stationary exercise device 600 also includes cooling air outlets 610E and 610F, which direct cooling air toward the front middle torso of exerciser 602. The front section of stationary exercise device 600 also includes cooling air outlets 610G and 610H, which direct cooling air toward the legs and feet of exerciser 602.

The plurality of cooling air outlets of FIG. 6A cooperate to create a SurroundCool™ personal cooling environment for the exerciser. As described in more detail with respect to the embodiments disclosed herein, SurroundCool™ systems use multiple cooling air outlets to project multiple flows of cooling air directly upon an exerciser so as to efficiently cool the exerciser without wasting energy by cooling the general environment around the exerciser. In some embodiments, the plurality of cooling air flows provided by SurroundCool™ systems cannot be directed away from the exerciser's body. Instead, in these embodiments the exerciser can only restrict or block the flow of cooling air. As such, SurroundCool™ systems in these embodiments thereby improve energy efficiency, by forcing the user to restrict or block flows of cooling air when they are no longer desired, rather than wastefully diverting unwanted cooling air flows away from the body and into the general environment.

For example, in the illustrated embodiment of FIG. 6A, cooling air outlet 610J, directly cools the face and upper front body of the exerciser 602, while cooling air outlets 610E-H directly cool the lower front portion of the exerciser 602. At the same time, cooling air outlets 610A-C directly cool the rear portion of the exerciser 602. As described in more detail below, these cooling air outlets provide limited user-controlled direction within a restricted range of directions, for example to direct cooling air according to an exerciser's body size and shape. The ranges of direction adjustment are restricted so as to always direct some portion of the cooling air onto the exerciser. In other embodiments, the stationary exercise device can request from the exerciser, or automatically determine, the particular exerciser's body weight and/or height. Using the requested or determined information, preferred embodiments restrict the ranges of motion of the user-controlled cooling air outlets so as to ensure that a portion of each air flow always contacts at least a portion of the exerciser.

In the preferred embodiment of FIG. 6B, air conditioner 608 that supplies cooling air through an input hose 606 to stationary exercise device 600, as in FIG. 6A. However, instead of an upward rear extension having a plurality of cooling air outlets, stationary exercise device 600 of FIG. 6A includes a single forward extension 612 coupled to rear section 604. Forward extension 612 includes a single cooling air outlet 610A, which directs cooling air 612 toward the rear of exerciser 602.

Similarly, front extension 616 couples to a front section of stationary exercise device 600. The front section of stationary exercise device 600 includes conduits (not shown) internal to the stationary exercise device 600 that carry air from input hose 606 through to front extension 616 and out through cooling air outlet 610D, which directs cooling air toward the face, neck, and upper torso of exerciser 602. The front section of stationary exercise device 600 also includes cooling air outlets 610E and 610F, which direct cooling air toward the front middle torso of exerciser 602. The front section of stationary exercise device 600 also includes cooling air outlets 610G and 610H, which direct cooling air toward the legs and feet of exerciser 602.

FIG. 6C illustrates cooling air projections associated with the cooling air outlets 610A, 610B, and 610D-H of FIG. 6B. Exerciser 602 is not shown for clarity of illustration. Cooling air outlet 610A directs cooling air generally toward the area indicated by cooling air projection 612A. Cooling air outlet 610D directs cooling air generally in the area indicated by cooling air projection 612D. Cooling air outlet 610F directs cooling air generally in the area indicated by cooling air projection 612F. Cooling air outlet 610G directs cooling air generally in the area indicated by cooling air projection 612G. Cooling air outlet 610H directs cooling air generally in the area indicated by cooling air projection 612H.

Additionally, FIG. 6C illustrates, using the cooling air projections, how the collective air flow from cooling air outlets 610A-H mostly surround the exerciser 602 with cooling air. Further, the arrangement of the cooling air outlets and cooling air projections suggests the impression of being in a vehicle cockpit to the exerciser 602.

FIG. 6D illustrates, using the cooling air projections, how the collective air flow from cooling air outlets 610D-H mostly cover the front of exerciser 602 with cooling air. Similarly, FIG. 6E illustrates, using the cooling air projections, how the collective air flow from rear cooling air outlets, here cooling air outlet 610A, mostly covers the rear of exerciser 602 with cooling air.
FIG. 7A illustrates an exemplary cooling air outlet 700 that receives cooling air from a connector 702 that connects cooling air outlet 700 to a hose 704. Hose 703 connects to a cooling air supply (not shown). Cooling air outlet 700 is rotatably coupled to connector 702, so that an exerciser can manually adjust the cooling air flow exiting cooling air outlet 700. Tab 706 provides a convenient grasping point for the exerciser. FIG. 7A shows cooling air outlet 700 in neutral position.

FIG. 7B shows cooling air outlet 700 in an upward tilt position that directs cooling air upwards. FIG. 7C shows cooling air outlet 700 in a downward tilt position that directs cooling air downwards. FIG. 7D shows cooling air outlet 700 in a rightward tilt position that directs cooling air to the right. FIG. 7E shows cooling air outlet 700 in a leftward tilt position that directs cooling air to the left.

FIG. 8A illustrates a preferred embodiment that includes a cooling air source 808 (such as an air conditioner, or a fan that pulls in cold outside air, for example) that is not attached to the stationary exercise device 800. The cooling air source 808 supplies cooling air through a hose 809 and through conduits within the body of the stationary exercise device 800. Cooling air from cooling air source 808 travels from the conduits into up to eight outlets 804A, 804B, 806A, and 806B. The cooling air leaves the up to eight outlets through a plurality of cooling air outlets 808A-D, 810A-D, and 812. Working in cooperation, air flows leaving cooling air outlets 808A-D, 810A-D, and 812 mostly surround an exerciser (not shown) using stationary exercise device 800.

As shown, cooling air outlets 808A-D are located on forward upright members 804A and 804B, and direct cooling air toward the front middle torso, legs, and feet of the exerciser. Similarly, cooling air outlets 810A-D are located on rear upright members 806A and 806B, and direct cooling air toward the rear middle torso, legs, and feet of the exerciser. Upper member 802 includes cooling air outlet 812, which directs cooling air toward the head, neck, and front torso of the exerciser.

FIG. 8B also illustrates a preferred embodiment that includes horizontal members 814A, 814B that supply cooling air from either side of an exerciser, as well as cooling air source 808 that supplies cooling air through a hose 809 and through conduits within the body of the stationary exercise device 800. Cooling air from cooling air source 808 travels from the conduits into substantially upright members 804A and 804B. The cooling air leaves the upright members and enters horizontal members 814A and 814B and upper member 802. The cooling air leaves the horizontal members through a plurality of cooling air outlets 816A-H. Working in cooperation, air flows leaving cooling air outlets 816A-D and 816E-H mostly surround an exerciser (not shown) using stationary exercise device 800.

As illustrated, cooling air outlets 816A-D direct cooling air from the left side of the stationary exercise device 800. Similarly, cooling air outlets 816F-H direct cooling air from the right side of the stationary exercise device 800.

FIG. 8C illustrates an embodiment similar to FIG. 8B, except that the cooling air source (such as an air conditioner, or other suitable cooling air source) is contained within the stationary exercise device 800. The cooling air source supplies an air inlet 811 through which ambient air is drawn into the cooling air source and cooled before being delivered to the cooling air outlets 812, 816A-H.

FIG. 9A also illustrates a preferred embodiment that includes a cooling air source 808 that is external to the stationary exercise device 900 and supplies cooling air through a hose 809 and through conduits within the body of stationary exercise device 900. Cooling air from cooling air source 808 travels from the conduits into substantially upright members 804A and 804B and upper member 802. The cooling air also travels within the conduits, leaving the body of the stationary exercise device 900 through cooling air outlets 906A and 906B. Working in cooperation, air flows 910A and 910B, leaving cooling air outlets 906A and 906B, respectively, directly cooling air upward from below, toward the rear middle torso, legs, and feet of the exerciser.

FIG. 9B illustrates an embodiment similar to FIG. 9A, except that the embodiment shown in FIG. 9B includes an additional pair of rear cooling air outlets 906C and 906D. As shown, the additional pair of rear cooling air outlets 906C and 906D directs air flows 910C and 910D, respectively. Working in cooperation, the inner rear cooling air outlets 906C and 906D directs cooling air upward from below, toward the legs and feet of the exerciser. Similarly, the outer rear cooling air outlets 906A and 906B directs cooling air upward from below, toward the rear middle torso of the exerciser.

FIG. 9C illustrates an embodiment which is similar to FIG. 9A, except that the cooling air source is contained within the stationary exercise device 900, the cooling air source having an air inlet 811 through which ambient air is drawn into the cooling air source and cooled before being delivered to the cooling air outlets 812, 808A-D, and 806A-B.

FIG. 10 illustrates an embodiment similar to FIG. 6, except that the stationary exercise device 600 includes a cooling air output hose 1000. The cooling air output hose 1000 enables the stationary exercise device 600 to supply cooling air to a second stationary exercise device 1002. As shown, cooling air output hose 1000 serves as an input hose 606 to the stationary exercise device 1002. This enables the cooling air source 1008 to supply cooling air to both of the stationary exercise devices 600, 1002 without requiring a direct cooling air connection between the cooling air source 608 and the secondary stationary exercise device 1002.

Embodiments of the present invention direct cooling air specifically towards where it is needed, that is, towards the body of the exerciser 602, and in some embodiments, towards targeted regions of the body of the exerciser 602. Embodiments of the invention create a personal cooling environment which surrounds at least part of the body of the exerciser 602.

As a consequence, with reference to FIG. 11, using an adaptor for collecting cooling air from a room air conditioner, overall cooling requirements can be reduced for the room in which the stationary exercise device 600 is located. The room air conditioner 1102, previously used for cooling the entire room, can operate so as to only cool the exerciser directly, which requires less energy than cooling the entire room. The room air conditioner 1102, combined with the adaptor 1100, serves as the source of cooling air, rather than the separate, dedicated cooling air source 608 shown in FIG. 6A, for example.

In these embodiments, the cooling air input hose 606 is connected to an adaptor 1100, which collects and diverts cooling air from the room air conditioner 1102 to the cooling air input hose 606. In some embodiments the adaptor 1100...
includes a boosting fan 1104 that increases the pressure and/or flow rate of the cooling air supplied to the cooling air input hose 606.

[0093] FIG. 12 shows a cooling air source 200 located in an exercise room having a plurality of exercise devices 304, the cooling air source 200 being able to supply cooling air to the plurality of stationary exercise devices 304 via main hose 300, which branches out via distribution hose 302. The cooling air source 200 supplies cooling air at a pressure and flow rate that enables each exerciser to meet individually-selected cooling requirements and/or preferences. The cooling air source 200 can include a regulator that can ensure that the cooling air source 200 supplies a desired pressure, flow, etc. to each exercise device when fewer than all of a large number of connected exercise devices are in use.

[0094] Each exercise device 304 includes a pair of cooling air outlets 1200A, 1200B in its upper structure, which can direct cooling air toward the face of an exerciser, a plurality of cooling air vents along its base 204A-H, which can direct cooling air upward toward the exerciser from below, and a plurality of cooling air outlets 1204A-D located in upright structures, which can direct cooling air toward the front of the exerciser. Alternatively, the cooling air source can be located outside of the exercise room.

[0095] Other modifications and implementations will occur to those skilled in the art without departing from the spirit and the scope of the invention as claimed. Accordingly, the above description is not intended to limit the invention except as indicated in the following claims.

What is claimed is:

1. An apparatus for cooling an exerciser while the exerciser uses a stationary exercise device, the apparatus being built into the stationary exercise device, the apparatus comprising: at least one cooling air input that is connectable to a cooling air source, the cooling air source being capable of supplying a flow of cooling air; and a plurality of air outlets built into the stationary exercise device.

2. The apparatus of claim 1, wherein the range of directions is bounded so as to ensure that the at least one air outlet remains directed toward at least a part of the exerciser.

3. The apparatus of claim 1, the cooling air being at least one of cool fresh air, chilled air, filtered air, and dehumidified air.

4. The apparatus of claim 1, further comprising an air characteristic controller able to control at least one characteristic of the cooling air supplied to at least some of the plurality of air outlets, the characteristic being at least one of: fresh air content; temperature; flow rate; and humidity.

5. The apparatus of claim 4, wherein the plurality of air outlets is divided into at least two groups, and the air characteristic controller is able to independently control the at least one characteristic of the cooling air for each of the at least two groups.

6. The apparatus of claim 1, wherein at least one of the air outlets includes a flow rate adjuster that enables manual adjustment of a flow rate, within a range of flow rates, of the cooling air flowing out of the at least one air outlet.

7. The apparatus of claim 6, wherein the range of flow rates includes zero flow.

8. The apparatus of claim 1, wherein at least one of the air outlets includes a shut-off mechanism that is able to prevent cooling air from flowing out of the at least one air outlet.

9. The apparatus of claim 1, wherein the range of directions is bounded so as to allow a range of directions shaped like one of:

   a rectangle;
   an ellipse;
   a diamond;
   a hexagon;
   an octagon;
   a square;
   a circle;
   a polygon; and
   an outline of a person.

10. The apparatus of claim 1, wherein the cooling air source is one of:

    a fresh air conduit;
    a dehumidifier;
    a window air conditioner;
    a free-standing room air conditioner; and
    a central air conditioner.

11. The apparatus of claim 1, wherein the cooling air source is built in to the stationary exercise device.

12. The apparatus of claim 1, wherein at least some of the plurality of air outlets are built into at least one extended member of the stationary exercise device, the extended member being extended so as to enable the air outlets to contribute to mostly surrounding the exerciser with cooling air.

13. The apparatus of claim 1, wherein at least one air outlet is a directable nozzle having a rotatable ring that can be rotated to control the air flow rate, including being able to completely stop air flow from the nozzle.

14. The apparatus of claim 1, wherein at least one air outlet is a cooling air outlet with two sets of mutually perpendicular and independently movable louvers, and a tab for directing both sets of louvers.

15. The apparatus of claim 1, wherein at least one air outlet includes a mechanism for closing the cooling air outlet.

16. The apparatus of claim 1, wherein at least one of the air outlets is a cooling air outlet having a rotatable ball with an array of square air channels, the cooling air outlet also having a central joystick that can be used to direct the rotatable ball and to shut off the cooling air outlet by rotating the joystick.

17. The apparatus of claim 1, wherein at least some of the plurality of air outlets are arranged to suggest that the exerciser is within a vehicle cockpit.

18. The apparatus of claim 1, wherein each air outlet can be manually and independently adjusted using only one hand.

19. The apparatus of claim 1, wherein the cooling air source is able to supply cooling air to a plurality of stationary exercise devices, the cooling air being regulated so as to be supplied at a pressure and flow rate that enables each exerciser to meet individually-selected cooling preferences.

20. An apparatus for cooling an exerciser while the exerciser uses a stationary exercise device, the apparatus being built into the stationary exercise device, the apparatus comprising:
at least one cooling air input that is connectable to a cooling air source,
the cooling air source being capable of supplying a flow of cooling air,
the cooling air being at least one of cool fresh air, chilled air, and filtered air; and
a plurality of air outlets built into the stationary exercise device,
each air outlet being in airflow communication with the at least one cooling air input,
at least one air outlet being manually and independently adjustable in direction over a range of directions, the range of directions being bounded so as to ensure that the air outlet remains directed toward at least a part of the exerciser,
at least one of the air outlets including a flow rate adjuster that enables manual adjustment of the flow rate, within a range of flow rates, of the cooling air flowing out of the at least one air outlet,
at least one of the air outlets including a shut-off mechanism that is able to prevent cooling air from flowing out of the at least one air outlet, and
the plurality of air outlets being arranged so as to mostly surround the exerciser with cooling air.

21. The apparatus of claim 20, wherein at least one of the plurality of air outlets is built into an extended member of the stationary exercise device, the extended member being extended so as to enable the at least one air outlet to contribute towards mostly surrounding the exerciser with cooling air.

22. The apparatus of claim 20, wherein the cooling air source is able to supply cooling air to a plurality of stationary exercise devices, the cooling air being regulated so as to be supplied at a pressure and flow rate that enables each exerciser to meet individually-selected cooling preferences.

23. The apparatus of claim 1, further comprising:
at least one conductive cooling applicator,
the conductive cooling applicator being capable of providing cooling by thermal conduction due to a flow of cooling air flowing within the conductive cooling applicator,
the conductive cooling applicator being in airflow communication with the cooling air source.

24. The apparatus of claim 23, wherein the conductive cooling applicator is included in at least one of:
a handle;
a seat; and
a backrest.

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