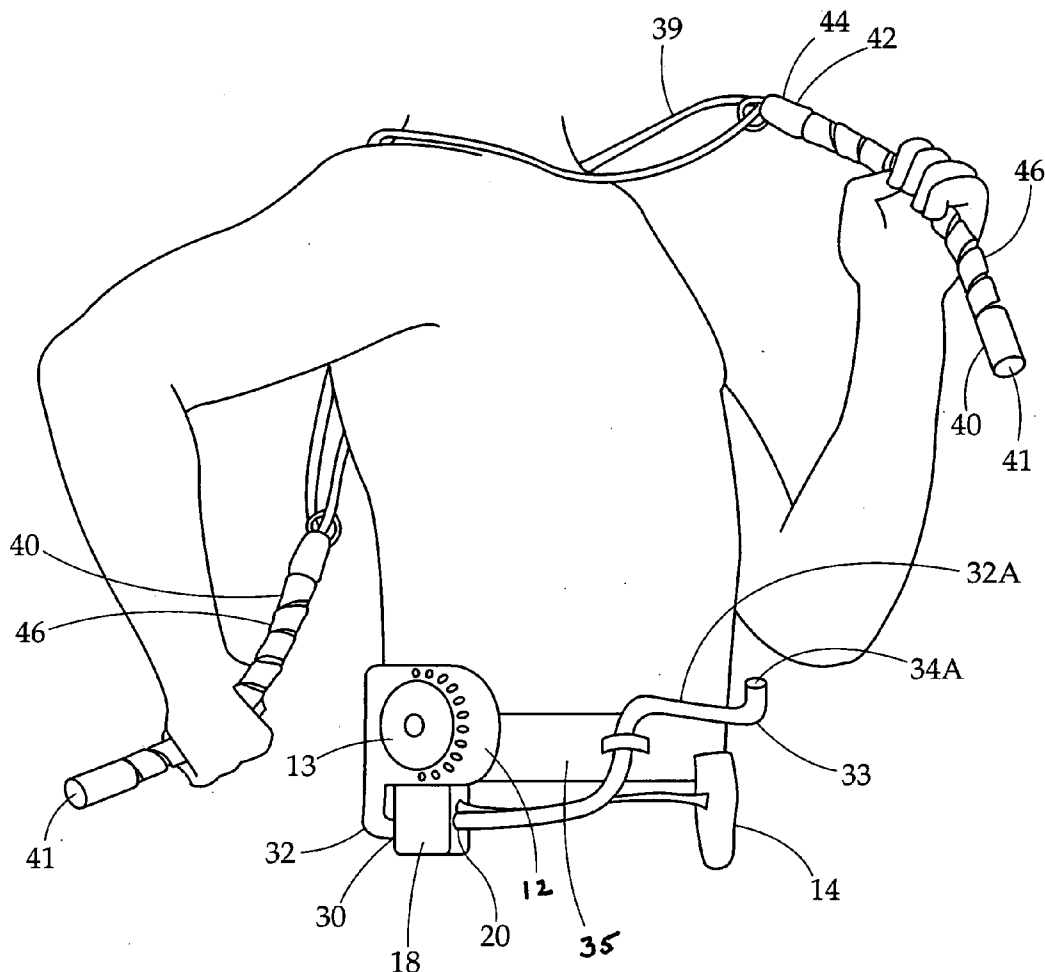


(43) **Pub. Date:** **May 12, 2016**



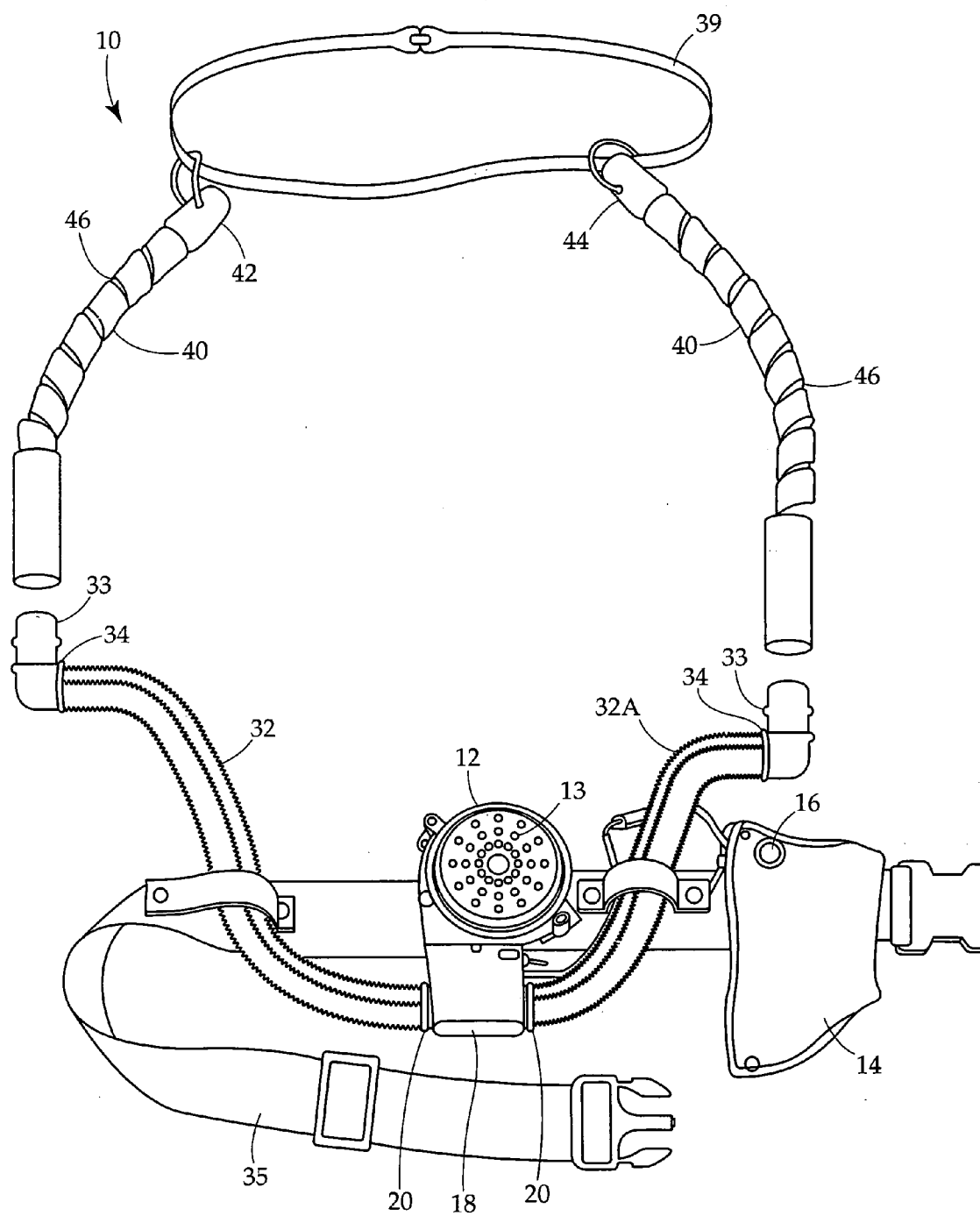


Fig. 1

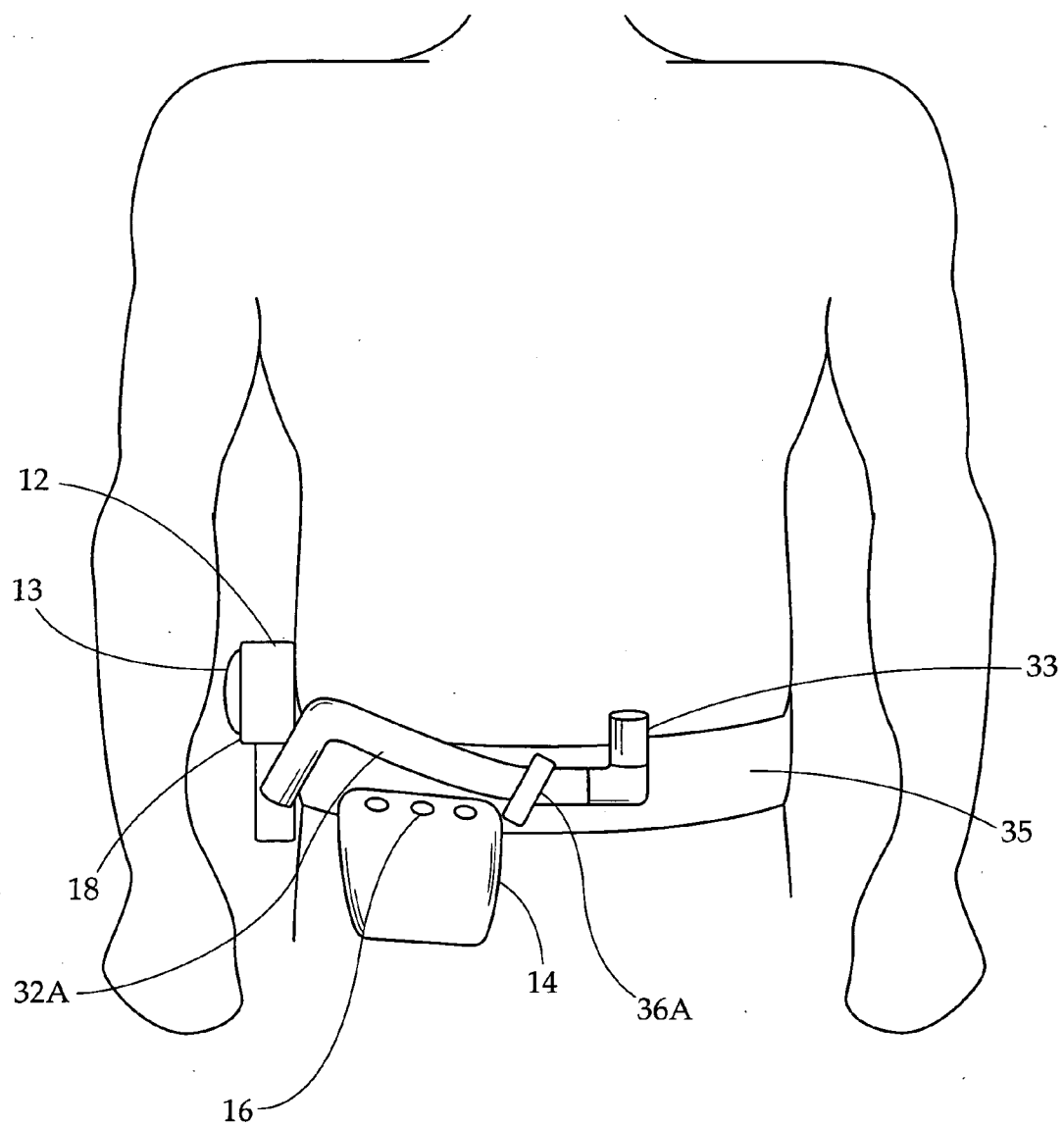


Fig. 2

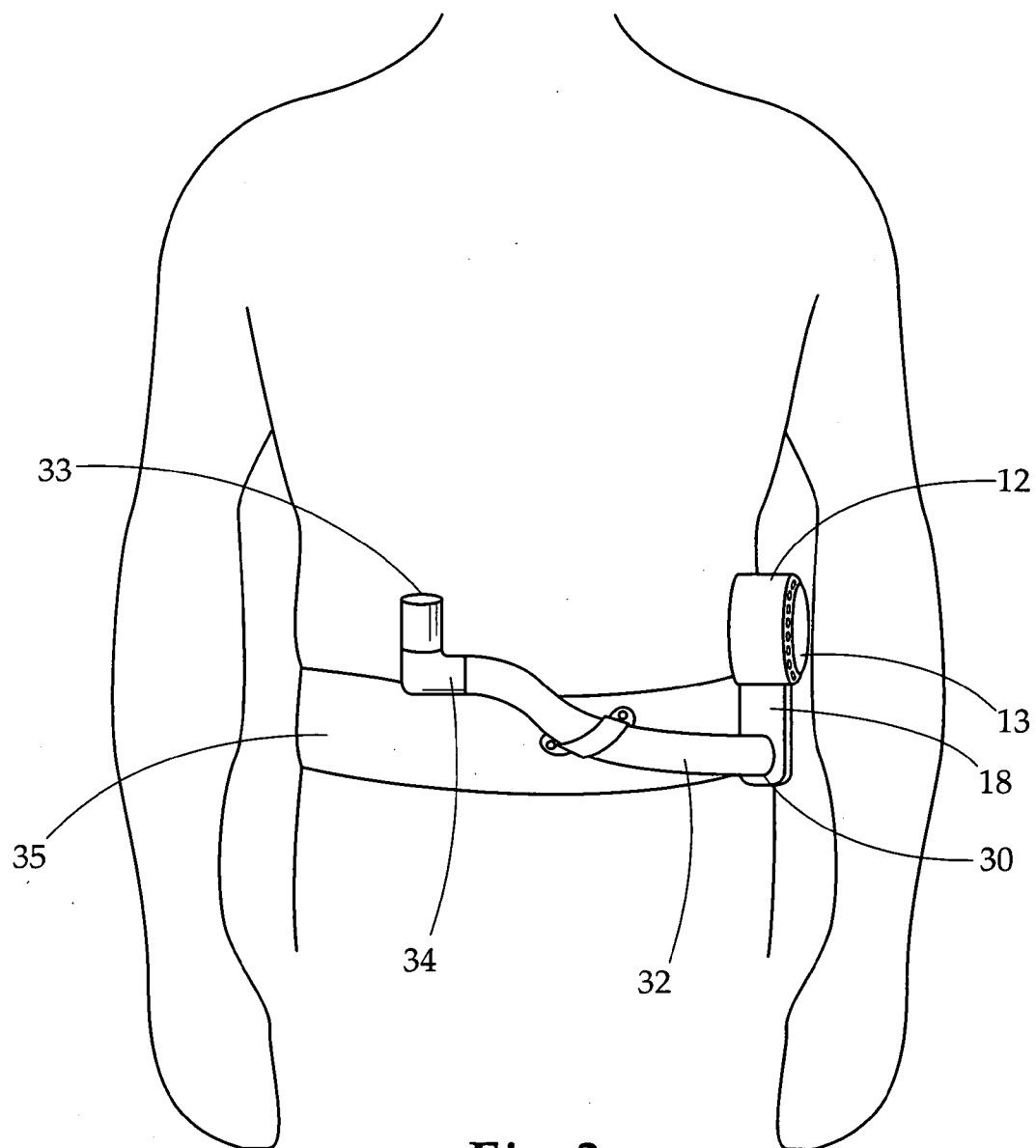


Fig. 3

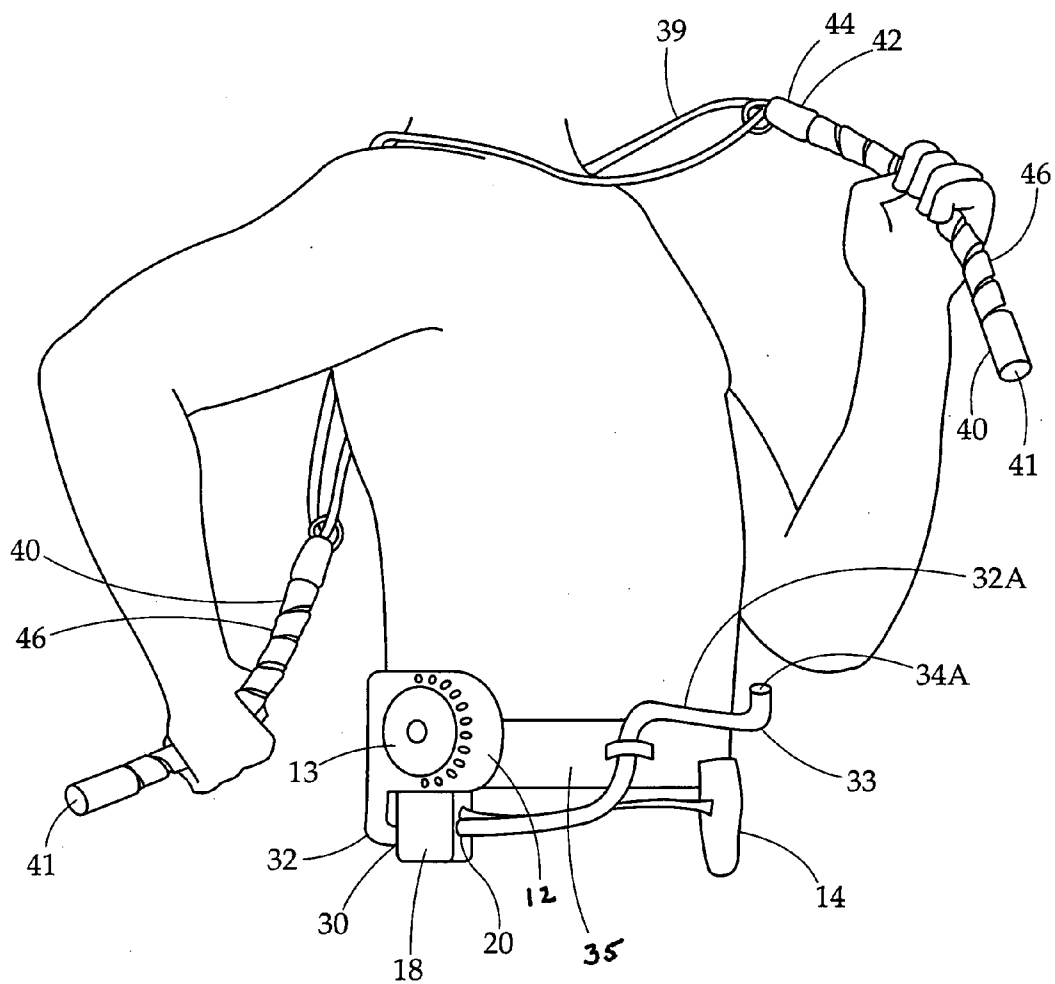


Fig. 4

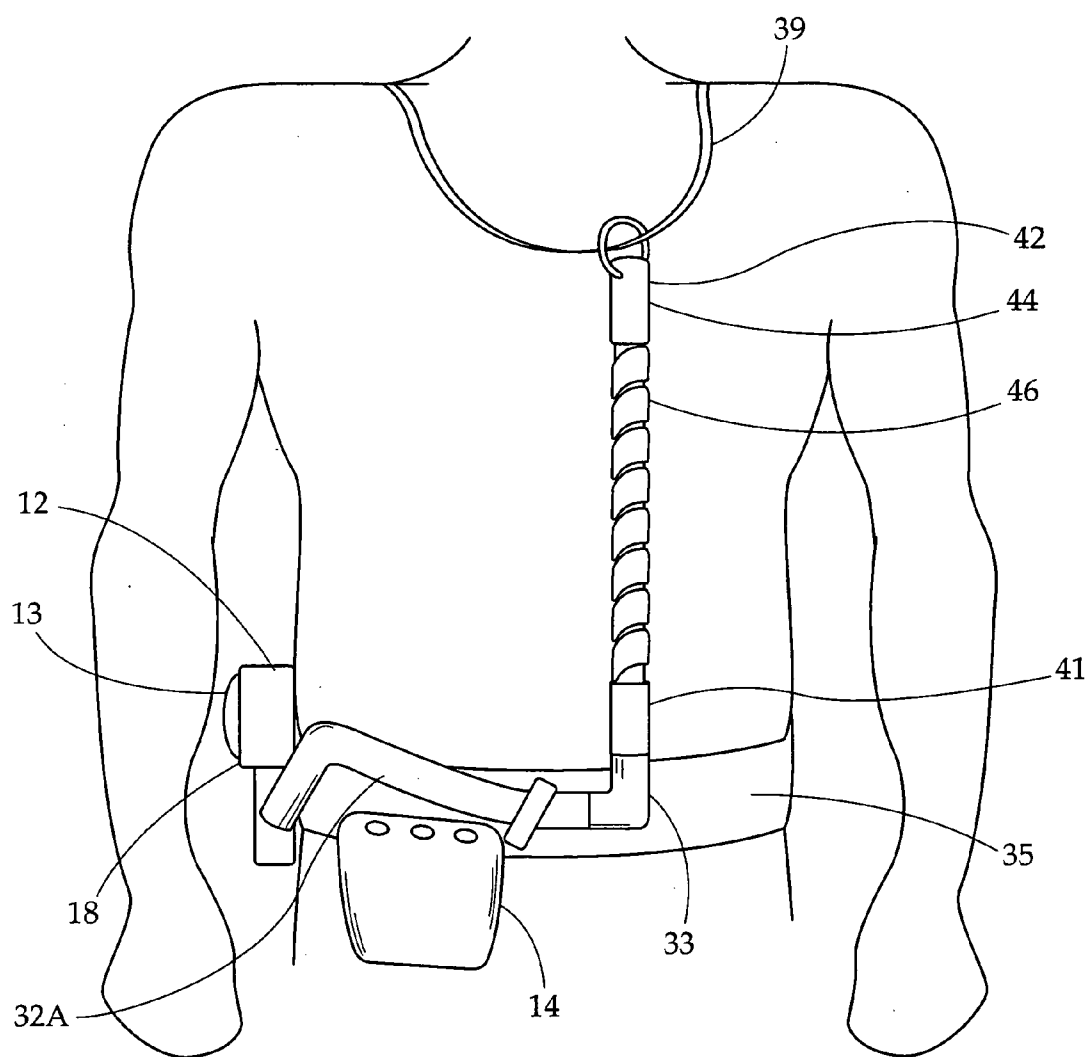


Fig. 5

AIR DISTRIBUTION SYSTEM FOR INDIVIDUAL COOLING

RELATED APPLICATIONS

[0001] Applicant claims the benefit of provisional application Ser. No. 61/962,798, filed Nov. 18, 2013.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an air distribution system for particular use by an individual to prevent heat stress and fatigue by evaporating body moisture and perspiration when exposed to high ambient temperature. The present invention is described and has a particular cooling and evaporative effect to humans.

Copyright Notice

[0004] A portion of the disclosure of this patent document contains material that is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights.

[0005] 2. Description of the Prior Art

[0006] Individuals are oftentimes required to perform physical activity or duty in ambient atmosphere which is conducive to perspiration. Construction workers in hot climates oftentimes find themselves in such situations.

[0007] Other individuals performing in such ambient temperatures are not often allowed the luxury of rest breaks and the like. These include military personnel, which are often required to wear tactical protective vests and multiple layers of clothing, in addition to the personal military equipment they must carry with them. Similar workers that are involved in hazardous waste clean up, or fire fighting, have to wear protective gloves, boots, and outer clothing, together with protective headgear and face masks. These individuals are subjected to substantial fluid loss due to the clothing they are wearing, the equipment they are carrying, and the ambient thermal atmosphere.

[0008] Therefore there has been a need for a self-contained apparatus which can be worn by an individual in such conditions which is light weight, comfortable, and distributes air flow about the body of the individual, including the chest and the back and head and the legs. Such a system needs to be responsive to the body movement and not be subject to shut down or collapse by the movement of the body. That is, the individual should be able to lie on his stomach, lie on his back, or sit with his back against a rigid object without the system shutting down or ceasing the distribution and flow of air about the body.

[0009] Cooling garments have been widely explored and include systems which attempt to blot the moisture and perspiration from the body, as well as incorporation an air flow system which is incorporated within a protective vest to distribute air yet such a system compromises the performance of the protective vest.

[0010] There are numerous personal cooling systems to prevent heat overload and stress. The advantages, methods and construction have been well documented. Currently, vest or garment systems that keep the body cool use phase change material, air, compressed gas, ice, water or a circulating refrigerated liquid. U.S. Pat. No. 6,257,011 B1 to Siman-Tov,

et al. teaches an air moving channel sheet capable of absorbing evaporative liquid. U.S. Pat. No. 6,874,332 B2 to Forgach teaches a vest having a fan to discharge air through its elongated housing. U.S. Pat. No. 5,533,354 to Pirkle teaches a harness constructed of perforated tubing which uses a gas to circulate air over the body.

[0011] None of the above have a stand alone pressurized flexible discharge outlet air system that is capable of channeling the exhausting air directly or indirectly over the body or the skin of an individual through primary exhaust nozzles or by attaching secondary open passageways or channels about the body.

[0012] Applicant's system is a lightweight plenum manifold system which distributes a flow of air about the torso of an individual, or the legs, the flow of air itself cooling the skin directly or the clothing worn by the individual by providing a pressurized air stream that evaporates moisture and perspiration.

[0013] The system includes a self-contained portable battery operated blower fan assembly capable of producing a minimum 15 CFM, having a plenum with a manifold to distribute pressurized ambient or moisturized air directly or indirectly against the skin or clothing of an individual either through primary exhaust nozzle or nozzles or by attaching secondary open air conduit passageways or channels placed about the individual. As the air exits and passes over the skin or clothing, it provides a cooling effect by evaporating body moisture. The apparatus may be worn beneath the clothing or exterior to the clothing.

OBJECTS OF THE INVENTION

[0014] An object of the present invention is to provide for a self-contained air transfer system which can be worn by an individual about the waist, either under the user's clothing or over the clothing, the system distributing air about the skin or body of the user or upon the clothing of the user.

[0015] A further object of the present invention is to provide for a novel flexible air transfer system which is lightweight and which can be easily and comfortably worn beneath the clothing and equipment of the individual.

[0016] A still further object of the present invention is to provide for a novel flexible air transfer system which is responsive to the movement of the body.

[0017] A still further object of the present invention is to provide for a novel flexible air transfer system which allows the individual to perform normal bodily movement, such as sitting, lying prone, lying supine, without affecting the integrity of the system or interrupting the flow of air.

[0018] A still further object of the present invention is to provide for a novel flexible air transfer apparatus which distributes ambient air flow, that evaporates moisture, cooling the body or the skin, or drying the clothing of an individual.

[0019] A still further object of the present invention is to provide for a novel self-contained air distribution system which can be independently worn with or without clothing, the discharge system distributing air about the desired portion of the body.

[0020] A still further object of the present invention is to provide for a novel flexible air transfer system which is responsive to the movement of the body of the individual.

[0021] A still further object of the present invention is to provide a novel air distribution system that is independent of incorporation in garments or vests to hold it in place.

[0022] A still further object of the present invention is to provide for an air distribution system that evaporates body moisture by the movement of air through primary exhaust nozzles or secondary conduits channel or passageways placed about an individual.

[0023] A still further object of the present invention is to provide a novel air distribution system that can use moisturized ambient air to cool the skin of an individual.

SUMMARY OF THE INVENTION

[0024] A self-contained air distribution system for an individual which can distribute air over the chest, back, head, or legs of the individual, directly against the skin or the clothing of the individual, the system including a battery operated blower fan in communication with the plenum and manifold, the manifold having a primary exhaust nozzle or nozzles which may be attached to secondary distribution conduits extending over the chest, back, head, or legs of the individual, thereby allowing air to selectively escape providing a cooling and evaporate effect.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] These and other objects of the present invention will become apparent, particularly when taken in light of the following illustrations wherein:

[0026] FIG. 1 is a front planar view of the self-contained air distribution system of the present invention;

[0027] FIG. 2 is a front view of the self-contained air distribution system positioned about the torso of an individual;

[0028] FIG. 3 is a rear view of the self-contained air distribution system disposed about the torso of an individual; and

[0029] FIGS. 4 and 5 are a side view and front view of a second embodiment of the self-contained air distribution system disposed about the torso of an individual.

DETAILED DESCRIPTION OF THE INVENTION

[0030] FIG. 1 is a front view of the self-contained air distribution system of the present invention. The self-contained air distribution system 10 is described initially with respect to its adaption to use by a human individual who is required to perform physical activity in ambient atmosphere which is conducive to excessive perspiration. This would include construction workers, astronauts, military personnel, hazardous waste clean up individuals, fire fighters, and others who often-times are required to wear substantial protective clothing and equipment. The distribution of air by the system will have a cooling and evaporative effect on the individual wearing the system, either directly to the skin or the clothing. It will also be understood that while the preferred embodiment is illustrated with two distribution nozzles, the system can be operated with a single distribution nozzle or more than two distribution nozzles without departing from the spirit and scope of the invention.

[0031] The self-contained air distribution system 10 as illustrated in FIG. 1 is adapted for human use. The system may comprise an outer protective shell (not shown) to shield the contents from dirt, dust, and particulate matter. The outer protective shell is formed with an optional filter aperture. Positioned within the optional outer protective shell is an electric blower fan assembly 12 and inlet port 13 that is energized by a battery pack 14 or other power supply that is connected to a selective on/off switch 16. The blower fan

assembly is in communication with a plenum manifold 18 having a plurality of outlet ports 20.

[0032] Outlet ports 20 have secured thereto primary flexible directional conduits 32 and 32A which extend from a respective outlet port to a selected position about the torso. The select position about the torso could be the middle of an individual's back or the middle of an individual's stomach. The terminus 34 and 34A of directional conduits 32 and 32A is formed with upwardly extending nozzles 33 which will disburse the air flow from the energized blower fan assembly 12 upwardly across the individual's back or across the individual's stomach and chest, either directly over the skin or the clothing, thus providing a cooling and evaporative affect to the individual.

[0033] The terminus 34 and 34A of the directional conduits 32 and 32A and the nozzles 33 could be secured to the belt of an individual, but would preferably be formed on a harness-like belt member 35 which would allow the blower fan assembly 12 to be secured about the waist of the individual, and the terminus 34 of the directional conduit 32 and nozzles 33 being secured to a position on the harness-like belt member 35 so as to position the nozzle member 33 in a desired direction at the small or mid portion of the individual's back or alternatively on the midpoint of the stomach of the individual. Nozzle 33 in the Figures are illustrated as being circular in cross section, however, they may also incorporate a fan shape to disburse the flow of air, or a T-shaped or Y-shaped fitting to simultaneously distribute air flow to a plurality of conduits extending about the torso or down the legs.

[0034] By securing the blower fan assembly 12 and directional conduits 32 and 32A and nozzle 33 to its own independent belt or harness 35, allows for the ease of and facility in securing the apparatus about the individual's waist before the individual is required to dress in the particular uniform, garment or clothing required for the particular task to be performed by the individual.

[0035] FIG. 2 is a front view of an individual illustrating the air distribution system positioned with nozzle 33 on the stomach of the individual, and FIG. 3 is a rear view of an individual illustrating the self-contained air distribution system positioned with a nozzle member 33 at the middle of the back of the individual. In both instances, when the blower fan 12 is energized, it moves air through directional conduits 32 and 32A, nozzles 33 and terminus 34 and 34A in a direction across the back and chest of an individual.

[0036] FIG. 4 is a side view of a second embodiment of the self-contained air distribution system of the present invention, and FIG. 5 is a front view of this embodiment. In the embodiment illustrated in FIG. 4, a suspender harness 39 is secured over the shoulders of the individual. In this embodiment, the directional conduits 32 and 32A do not terminate in the nozzle 33, but rather, has an upwardly extending conduit 40 secured to nozzle 33 and supported by suspender harness 39 preferably in alignment with the spine of the individual. This upwardly extending conduit 40 is capped 42 at its upper terminus 44, and the conduit 40 itself is formed with a helical open slot 46 extending from its lower terminus 41 to its upper terminus 44 and capped end 42. In operation, the air flow from the blower fan assembly 18 is directed upwardly through conduit 40, and outwardly from conduit 40 through the helical open slot 46, thus spreading the flow of air across the back, chest, and head of the individual, and thus providing the cooling and evaporative affect.

[0037] Upwardly extending conduit 40 is flexible so that it reacts to movement of the individual's body and selectively widens or narrows the helical slot 46 as the individual performs certain physical functions, thus improving the flow of air from the energized blower fan assembly 12 across the torso of the individual. FIG. 5 illustrates the upwardly extending conduit in the front of the individual extending upwardly from the stomach to the chest area.

[0038] The air distribution cooling system for an individual as described herein, has been illustrated with nozzle assemblies positioned on both the back of the individual's torso and on the front of the individual's torso. It will be recognized by one of ordinary skill in the art that a single conduit 32 or 32A in association with a nozzle 33 could be utilized to disburse a flow of air over the back of the torso or the front of the torso without having to disburse air simultaneously to both without departing from the spirit and scope of the invention. Still further, nozzle 33 could be oriented in a downward direction with appropriate attached conduits to distribute air flow down the legs of an individual without departing from the spirit and scope of the invention.

[0039] The self-contained distribution system being light weight does not present a significant load to the individual with respect to other equipment or garments which he may be carrying or wearing. The protective garments, equipment, or clothing required by the individual would be worn over the self-contained distributive evaporating system.

[0040] Therefore, while the present invention has been disclosed with respect to the preferred embodiments thereof, it will be recognized by those of ordinary skill in the art that various changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore manifestly intended that the invention be limited only by the claims and the equivalence thereof.

1. An air distribution system for the purpose of reducing a persons body's heat load by controlling directly or indirectly the flow of ambient air immediately adjacent an individual's torso, body, legs, neck, or head, independently worn with or without clothing, said system comprising:

a pressurized ambient air flow source having a power supply, in communication with an inlet, a plenum manifold having a plurality of one or more air passageway outlets for channeling exhausting air through a plurality of one or more waist mounted primary exhaust nozzles that disburses air directly or indirectly towards the lower or upper body or by attaching said plurality of one or more waist mounted primary exhaust nozzles to a plurality of one or more secondary flexible discharge open air passageways or channels facing the torso, body, legs, neck or head, said plurality of one or more flexible discharge open air passageways or channels, exhausting air directly or indirectly towards the torso, body, legs, neck, or head, thereby cooling a person by evaporating body moisture or drying the clothing of an individual.

2. The air distribution system for controlling the ambient air immediately adjacent an individual's torso in accordance with claim 1 wherein said system is a waist mounted assembly having an air transfer distributing system that disburses air directly or indirectly against said torso of said individual through a plurality of one or more exhaust nozzles that are waist mounted, or by connecting said plurality of one or more waist nozzles to a plurality of one or more secondary open air conduit passageways or channels placed about said torso, body, legs, neck, or head.

3. An air distribution system for controlling the ambient air immediately adjacent to an individual in accordance with claim 2 is a waist mounted assembly having the plurality of one or more plenum manifold outlets connected to a plurality of one or more secondary open air passageways or channels placed about said torso, body, legs, neck, or head.

4. An air distribution system for controlling the ambient air immediately adjacent to an individual's torso in accordance with claim 1 wherein the air distribution system comprises:

said ambient air flow source having said power supply is a battery operated blower fan having an inlet and outlet, said blower fan outlet in communication with said plenum manifold, said plenum manifold having a plurality of one or more directional conduits opposingly secured thereto and extending outwardly in a substantial horizontal orientation, each conduit having directional extended ends, directing air flow from said blower fan to the torso or legs of an individual.

5. The air distribution system for controlling the ambient air immediately adjacent an individual's torso in accordance with claim 1 wherein said open air passageways and channels are longitudinally flexible, and circumferentially semi-rigid responding to the movement and motion of said torso or legs of said individual, and allow expulsion of air over the skin or clothing of the user.

6. The air distribution system in accordance with claim 4 wherein said blower fan, said plenum chamber is secured to a waist belt member, said plurality of one or more directional conduits being flexible and secured to said waist belt delivering an air flow of at least 15 CFM.

7. The air distribution system in accordance with claim 4 wherein said air distribution system may be worn beneath or over the clothing of the individual promoting the evaporation of perspiration from said skin or clothing, and cooling of said individual.

8. (canceled)

9. (canceled)

10. (canceled)

11. An air distribution system having one or more open air passageways or conduits in accordance with claim 5 for controlling the ambient air immediately adjacent to an individual comprising:

a power supply for the operation of a blower fan, said blower fan in communication with a plenum chamber manifold, said blower fan, said plenum manifold secured to a belt member worn by an individual;

a plurality of one or more flexible directional conduits or plenum manifold outlets connected to a secondary flexible open air passageways or channels having a longitudinal opening along the length thereby distributing air towards the torso, body, legs, neck, or head through said flexible directional conduits longitudinally flexible and circumferentially semi-rigid;

a first and second harness member, said first harness member and said second harness member secured to said flexible secondary open air conduit proximate a capped end, said first harness member worn across the chest of said individual, said second harness member worn across the back of said individual, said first and second harness members secured by a flexible securing means, securing said second conduit in substantially vertical orientation.

12. The air distribution system in accordance with claim 11 wherein said system distributes air about the body of the

individual either directly to the skin or to clothing promoting evaporation of perspiration and the cooling of said individual.

13. (canceled)

14. The air distribution system in accordance with claim **11** wherein the open air passageways or channels extend downwardly along the legs of said individual.

15. The air distribution system in accordance with claim **11** wherein said power source is a rechargeable portable battery pack.

16. (canceled)

17. The air distribution system in accordance with claim **11** wherein the system is self-contained, and worn adjacent the body of the user or over the clothing of the user requiring no outside external connections.

* * * * *