APPARATUS AND METHODS FOR ADJUSTING TEMPERATURES WITHIN SHOES

Inventor: Samuel C. Vickroy, Madison, AL (US)

Correspondence Address:
LANIER FORD SHAVER & PAYNE P.C.
P O BOX 2087
HUNTSVILLE, AL 35804-2087

Appl. No.: 11/525,214
Filed: Sep. 21, 2006

Related U.S. Application Data
Provisional application No. 60/831,534, filed on Jul. 18, 2006.

Publication Classification
Int. Cl. A43B 7/02 (2006.01)
A43B 7/06 (2006.01)

U.S. Cl. 36/2.6, 36/3 B

ABSTRACT
The present disclosure generally pertains to apparatuses and methods for cooling and/or heating feet. In accordance with one exemplary embodiment of the present disclosure, a medium transfer apparatus is inserted into and/or coupled to a shoe. The apparatus has an inlet that can be detachably coupled to a medium injection apparatus, such as a conventional spray can, that injects compressed air or some other cooling medium through the medium transfer apparatus into an interior region of the shoe. Thus, by injecting the cooling medium into the shoe, a user is able to cool his foot without removing his foot from the shoe. In one embodiment, the cooling medium is directed to an insole of the shoe such that the insole is significantly cooled by the cooling medium being injected into the shoe. The cooled insole continues to draw heat from the user's foot and the user continues to feel a cooling sensation long after the cooling medium injection has ended.
START

INSERT MEDIUM TRANSFER APPARATUS INTO SHOE

INTERFACE INLET OF MEDIUM TRANSFER APPARATUS WITH MEDIUM INJECTION APPARATUS

INJECT MEDIUM THROUGH MEDIUM TRANSFER APPARATUS TO INTERIOR OF SHOE

DECOUPLE INLET FROM MEDIUM INJECTION APPARATUS

END

FIG. 13
START

PROVIDE TWO SHEETS OF MATERIAL

311

PUNCTURE ONE SHEET

314

OVERLAY ONE SHEET WITH THE OTHER

316

MELD SHEETS TO FORM BEAD

317

SEPARATE MEDIUM TRANSFER APPARATUS FROM REMAINDER OF SHEET MATERIAL

325

END

FIG. 14
APPARATUSES AND METHODS FOR ADJUSTING TEMPERATURES WITHIN SHOES

CROSS REFERENCE TO RELATED APPLICATION

[0001] This Application claims priority to U.S. Provisional Application No. 60/831,534, entitled “Apparatuses and Methods for Cooling Feet within a Shoe,” and filed on Jul. 18, 2006, which is incorporated herein by reference.

RELATED ART

[0002] A shoe typically provides a finite amount of insulation that traps at least some body heat within the shoe, and a foot placed within a shoe may become heated by trapped body heat or by heat emanating from other sources. Depending on various factors, such as atmospheric temperatures, such heating may cause some discomfort to a user. Moreover, at times, a user may desire to cool one or more of his feet by removing one or more shoes at least temporarily.

[0003] However, cooling one’s feet by temporarily removing a shoe can be burdensome or problematic. For example, an athlete competing in an athletic event, such as a football, basketball, or tennis event, may not have sufficient time during a break to remove and then re-don his shoe before play resumes. Indeed, an athlete’s shoe is sometimes taped to his foot making it particularly difficult and time consuming to remove a shoe. In addition, non-athletes may also find it burdensome or impractical in at least some circumstances to cool one’s feet by temporarily removing shoes for a brief time period.

[0004] Some shoes provide for ventilation to allow air within the shoe to be replaced by air external to the shoe. Although ventilation can assist in reducing temperatures within the shoe under certain circumstances, such temperatures may nevertheless remain at undesirably high levels. Further, in some instances, ventilation can actually exacerbate the aforesaid heating problems. In this regard, temperatures close to some floor or ground surfaces, such as tennis courts or other athletic playing surfaces, can reach extremely high levels, such as 120 degrees Fahrenheit (F) or more. In such an environment, the temperature of the air entering the shoe can be greater than that of the air exiting the shoe such that ventilation actually results in warming rather than cooling.

[0005] Better techniques for enabling users to cool their bodies and, in particular, their feet are generally desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The disclosure can be better understood with reference to the following drawings. The elements of the drawings are not necessarily to scale relative to each other, emphasis instead being placed upon clearly illustrating the principles of the disclosure. Furthermore, like reference numerals designate corresponding parts throughout the several views.

[0007] FIG. 1 is diagram illustrating a top view of a medium transfer apparatus in accordance with an exemplary embodiment of the present invention.

[0008] FIG. 2 is a diagram illustrating a cross-sectional view of the medium transfer apparatus depicted in FIG. 1.

[0009] FIG. 3 is diagram illustrating an exploded view of an exemplary shoe of the prior art.

[0010] FIG. 4 is diagram illustrating an exploded view of the shoe of FIG. 3 with the medium transfer apparatus of FIG. 1 inserted between an insole and an outsole of the shoe.

[0011] FIG. 5 is a diagram illustrating a cross-sectional view of the shoe depicted in FIG. 4.

[0012] FIG. 6 is a diagram illustrating a side view of the shoe depicted in FIG. 5 when a medium injection apparatus is being used to inject a medium through the medium transfer apparatus into the shoe.

[0013] FIG. 7 is a diagram illustrating the medium injection apparatus and a portion of the medium transfer apparatus depicted in FIG. 6.

[0014] FIG. 8 is a diagram illustrating a cross-sectional view of a shoe in accordance with an exemplary embodiment of the present disclosure.

[0015] FIG. 9 is a diagram illustrating a side view of a shoe having a built-in medium transfer apparatus in accordance with an exemplary embodiment of the present disclosure.

[0016] FIG. 10 is a diagram illustrating a front view of the shoe depicted in FIG. 9.

[0017] FIG. 11 is a diagram illustrating a top view of a shoe in accordance with an exemplary embodiment of the present disclosure.

[0018] FIG. 12 is a cross-sectional view of the shoe depicted in FIG. 11.

[0019] FIG. 13 is a flow chart illustrating a method for altering temperatures within a shoe in accordance with an exemplary embodiment of the present disclosure.

[0020] FIG. 14 is a flow chart illustrating a method for making a medium transfer apparatus in accordance with an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

[0021] The present disclosure generally pertains to apparatuses and methods for cooling and/or heating feet. In accordance with one exemplary embodiment of the present disclosure, a medium transfer apparatus is inserted into and/or coupled to a shoe. The apparatus has an inlet that can be detachably coupled to a medium injection apparatus, such as a conventional spray can, that injects compressed air or some other cooling medium through the medium transfer apparatus into an interior region of the shoe. Thus, by injecting the cooling medium into the shoe, a user is able to cool his foot without removing his foot from the shoe.

[0022] In one embodiment, the cooling medium is directed to an insole of the shoe such that the insole is significantly cooled by the cooling medium being injected into the shoe. The cooled insole continues to draw heat from the user’s foot and the user continues to feel a cooling sensation long after the cooling medium injection has ended.

[0023] FIGS. 1 and 2 depict a medium transfer apparatus 50 in accordance with an exemplary embodiment of the present disclosure. The medium transfer apparatus 50 comprises an upper layer 52 that has been melded with a lower layer 53 to form a bead 55 joining the upper and lower layers 52 and 53, which form a foot-shaped base 68 and an inlet 69. The upper and lower layers 52 and 53, as well as the bead 55, form a cavity 63 that is airtight except for a plurality of apertures 66 in the upper layer 52 and except for the inlet 69. As will be described in more detail hereafter, the inlet 69 allows a medium, such as cooled or heated air, to enter the cavity 63, and the apertures 66 allow the medium to exit the cavity 63.
In the embodiment depicted by FIG. 1, the inlet 69 is hollow and open at both ends 72 and 73 such that a medium may be injected into the end 72 and pass into the cavity 63 through end 73. The end 72 of the inlet 69 forms a tab 76 that is wider than a throat 77 of the inlet 69, as shown by FIG. 1. In one embodiment, the width \( w_1 \) of the tab 76 is about 1/4 inches, and the width \( w_2 \) of the throat 77 is about one-quarter of an inch, although \( w_2 \) increases slightly at end 73 making this end 73 tapered. By being wider than the throat 77, the tab 76 is easier to locate and grasp by a user. In addition, a length \( l_1 \) of the inlet 69 is about 5/16 inches, and a length \( l_2 \) of the tab 76 is about 1/2 inches. In other embodiments, other shapes and dimensions of the inlet 69 are possible.

As shown by FIG. 1, the tab 76 has a slit 79 in its upper layer 52. The slit 79 provides an opening through which a medium can be injected, as will be described hereafter in more detail.

A width \( w_1 \) of the base 68 is about 10 inches, and a length \( l_1 \) of the base 68 is about 2 1/2 inches. In FIG. 1, the perimeter of the base 68 is generally shaped like a foot in two dimensions (2D). However, other shapes and dimensions of the base 68 are possible in other embodiments.

The bead 55 forms the outer perimeter of both the base 68 and inlet 69. Further, each layer 52 and 53 is composed of polyvinyl chloride (PVC) and is about 0.006 inches thick. In addition, the material of the apparatus 50 is flexible. However, in other embodiments, other types of material, including flexible and/or inelastic material, as well as porous and/or non-porous, may be used, and other dimensions are possible.

In one embodiment, the apparatus 50 is inserted into a shoe, and the inlet 69 is positioned such that end 72 is exposed and conveniently accessible to a user. FIG. 3 depicts an exemplary shoe 81 of the prior art. The shoe 81 comprises an outsole 84, an insole 85, and a vamp 86. The outsole 84 is attached to the vamp 86, and the insole 85 resides between the vamp 86 and the outsole 84. When a user is wearing the shoe 81, the bottom of the user’s foot is pressed against the upper surface 88 of the insole 85 such that the user’s weight is supported by the outsole 84 and insole 85 with the vamp 86 covering the top of the user’s foot. Although the insole 85 is inserted between the vamp 86 and the outsole 84, the insole 85 is often not fixedly attached to either the vamp 86 or the outsole 84 so that the insole 85 can be removed through an opening 89 in the vamp 86.

In one exemplary embodiment, the base 68 of the medium transfer apparatus 50 is positioned between the outsole 84 and the insole 85, as depicted by FIG. 4. For example, the insole 85 may be removed from the shoe 81 through the opening 89, and the medium transfer apparatus 50 may be inserted into the shoe 81 through this same opening 89. In particular, the apparatus 50 may be positioned on the upper surface of the outsole 84, and the insole 85 may then be re-inserted into the shoe 81 through the opening 89 such that a bottom surface of the insole 85 contacts the upper layer 52 of the apparatus 50. Thus, a medium passing through the apertures 66 in the layer 52 strikes the bottom surface of the insole 85, as will be described in more detail hereafter.

FIG. 5 depicts a cross-sectional view of the shoe 81 after the apparatus 50 has been inserted as described above. In the embodiment depicted by FIG. 5, the insole 85 has been positioned such that it passes through opening 89, and the end 72 of the inlet 69 is exposed. In other embodiments, the inlet 69 may be positioned differently. When a person’s foot is inserted into the shoe 81, as shown by FIG. 6, the person’s foot, ankle, and/or leg presses the inlet 69 against an inner surface of the vamp 86 thereby keeping the inlet 69 in the same approximate position such that the end 72 remains exposed and accessible.

When desired, a user may cool his foot by interfacing a medium injection apparatus 110 with the exposed end 72 of the inlet 69 and then using the apparatus 110 to inject a cooling medium, such as compressed air or oxygen, into the cavity 63 of the medium transfer apparatus 50. The cooling medium is forced through the apertures 66 in the upper layer 52 of the apparatus 50 and strikes the insole 85 lowering the temperature of the insole 85. Lowering the temperature of the insole 85 helps to draw heat from the user’s foot thereby cooling the user’s foot. Further, some of the cooling medium may be forced around the edges of the insole 85 into the region between the vamp 86 and the insole 85. Such medium may strike the user’s foot further cooling the user’s foot. Moreover, injecting the cooling medium into the shoe 81 may provide the user with an immediate cooling sensation as well as significantly lower the temperature of the insole 85 for a relatively long period of time (e.g., several minutes) so that the user continues to feel a cooling sensation long after the injection.

The material of the apparatus 50 is flexible in at least one embodiment. In such an embodiment, there may be no space between the upper and lower layers 52 and 53 when medium is not being injected into the apparatus 50. When medium is injected into the apparatus 50, the medium will slightly separate portions of the upper layer 52 from the lower layer 53 as the medium travels through the apparatus 50.

In one exemplary embodiment, as shown by FIG. 6, the medium injection apparatus 110 comprises a spray can 121 having a nozzle 125. The cooling medium is contained within the spray can 121 and is under a pressure that is greater than atmospheric pressure. For example, in one embodiment, the cooling medium is under a pressure of about 150-180 pounds per square inch (psi) when measured at an ambient temperature of 130 degrees F. Many conventional spray cans of compressed air or other media are manufactured with contents at about 100 to 200 psi when measured at an ambient temperature of 130 degrees F, and any known or future-developed spray can be used to implement the medium injection apparatus 110. Such spray cans often include a refrigerant. In one embodiment, the cooling medium contained within the apparatus 110 is composed, at least partially, of difluorothane. For example, the medium in the apparatus 110 may be a compressed mixture of air and difluorothane. Further, other types of devices and other pressures are also possible.

In the embodiment depicted by FIG. 6, the apparatus 110 comprises a removable hollow straw 131 that detachably couples the nozzle 125 to the end 72 of the inlet 69. The tip of the straw 131 and the inlet 69 are dimensioned such that the inlet 69 fits around an outer periphery of the straw tip, as shown by FIGS. 6 and 7. Various other techniques for interfacing the apparatus 110 and the inlet 69 are possible in other embodiments. Indeed, the use of a straw 131 is unnecessary, and the inlet 69 may be detachably
coupled to the nozzle 125 in some other manner. For example, the nozzle 125 may be interfaced directly with the inlet 69.

In the instant embodiment, the cooling medium exiting the can 121 passes through a hollow tip 126 of the nozzle 125. The inner wall of the tip 126 fits snugly around the straw 131 such that frictional forces help to keep the straw 131 coupled to the tip 126 and such that medium exiting through the nozzle 125 preferably does not escape between the straw 131 and tip 126. In another example, the inner wall of the straw 131 may be dimensioned to snugly fit around the tip 126.

In addition, the width of the throat 77 is slightly larger than that of the straw 131 such that the straw 131 can be inserted into the inlet 69 through the slit 79 and pass into the throat 77, as shown by FIGS. 6 and 7. When a medium is being injected by the apparatus 110, a significant portion of the medium is forced through the throat 77 into the cavity 63 and then through the apertures 66, as will be described in more detail hereafter. In general, the closer that the straw 131 is inserted to the tapered end 73, the less likely it is that portions of the injected medium will escape through the slit 79.

The nozzle 125 comprises a trigger 138 that, when actuated by a user, releases the cooling medium within the can 121 through the nozzle 125. In this regard, actuation of the trigger 138 transitions the nozzle 125 to a state in which a path is provided from the interior of the can 121 through the nozzle 125 to the atmosphere or, in the case when the nozzle 125 is interfaced with the inlet 69, to the cavity 63 of the apparatus 50. Since the contents of the can 121 are under pressure greater than the external pressure, the cooling medium of the can 121 is expelled through such a path when the trigger 138 is actuated. When the trigger 138 is released or otherwise no longer actuated, the path is closed such that the contents of the can 121 are not allowed to escape. The operation of the spray can 121 described herein may be similar or identical to that of other conventional spray cans and other types of medium injection apparatuses.

In one exemplary embodiment, the cooling medium that is within the apparatus 110 and injected into the shoe 81 by the apparatus 110 is compressed air. The temperature of the cooling medium compressed at about 100-180 psi can be very low, such as close to or below freezing (i.e., 32 degrees F.) upon exiting the spray can 121. Thus, the cooling medium being injected into the shoe 81 in the instant example is likely significantly colder than the interior region of the shoe 81 prior to the injection. Accordingly, injection of the cooling medium within the shoe 81, as described herein, has a significant effect to the temperatures within the shoe 81 and provides the user with a significant cooling sensation.

In fact, injecting the cooling medium into the shoe 81, as described above, for only a short time, such as a few seconds, can have a significant and prolonged impact to the temperatures within the shoe 81. In particular, the insole 85, which is struck directly by the cooling medium in the instant example, can be significantly cooled such that its temperature remains significantly below its original temperature (i.e., its temperate prior to the cooling medium injection) for a prolonged period (e.g., about ten minutes or more) without another injection. Accordingly, an athlete, such as a tennis or football player, may make an injection during a short break in play, yet the effects of the injection may linger well after play has resumed.

FIG. 8 depicts another embodiment in which the medium transfer apparatus 50 is positioned on the upper surface 88 of the insole 85 rather than between the insole 85 and the outsole 84. In this regard, the upper layer 52 faces the insole surface 88 such that the cooling medium passing through the apertures 66 strikes and cools the insole surface 88. However, the presence of the apparatus 50 between the user’s foot and the insole 85 may somewhat shield the insole 85 from the foot. Depending on the heat transfer characteristics of the insole 85 and the apparatus 50, the insole 85 may be better cooled and/or cooled for a longer time period relative to the apparatus 50 such that it would be more preferable for the user’s foot to abut the insole 85, as described above for the embodiment depicted in FIG. 5. However, the injected cooling medium cools the apparatus 50 as well as the insole 85, and if desired, the apparatus 50 may abut the user’s foot so that heat is drawn from the user’s foot by the apparatus 50.

In another exemplary embodiment, the medium transfer apparatus 50 is positioned on the upper surface 88 of the insole 85, similar to the embodiment depicted by FIG. 8. However, the lower layer 53 faces the insole 85 such that the upper layer 52 faces the user’s foot. Thus, the cooling medium passing through the apertures 66 directly strikes the user’s foot. In such an embodiment, it is not likely that the insole 85 is as affected by the injection as in the embodiments described above, possibly limiting the duration of the injection’s effect to the insole 85. In addition, as described above, the temperature of the cooling medium can be very cold, such as close to or below freezing. In such an example, longer bursts of the cooling medium may not be possible without harming the user’s foot. Thus, shorter bursts may be desired in order to prevent injury. Such shorter bursts, although giving the user an immediate cooling sensation, may have shorter lasting effects.

As described above, the medium transfer apparatus 50 may be inserted into the shoe 81 after the shoe 81 has been manufactured, such as by removing the insole 85, inserting the apparatus 50, and inserting the insole 85 back into the shoe 81. In other embodiments, the apparatus 50 may be built-in such that it is inserted into the shoe 81 during manufacturing. For example, FIGS. 9 and 10 depict an embodiment in which the apparatus 50 is positioned in the shoe 81 during manufacturing, and the insole 69 passes through the outsole 84. In this regard, as best illustrated in FIG. 10, an end 72 of the inlet 69 protrudes from the outsole 84. In the depicted embodiment, the end 72 is not wider than the throat 77. An inner periphery of the end 72 can, however, be about the same as the outer periphery of the straw 131 such that the end 72 snugly fits around the straw 131 when the straw 131 is interfaced with the end 72. In another example, the end 72 may form a tab 72 that is wider than the throat 77, as described above. Except for the positioning of the inlet 69, the configuration of the shoe 81 and the apparatus 50 may be identical to any of the embodiments previously described above. In the embodiment depicted by FIGS. 9 and 10, the outsole 84 may be manufactured with a groove (not shown) through which the inlet 69 may be inserted when the apparatus 50 is positioned during manufacturing. In other embodiments, the inlet 69 may pass
through other components of a shoe. For example, the inlet 69 may pass through a hole in the vamp 86.

[0043] In addition, in several of the embodiments described above, the width of the straw 131 has been described as being smaller than the width of the inlet 69 and, in particular, the throat 77 of the inlet 69. However, it is possible for the width of the straw 131 to be greater than the width of the inlet 69. As an example, the end 72 of the inlet 69 could be composed of a rigid material having an outer periphery slightly smaller than the inner periphery of the straw 131. In such an embodiment, the medium injection apparatus 110 could be interfaced with the medium transfer apparatus 50 by inserting the end 72 into the straw 131 such that the straw 131 fits snugly around the end 72. Various other techniques for interfacing the medium transfer apparatus 50 with the medium injection apparatus 50 would be apparent to one of ordinary skill in the art upon reading this disclosure.

[0044] In some embodiments described above, the medium transfer apparatus 50 is composed of flexible material. However, the apparatus 50 may be composed of inflexible material or a combination of flexible and inflexible material. For example, the inlet 69 may be composed of a rigid material, such as a rigid plastic material, and the base 68 may be composed of a flexible material. In another example, the end 72 may be covered by a hollow and rigid tip (not shown). Such a rigid tip may facilitate interfacing of the apparatuses 50 and 110.

[0045] FIGS. 11 and 12 depict a shoe 81 in accordance with an exemplary embodiment of the present disclosure. The embodiment shown by FIGS. 11 and 12 is identical to that shown by FIG. 5 except that the inlet 69 is embedded in the vamp 86 and has a rigid tip 99 at end 72. The straw 131 may be interfaced with the tip 99 so that the cooling medium can be injected via inlet 69 into the cavity 63 of the apparatus 50 similar to the embodiments previously described above. The tip 99 is hollow and dimensioned such that the straw 131 snugly fits around the tip 99 or vice versa. For example, the outer periphery of the tip 99 may be about the same as the inner periphery of the straw 131 so that the straw 131 fits snugly around the tip 99, or the outer periphery of the straw 131 may be about the same as the inner periphery of the tip 99 so that the tip 99 fits snugly around the straw 131.

[0046] Note that the apparatus 50 may be positioned differently in other yet embodiments. For example, the base 68 of the apparatus 50 may be embedded within the insole 85. In such an embodiment, the insole 85 may have a hole (not shown) for allowing the inlet 69 to pass out of the insole 85, or the inlet 69 may be an integral component of the insole 85. If the inlet 69 passes through a hole in the insole 85, such a hole may be large enough to allow the injected medium to exit the insole 85, or the insole 85 may have additional holes for allowing the injected medium to exit. In addition, the layers 52 and 53 may be composed of a material similar to that of the insole 85 so that the apparatus 50 can replace the conventional insole 85 or be used in lieu of the conventional insole 85.

[0047] It should be emphasized that in any of the embodiments described above, the nozzle 125 may be interfaced directly with the medium transfer apparatus 50 without the use of a straw 131. For example, in the embodiment depicted by FIGS. 11 and 12, the shoe tip 99 may fit snugly into nozzle tip 126 or vice versa. As an example, the outer periphery of the shoe tip 99 may be about the same as the inner periphery of the nozzle tip 126 so that the nozzle tip 126 fits snugly around the shoe tip 99, or the outer periphery of nozzle the tip 126 may be about the same as the inner periphery of the shoe tip 99 so that the shoe tip 99 fits snugly around the nozzle tip 126.

[0048] An exemplary use and operation of a medium transfer apparatus 50 will be described in detail hereinafter with particular reference to FIG. 13.

[0049] Assume that a user of the shoe 81 shown by FIG. 3 desires to use the medium transfer apparatus 50 to cool his feet when wearing the shoe 81. Before donning the shoe 81, the user removes the insole 85 and inserts the medium transfer apparatus 50 into the shoe 81, as shown by block 211 of FIG. 13. The user then inserts the insole 85 back into the shoe 81 on top of the apparatus 50, as shown by FIGS. 4 and 5. In other examples, the apparatus 50 may be inserted and/or attached to the shoe 81 by the shoe manufacturer such that it is unnecessary for the user to insert the apparatus 50 into the shoe 81.

[0050] At some point, the user may desire to use the apparatus 50 for cooling his foot. For example, the user may be an athlete, such as a football player, and desire to use the apparatus 50 for cooling his foot after coming to the sideline during a football game. In another example, the user may be a tennis player and desire to use the apparatus 50 to cool his foot during a break between sets.

[0051] To cool his foot, the user interfaces the medium injection apparatus 110 with the inlet 69 so that the cooling medium in the apparatus 110 can be injected into the medium transfer apparatus 50 through the inlet 69, as shown by block 215 of FIG. 13. For illustrative purposes, assume that the apparatus 110 comprises a spray can 121, as described above with reference to FIG. 6, and that the cooling medium is composed of compressed air and a refrigerant, although other types of medium injection apparatuses 110 and cooling media may be used in other examples. In the instant example, the user couples one end of the hollow straw 131 to the nozzle 125 such that any of the cooling medium exiting the apparatus 110 passes through the straw 131. The user also inserts the opposite end of the straw 131 into the inlet 69 through the slit 79 such that the cooling medium passing through the straw 131 enters the inlet 69 and passes into the cavity 63 of the apparatus 50.

[0052] The user then operates the medium injection apparatus 110 such that cooling medium within the apparatus 110 is injected into the medium transfer apparatus 50, as shown by block 221 of FIG. 13. In the instant example, the user actuates the trigger 138 such that the cooling medium, which is under pressure, is forced out of the apparatus 110 through the nozzle 125. During injection, the relatively high pressure within the apparatus 110 forces the cooling medium through the straw 131 and inlet 69 into the cavity 63. In addition, such pressure also forces the cooling medium out of the cavity 63 through the apertures 66 such that the cooling medium strikes the insole 85 thereby cooling the insole 85. In the instant example, the cooling medium is pressurized to about 160-180 psi when measured at an ambient temperature of 130 degrees F, although other pressures are possible in other examples.

[0053] The duration of the injection may be for any time period, and the user may make more than one injection, if desired. Generally, the longer that cooling medium is injected into the shoe 81 via apparatus 50, the greater is the
cooling effect to the user’s foot and to the insole 85. In one example, the user maintains an injection for about 5 to 10 seconds. Such a duration, at the exemplary pressures described above for the instant example, can provide a significant cooling effect. Indeed, the insole 85 may remain below its original temperature (i.e., its temperature prior to the injection) for several minutes after the injection has ended. Moreover, the insole 85 may continue cooling the user’s foot long after the injection has ended. Eventually, heat from the user’s foot and/or other sources may raise the temperature of the insole 85 back to its original temperature, but at any time, the user may perform another injection to again cool his foot and the insole 85, as described above.

Additionally, it should be emphasized that the aforedescribed embodiments of the medium transfer apparatus 50 and the medium injection apparatus 110 are exemplary, and other configurations of the apparatuses 50 and 110 are possible without departing from the principles of the present disclosure. In addition, the shoe 81 depicted above is also exemplary, and apparatuses 50 and 110 may be used with other types of known or future-developed shoes in other embodiments. Further, the method of manufacturing an exemplary medium transfer apparatus 50 is described above for illustrative purposes, and other methods of manufacturing a medium transfer apparatus 50 are possible.

Now, therefore, the following is claimed:

1. A shoe, comprising:
   a. a vamp;
   b. an outsole;
   c. an insole positioned between the outsole and the vamp; and
   a medium transfer apparatus positioned between the insole and the outsole, wherein the medium transfer apparatus is detachably coupled to a medium injection apparatus containing a medium such that the medium is forced by the medium injection apparatus through the medium transfer apparatus thereby altering a temperature of the insole.

2. The shoe of claim 1, wherein the medium is composed of a refrigerant.

3. The shoe of claim 1, wherein the medium injection apparatus is external to the shoe.

4. The shoe of claim 1, wherein the medium transfer apparatus is composed of polyvinyl chloride.

5. The shoe of claim 1, wherein the medium is stored in the medium transfer apparatus at a pressure greater than 100 pounds per square inch.

6. The shoe of claim 1, wherein a portion of the medium injection apparatus is inserted into the medium transfer apparatus.

7. The shoe of claim 1, wherein the medium transfer apparatus has a first layer and a second layer, the first layer having at least one aperture, the first and second layers being molded together along a bead defining a cavity between the first and second layers, the bead defining an inlet, wherein the medium is forced by the medium injection apparatus into the cavity via the inlet and passes through the at least one aperture.

8. The shoe of claim 1, wherein the medium transfer apparatus has an inlet for receiving a portion of the medium injection apparatus, the inlet having a tab and a throat, the tab having a width greater than a width of the throat.

9. The shoe of claim 1, wherein the medium transfer apparatus has a surface having at least one aperture, the surface contacting the insole such that the medium passes through the at least one aperture and strikes the insole.

10. The shoe of claim 1, wherein the medium injection apparatus comprises a spray can.

11. The shoe of claim 10, wherein the medium injection apparatus comprises a straw coupled to the spray can.

12. A medium transfer apparatus for insertion into a shoe, comprising:
   a. a first layer having at least one aperture; and
   a second layer, the first and second layers being molded together along a bead defining a cavity between the first and second layers, the bead defining an inlet, wherein
a medium injected into the cavity via the inlet passes through the at least one aperture.

13. A shoe, comprising:
   a vamp;
   an outsole; and
   a medium transfer apparatus positioned between the outsole and the vamp, the medium transfer apparatus having an exposed inlet for interfacing with a medium injection apparatus such that a medium from the medium injection apparatus can be injected through the medium transfer apparatus thereby altering a temperature within the shoe.

14. The shoe of claim 13, wherein the medium transfer apparatus is detachably coupled to the medium injection apparatus, the medium injection apparatus containing the medium at a pressure greater than atmospheric pressure.

15. The shoe of claim 14, wherein the medium is composed of a refrigerant.

16. A method, comprising the steps of:
   detachably coupling a medium injection apparatus to a medium transfer apparatus that is positioned within a shoe, the medium injection apparatus having a medium that is compressed at a pressure greater than atmospheric pressure; and
   injecting the medium from the medium injection apparatus through the medium transfer apparatus.

17. The method of claim 16, wherein the medium is composed of a refrigerant.

18. The method of claim 16, wherein the medium transfer apparatus has a first layer and a second layer, the first layer having at least one aperture, the first and second layers being molded together along a bead defining a cavity between the first and second layers, the bead defining an inlet, wherein the injecting step causes the medium to pass into the cavity via the inlet and to pass through the at least one aperture.

19. The method of claim 16, wherein the medium transfer apparatus has an inlet, and wherein the detachably coupling step comprises the step of inserting a portion of the medium transfer apparatus into the medium injection apparatus.

20. The method of claim 16, wherein the detachably coupling step comprises the step of interfacing a portion of the medium injection apparatus with an exposed inlet of the medium transfer apparatus.

21. The method of claim 16, wherein the medium injection apparatus comprises a straw and a spray can having a nozzle connected to the straw, and wherein the detachably coupling step comprises the step of inserting the straw through an inlet of the medium transfer apparatus.

22. The method of claim 16, wherein the medium is compressed within the medium injection apparatus at a pressure greater than 100 pounds per square inch.

23. The method of claim 16, wherein the injecting step causes the medium to strike an insole within the shoe.

24. The method of claim 16, wherein the medium injection apparatus comprises a spray can.

25. The method of claim 16, wherein the detachably coupling step comprises the step of inserting a portion of the medium injection apparatus through an inlet of the medium transfer apparatus.

26. The method of claim 25, wherein the inlet has a tab and throat, the tab having a width greater than a width of the throat, wherein the inserting step is performed such that the portion of the medium injection apparatus passes through an opening in the inlet and into the throat.

27. The method of claim 16, further comprising the step of positioning the medium transfer apparatus between an insole and an outsole of the shoe.

28. The method of claim 27, wherein the medium transfer apparatus has a surface, the surface having at least one aperture, wherein the positioning step is performed such that the surface contacts the insole.

29. A method, comprising the steps of:
   interfacing a spray can with a medium transfer apparatus contacting a shoe, the spray can containing a medium compressed at a pressure greater than atmospheric pressure; and
   injecting the medium from the spray can through the medium transfer apparatus and into the shoe.

30. The method of claim 29, wherein the medium is composed of a refrigerant.

31. The method of claim 29, wherein the medium transfer apparatus is positioned between an insole and an outsole of the shoe during the injecting step.

32. The method of claim 31, wherein the injected medium strikes the insole.

33. The method of claim 32, wherein the medium transfer apparatus has a surface, the surface having at least one aperture and contacting the insole.

34. The method of claim 32, wherein the medium is compressed at a pressure greater than 100 pounds per square inch.

* * * * *