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THERMO-ELECTRIC COOLED MOTORCYCLE HELMET
BACKGROUND OF THE INVENTION

The invention generally comprises temperature or air conditioned safety helmets and more particularly thermo-electric cooled motorcycle helmets.

The prior art discloses air conditioning a safety helmet by evaporation of liquid, such as in Waters US patent 3,548,415 and the use of a small electrically energized fan. Thermo-electric cooling is taught by Lefferts, US patent 3,314,242 for use in scientific laboratories and in exothermic reactions.

The present invention teaches cooling a safety helmet with a thermo-electric heat pump adapted to and installed in said safety helmet in accordance with Federal Motor Vehicle Standards.

SUMMARY OF THE INVENTION

It is an object of the invention to adapt the teaching of a natural law, as disclosed by the Seebeck, Peltier, and Thomson effects, to the cooling of a motorcycle helmet as Lefferts did to the heating and cooling of portable heating and cooling devices for laboratory use.

Another object of the invention is to cool a motor cycle safety helmet with electrical means and without moving parts.

The foregoing and other objects of the invention will be apparent from the following disclosure, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view of a motorcycle safety helmet with thermo-electric heat pump and connecting wires in dashed lines indicating interior mounting;

Figure 2 is a three dimensional drawing of a thermo-electric heat pump;

Figure 3 is a longitudinal cross-sectional view of the helmet of Figure 1;

5 Figure 4 is a three dimensional view of a bladder top.

Referring to Figures 1-4, a safety motorcycle helmet 10 completely encloses the head of a wearer and is very hot to wear. A heat pump 12, having upper hot and lower cold plates, is mounted in a cavity 13 defined in the top of helmet 10. 10 Insulated electrical conductors 14 connect heat pump 12 to a motorcycle battery (not shown). A hardened, light-metal radiation member 15 is fixed by press-engaging anchor pins 16 and bonding to a hard fibre helmet shell 17 for the double purpose of closing said cavity 13 and for radiating heat from heat 15 pump 12 upper hot plate.

A hard foam helmet liner 18, defining a continuation of cavity 13, is bonded to the inner surface of hard fibre shell 17. An elastic bladder 20 is bonded to foam liner 18 and extends upwardly into the cavity 13. The bladder 20 has a 20 filler tube 22 extending downwardly in helmet 10 for filling said bladder 20 with a heat transfer liquid, preferably water in temperate climes. Bladder 20 is also attached to foam liner 18 to form dimples 24 along bladder centerline without blocking passage on either side of the dimples of heat transfer 25 liquid convection currents. Sponges 26 are pressed into dimples 24 and into cavity 13 below bladder 20 to respectively maintain said dimples' shapes, and to support bladder 20 in the cavity. A square metal top or cover 28, having depending fins 30, closes the upwardly extending opening of the bladder 20. 30 Cover 28 is dimensioned to conform with the bottom of heat pump 12 to which it is bonded making heat transfer liquid-to-metal and metal-to-metal contacts for the more efficient transfer of heat thereby.

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In operation, electrical conductors 14, one of which includes a diode for restricting a flow of current to one direction only, are engaged through a connector (not shown) to said motorcycle battery for the one way current to flow to
5 cool the lower plate side of heat pump 12 that is bonded to bladder square top 28. Helmet wearer's head heat is transferred by direct contact to the bladder 20 and thence to the heat transfer liquid contained therein, to the bladder top cover 28 and to said cooled lower plate and is electrically
10 pumped to said upper hot plate and transferred by contact with radiation member 15 to ambient atmosphere, and dispersed therefrom by airflow around helmet 10.

The helmet of the invention conforms to all Federal Motor Vehicle Safety Standards and Regulations FMVSS No.218
15 Motorcycle Helmets, and particularly with restrictions of projections above and below said hard fibre shell 17.

Electro-thermal pumps are obtained from Marlow Industries Inc., 1021 S. Jupiter Road, Garland, Texas 75042.



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CLAIMS .

1. Thermo-electric cooled headgear comprising:
 - a) a hard shell having a cavity defined in and through said hard shell;
 - b) thermo-electric heat pump means mounted in said
5 cavity;
 - c) thermal radiation means closing said cavity and extending along a portion of the exterior of said shell, said thermal radiation means being connected to said heat pump means whereby heat is transferred by said heat pump means
10 through said cavity for heat radiation from said radiation means;
 - d) insulated electrical conduction means operationally connected to said heat pump means and connectable to an electrical power source for energizing said heat pump to
15 electrically pump heat to said radiation means; and
 - e) liquid heat transfer means mounted in said headgear for transferring heat between a wearer's head and said heat pump, said liquid heat transfer means comprising bladder means conformable in shape to the contour of a
20 wearer's head, said bladder means being fillable with a heat transfer liquid whereby heat transfer liquid convection currents transfer heat from the wearer's head to said heat pump means.
2. The headgear of claim 1 wherein said thermal radiation means comprises a hardened, light-metal radiation member
25 secured to said shell by bonding and press-engaging pins into said hard shell.
3. The headgear of claim 1 or 2 wherein said electrical conduction means comprises a one-way flow diode connected therein.

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4. The headgear of any of claims 1 to 3 wherein said
cavity is through the top of said shell, wherein said
thermo-electric heat pump means is mounted in said cavity
flush with the top of said shell, and wherein said thermal
5 radiation means closes said cavity at the top of said shell.

5. The headgear of any of the preceding claims wherein
said headgear is for wear when riding a motorcycle, and
wherein said insulated electrical conduction means is
connectable to a motorcycle direct current electrical power
10 source.
