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(54) Protective headgear

(57) Protective headgear comprises a protective layer (1) and a cooling layer (3) which serves as a head harness. The cooling layer (3) is attached inside the protective layer (1) and consists of two flexible sheets which are joined at the seams. The sheets are cut as double segments which are joined together at the top by an annular channel. The double segments are divided by

longitudinal strips and cross-pieces, to form interconnected part chambers which are filled with a coolant which is added in liquid form via the annular channel. The double segments are connected together via a cross band (14) by means of which the cooling layer (3) is buttoned to the inside of the protective layer (1) via securing buttons (2). The cooling layer (1) may be easily unbuttoned from the securing buttons (2) for refrigeration of the coolant and be rebuttoned just as easily.

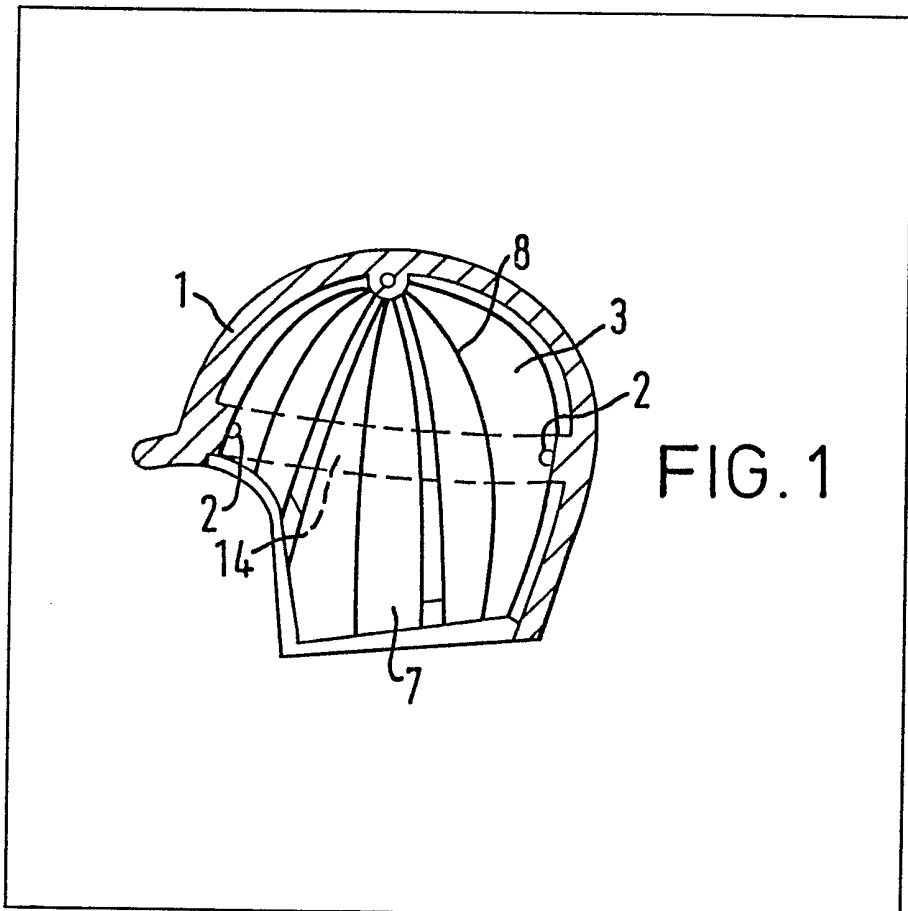


FIG. 1

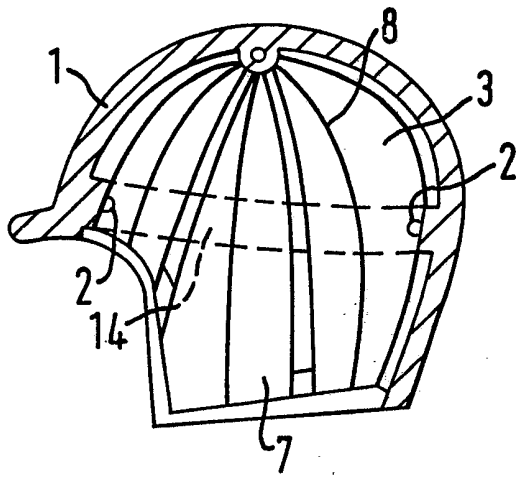


FIG. 1

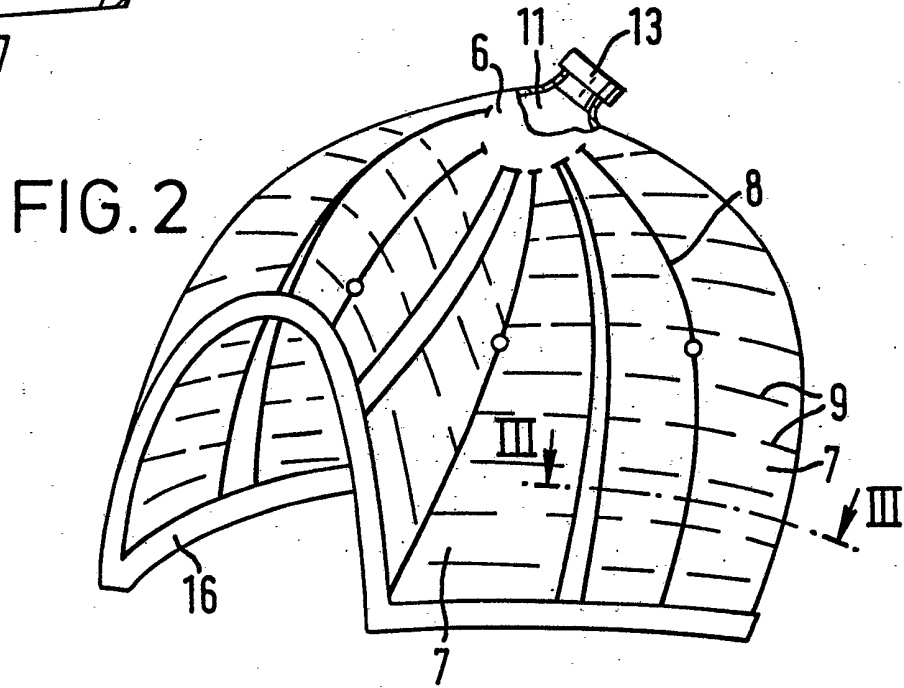


FIG. 2

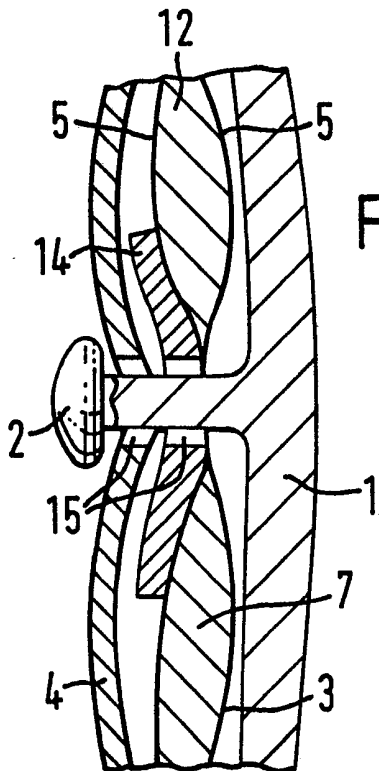


FIG. 4

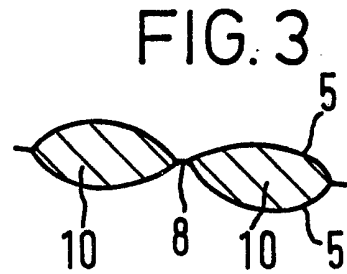


FIG. 3

SPECIFICATION
Protective headgear

This invention relates to protective headgear.

Provisions for creating safe working conditions
5 for workers under various climatic conditions must
take the health of the workers into account, and in
particular must concern protection of the head.
Known mechanical protection by means of
protective helmets is generally good. However,
10 known equipment for protection against climatic
conditions is far from adequate.

The known protective helmets generally have a
banded structure for the head which ensures that
the helmet shell fits well. Between the helmet
15 shell and the banded structure there is a space
which allows air to circulate thus producing a
certain degree of cooling. However, in hot work
places, for example in foundries or coking plants
and also in the case of racing car drivers, this
20 cooling is not adequate.

A special temperature-maintaining
arrangement for use, *inter alia* on the head, is
disclosed in United States Patent Specification
No. 34 63 161. This arrangement comprises a
25 plastic tempering mixture consisting of various
chemicals and a high proportion of water, enclosed
between flexible sheets in chambers which have
been cut by a flame torch. When the arrangement
is worn, for example on the body surface, it can
30 exchange considerable volumes of heat with the
environment, without appreciably changing its
original temperature or mechanical properties. The
arrangement may be provided with a permanent
filling of the tempering mixture or with a closeable
35 filling opening for changing the temperature
mixture. When the arrangement is to be worn on
the head, the torch-cut chambers form a helmet-
like shape which is secured by a banded structure.

No possibility of combining the arrangement
40 with mechanical head protection is provided. The
use of a standard protective helmet makes it
necessary to adjust the head fitting the leads to an
uneven pressure of the cooling surfaces on the
head.

A known cooling jacket is disclosed in
Drägerheft 310, Jan./April '78, pages 17—24,
and consists of a jacket-like body part and a hood-
like head part. Both parts are provided with flow
channels for a liquid coolant which is cooled by a
50 cooling unit carried on the back, and circulated
through the parts of the cooling jacket. The flow
channels are made of welded plastic sheets and
silicon fluid is used as the coolant. The flow
channels of the head part are kept in shape by a
55 cap-like support. A standard protective helmet is
worn over the head part, its head fitting being
adjusted so that it is suitably wide.

If the head fitting is incorrectly adjusted it may
hinder the circulation of the coolant. The head
60 fitting leads to an uneven pressure of the cooling
surfaces on the head and thus to different degrees
of cooling. The head part can not be used
separately because of its connection to the cooling
unit.

65 According to the present invention there is
provided protective headgear comprising a
protective layer, a cooling layer, and attachment
means, whereby the cooling layer, in use of the
headgear, is attached to the protective layer, the
70 cooling layer comprising double-walled portions
each of which has two walls defining a chamber,
each of the portions being connected to another of
the portions in an upper region of the headgear,
wherein the two walls of each portion are joined
75 to form interconnecting spaces for a coolant.

The two walls may be joined along longitudinal
unbroken lines and along latitudinal broken lines
to form said spaces.

Preferably, the attachment means comprises: a
80 latitudinal band-connecting the portions, below
said upper region, said band being provided with
holes; and protrusions, provided on the protective
layer, which co-operate with the holes for
attaching the cooling layer to the protective layer.
85 In the illustrated embodiment, the protrusions
comprise buttons.

The headgear may further comprise an
insulating layer attached to the protective layer,
internally of the cooling layer, by means of the
90 protrusions. This insulating layer, which may be
additionally buttoned on to the protective layer
without the need for any further connecting
arrangement enables reduced transmission of cold
to the wearer to be achieved. Also, the insulating
95 layer provides a cushioning effect against
mechanical disturbances to the protective layer of
the headgear.

The lower regions of the double-walled portions
may be connected by way of a flexible band.

100 In one embodiment of the present invention,
the cooling layer, which forms a structure for
fitting over the head of a wearer, comprises
double-walled segments connected in the region
of the upper head by an annular channel, the
105 segments being divided by longitudinal strips and
cross-pieces into interconnecting spaces, wherein
the segments are connected by a cross band
provided with button holes by means of which the
cooling layer is buttoned onto securing buttons in
110 the protective layer.

The present invention provides headgear which,
by virtue of the construction of the cooling layer,
provides efficient cooling with a good fit for a
wearer. The attachment means in the form of
115 buttons make the preparations for use of the
headgear very quick and easy.

For a better understanding of the present
invention and to show how the same may be
carried into effect, reference will now be made, by
120 way of example, to the accompanying drawings in
which:—

Figure 1 shows a section through protective
headgear in accordance with an embodiment of
the present invention;

125 Figure 2 shows an embodiment of the cooling
layer;

Figure 3 shows a partial section along the line
III—III in Figure 2; and

Figure 4 shows the attachment of the

protective layer to the cooling layer.

- As shown in Figure 1, the protective helmet comprises a protective shell 1 and a banded structure or head harness 3 buttoned inside this by means of securing buttons 2. The banded structure 3 is simultaneously designed as a cooling device. An optional insulating layer 4 held by means of the same securing buttons 2 improves wearing comfort.
- 10 The banded structure 3 consists, as shown in Figure 2, of two flexible sheets 5 connected by welding at the seams and which are cut as double-walled portions or segments 7 connected in the upper head region by an annular channel 6.
- 15 The double-walled segments 7 are interrupted by longitudinal strips 8 and cross pieces 9 thus forming smaller chambers 10 (Figure 3) to allow the structure 3 to fit well to the shape of the head and of the protective shell 1. The annular channel 20 6 is in communication with all the chambers 10. The chambers 10 are filled with a coolant 12 via an opening 11. The coolant is added in liquid form and the opening 11 is then sealed by a stopper 13. After refrigeration, during which the coolant 12 25 may remain plastic or solidify, the banded structure 3, which can be adjusted to fit by means of the longitudinal strips 8 and cross pieces 9, is then buttoned into the protective shell 1 by means of the securing buttons 2. The double-walled 30 segments 7 are joined together for this purpose at the level of the securing buttons 2 by means of a cross band 14 which has suitable button holes 15 (Figure 4).
- 35 In order to increase wearing comfort, the additional insulating cover 4 is then subsequently buttoned on by means of the same securing buttons 2.

The banded structure 3 may also be provided at

- 40 the outermost end with a flexible band 16 joining the double-walled segments 7 (Figure 2).

CLAIMS

- 1, Protective headgear comprising a protective layer, a cooling layer, and attachment means whereby the cooling layer, in use of the headgear, is attached to the protective layer, the cooling layer comprising double-walled portions each of which has two walls defining a chamber, each of the portions being connected to another of the portions in an upper region of the headgear, 45 wherein the two walls of each portion are joined to form interconnecting spaces for a coolant.
2. Protective headgear as claimed in claim 1, wherein the two walls are joined along longitudinal unbroken lines and along latitudinal broken lines to form said spaces. 50
3. Protective headgear as claimed in claim 1 or 2, wherein the attachment means comprises: a latitudinal band connecting the portions, below said upper region, said band being provided with holes; and protrusions, provided on the protective layer, which cooperate with the holes for attaching the cooling layer to the protective layer. 55
4. Protective headgear as claimed in claim 3, wherein the protrusions comprise buttons.
5. Protective headgear as claimed in claim 3 or 4, further comprising an insulating layer attached to the protective layer, internally of the cooling layer, by means of the protrusions. 60
6. Protective headgear as claimed in any preceding claim wherein lower regions of the portions are connected by way of a flexible band.
7. Protective headgear substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings. 70