

A DEW COLLECTOR

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THIS INVENTION relates to a dew collector, that is a device for collecting water from the atmosphere by condensation.

Where it is not possible or desirable to carry sufficient water during an expedition or other outdoor activity, and insufficient potable rain water or ground water is available, it is known to collect dew from the air in order to satisfy the drinking water requirements of the expedition.

Under such circumstances, it is common practice to collect dew on a large impervious ground sheet which is usually placed to cover a hollow in the ground or a pit which has been dug in the ground. However, the use of such a ground sheet is not always convenient, if there is insufficient open ground or if the ground is unsuitable for laying out the ground sheet over a large area.

It is an object of the present invention to provide a compact, portable device for collecting dew condensed out of the ambient air.

Accordingly, the invention provides a dew collector comprising a hollow dew-forming structure presenting a condensation region having a wall the surfaces of which define inner and outer condensation surfaces extending between an inlet opening and an outlet opening of the region, supporting means for supporting the structure in the air with the inlet opening of the condensation region above the outlet opening thereof, and collecting means for collecting dew at the outlet opening of the condensation region.

In a preferred form of the invention, the dew condensation forming structure presents a succession of regions and the supporting means supports the hollow structure in the air with the condensation arranged one above another such that the inner condensation surface of each condensation region collects dew falling from the

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inner and outer condensation surfaces of an adjacent higher condensation region.

Advantageously, the supporting means supports the dew-forming structure with the condensation regions in a nested condition in which each condensation region receives the adjacent higher region in spaced-apart relationship.

In one embodiment of the invention, the dew-forming structure of the dew collector comprises an assembly of individual dew collecting elements each defining a respective condensation region.

Preferably, each individual dew collecting element tapers from its inlet opening to its outlet opening.

Advantageously, each dew collecting element has a conical shape.

Conveniently, the dew collecting elements are all substantially identical.

In another embodiment of the invention, the dew-forming structure comprises a unitary dew collecting element formed by a helically wound strip each turn of which defines a respective condensation region.

Preferably, the helically wound strip is so shaped that each turn has a conical form.

Desirably, the dew-forming structure is made of flexible sheet material, such as fabric.

The supporting means for supporting the hollow structure may comprise connections, preferably releasable connections, between adjacent condensation

regions. A suitable releasable connection comprises a connecting strip attached to each condensation region of the hollow structure and carrying at each end a fastening element for co-operating with a complementary fastening element on a connecting strip attached to an adjacent condensation region.

Preferably, the complementary fastening elements of the connecting strips co-operate to form a snap fastener.

Advantageously, the connecting strips are made of flexible material.

According to a preferred feature, a water reservoir is provided for connection to the outlet opening of the or a lowermost collecting element to collect water from the dew-forming structure.

The dew collector may comprise a water reservoir connected to a funnel adapted to receive a lowermost turn of the helically wound strip to collect water from the unitary dew collecting element.

The means for supporting the dew-forming structure may comprise rope for suspending the structure from an overhead support, such as a tree.

The means for supporting the dew-forming structure may, however, comprise ground engaging poles from which the structure is suspended.

In a preferred embodiment of the dew collector, a canopy is attached to an upper end of the dew-forming structure, which canopy covers the inlet opening of the or the uppermost condensation region and projects outwardly beyond the edge of the dew-forming structure to prevent debris from falling into the collector.

The canopy may be provided with attachment points for connection to the means for supporting the dew-forming structure in the air.

A dew collector embodying the invention may also include an insect net for attachment to the dew-forming structure to encircle the structure to prevent insects entering the structure.

In order that the invention may be more readily understood, embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of one embodiment of a dew collector according to the invention having a hollow dew-forming structure comprising a plurality of individual dew-collecting elements;

Figure 2 is a plan view of the dew collector of Figure 1;

Figure 3 is a side view of one of the dew collecting elements of the dew collector shown in Figure 1;

Figure 4 is a plan view of the collecting element shown in Figure 3;

Figure 5 is a detailed view of a connecting strip indicated at X in Figure 3;

Figure 6 is a perspective view of two adjacent collecting elements of the dew collector of Figure 1 illustrating the detachable connection of the collecting elements by connecting strips;

Figure 7 is a plan view of a canopy of the dew collector of Figure 1;

Figure 8 is an edge view of the canopy shown in Figure 7;

Figure 9 is a detailed view of a peripheral section of the canopy indicated at Y in Figure 6;

Figure 10 is a perspective view of the canopy of figure 7;

Figure 11 is a detailed view of a peripheral section of the canopy indicated at Z in Figure 7;

Figure 12 is a perspective view of a support pole for use in supporting the dew collector above the ground;

Figure 13 is a side view of the support pole shown in Figure 12;

Figure 14 is a front view of the support pole shown in Figure 12;

Figure 15 is a view of one side of an insect net for attachment to a canopy of a dew collector embodying the invention;

Figure 16 is an edge view of the insect net of Figure 15;

Figure 17 is a view of the other side of the insect net of Figure 15;

Figure 18 is a side view of another embodiment of a dew collector according to the invention having a hollow dew-forming structure comprising a single dew collecting element;

Figure 19 is a side view of the collecting element of the dew collector shown in Figure 18; and

Figure 20 diagrammatically illustrates the helical winding of a strip forming the dew collecting element shown in Figure 19.

Referring firstly to Figure 1, one embodiment of a dew collector according to the present invention has a hollow dew-forming structure 1 comprising a plurality (eight) in the illustrated example, of individual conical dew collecting elements 2 each defining a respective condensation region in a succession of condensation regions. The dew collecting elements 2 are connected together by flexible connecting strips 3 in a nested condition.

As shown in Figures 3 to 6, each collecting element 2 is in the form of an inverted hollow cone made of fabric, the wall of the cone defining opposed inner and outer conical condensation surfaces 2A and 2B which extend between a large diameter inlet opening 4 at the base of the collecting element 2 and a small diameter outlet opening 5 at the apex of the collecting element 2. Adjacent collecting elements 2 are connected together to form the hollow structure 1 by the flexible connecting strips 3 which are, for example, made of fabric and are attached to the collecting elements 2 at their inlet openings 4. Each connecting strip 3 is provided at its ends with respective male and female elements 6 and 7 of a snap fastener, the male element 6 of each connecting strip 3 of a collecting element 2 being fastened to the female element 7 on the corresponding connecting strip 3 of the adjacent collecting element 2. In the illustrated embodiment, each collecting element 2 is provided with three fastening strips 3 at equally spaced locations around the inlet opening 4.

Referring again to Figures 1 and 2, the uppermost collecting element 2 of the

structure 1 is attached to a canopy 8 which covers the inlet opening 4 of the uppermost element 2 and projects radially outwardly beyond the edge of the hollow structure 1 to prevent debris from falling into the collector. The canopy 8 is connected to three ropes 9 which are secured to an available overhead support, such as a tree, to suspend the collector in the air with the nested interconnected collecting elements 2 in spaced-apart relationship.

The outlet aperture 5 of the lowermost collecting element 2 is connected via a flexible tube 10 to a water reservoir or collecting pouch 11 which rests on the ground and serves to accumulate the water collected by the dew collector. In the illustrated example, the water reservoir 11 has a capacity of 500 ml.

As shown in Figures 7 to 11, the canopy 8 of the collecting device comprises a circular web 12 attached to a flexible peripheral ring 13. Three equally spaced openings 14 are formed in the web 12 at its periphery adjacent the ring 13 to form attachment points for the three suspending ropes 9. A female fastening element 15 is secured to the web at a location which is radially inward of each opening 14 for attachment to the male fastening element of the respective connecting strip of the uppermost collecting element 2, so as to attach the canopy 8 to the hollow structure 1.

Merely by way of example, it is envisaged that each conical dew collecting element may have an apex angle of 60° and a height of 330mm. The connecting strips may have a width of 9mm and project about 70mm above the inlet opening 4 of the element 2, so that the spacing between the inlet openings 4 is about 60mm and the overall suspended height of the collector from the canopy 8 to the ground is about 900mm.

In operation of the dew collector described above the collector is suspended

in the air by tying the ropes 9 to a suitable overhead support such as a tree. Dew from the air condenses on both the inner and outer condensation surfaces 2A and 2B of the collecting elements 2 and trickles down the interior of the hollow element into the lowermost collecting element 2, where it passes out of the outlet opening 5, through the tube 10 into the reservoir 11.

Figures 12 to 14 show a ground engaging pole element 16 for use in constructing a support pole for supporting a dew collector embodying the invention in the absence of a suitable overhead support, such as a tree. The pole element 16 comprises a cylindrical rod 17 formed at a lower end thereof with a cylindrical peg 18 of smaller diameter. At its other end, the rod 17 is formed with a recess 19 having a cavity 20 for receiving the resilient ring 13 of the canopy 8 when the upper end of the rod is inserted in one of the openings 14 of the canopy 8. The resilient ring 13 is pressed into the cavity 20 through a restricted mouth opening 21 of the recess 19. The ring 13 resumes its original shape after passing through the mouth opening 21 and is thus retained in the cavity 20. An axial bore 22 extends into the rod 17 from its upper end and is dimensioned to receive the peg 18 of a similar pole element 16 to enable a plurality of such pole elements to be assembled end to end to form a composite support pole having a desired length.

By way of example only, it is envisaged that the rod 17 may be 250mm long and 24mm in diameter, the peg 18 and the bore 22 are 10mm in length and 10mm in diameter, so that four pole elements 16 are required to form a one metre long support pole.

An optional insect net 23 is shown in Figures 15 to 17. The net 23 may be suspended from the canopy 8 to encircle the hollow structure 1 and cover the inlet openings 4 of the collecting elements 2. The net 23 has fastenings 24 for attachment to the canopy 8 and Velcro (Registered Trade Mark) strips 25 so that it can be

formed into a tube around the hollow structure 1.

Figures 18 to 20 illustrate another embodiment of a dew collector according to the invention in which the hollow dew-forming structure 1 comprises a single unitary dew collecting element formed from a strip 31 of flexible material, such as fabric, which is wound in a helical shape. The turns 32 of the helically wound strip 31 are substantially conical and nested within one another with the inner surface of each turn of the helix being separated from the outer surface of the adjacent inner turn of the helix. The turns 32 of the helically wound strip 31 thus form a succession of nested condensation regions in a similar manner to the individual collecting elements of the first embodiment with the surfaces of the strip 31 defining the inner and outer condensation surfaces 32A and 32B of the successive condensation regions.

The individual turns of the strip 31 are interconnected and held in spaced relationship by connecting strips 33 formed in the same manner as the connecting strips 3 of the first embodiment.

A canopy 38 constructed in the same manner and serving the same purpose as the canopy 8 of the first embodiment is attached to the uppermost turn of the helically wound strip 31.

The lowermost turn of the helical strip 31 is received in a funnel 39 connected by a flexible tube 40 to a water reservoir 41.

In operation of this embodiment of the dew collector, the collector is suspended in the air and dew from the air condenses on the condensation surfaces 32A and 32B of the turns 32 of the strip 31. The dew trickles down the inside of the helically wound strip 31 to the bottom turn of the strip where it is collected by

the funnel 39 and delivered to the water reservoir 41.

The nested arrangement of conical collecting elements 2 of the first embodiment and the nested turns 32 of the helically wound strips 31 of the second embodiment maximises the dew collecting surface area of the collector for the least amount of space.

However, although the illustrated embodiments of the invention both employ a dew-forming structure having a plurality of nested condensation regions, it is envisaged that the structure may have a single condensation region, that is a single dew collecting element 2 on a strip 31 with a single turn 32.

When made of a flexible material, the dew collector is compact and can be easily folded and tucked into a small pack. The lightweight construction and compact size of the collector also make for easy carrying.

The collecting device can be readily manufactured and could be easily integrated into an existing range of outdoor products.

CLAIMS

1. A dew collector comprising a hollow dew-forming structure presenting a condensation region having a wall the surfaces of which define inner and outer condensation surfaces extending between an inlet opening and an outlet opening of the region, supporting means for supporting the structure in the air with the inlet opening of the condensation region above the outlet opening thereof, and collecting means for collecting dew at the outlet opening of the condensation region.
2. A dew collector according to Claim 1, in which the dew-forming structure presents a succession of condensation regions and the supporting means supports the hollow structure in the air with the condensation regions arranged one above another such that the inner condensation surface of each condensation region collects dew falling from the inner and outer condensation surfaces of an adjacent higher condensation region.
3. A dew collector according to Claim 2, in which the supporting means support the dew-forming structure with the condensation regions in a nested condition in which each condensation region receives the adjacent higher region therein in spaced-apart relationship.
4. A dew collector according to Claim 2 or 3, in which the dew-forming structure of the dew collector comprises an assembly of individual dew collecting elements each defining a respective condensation region.
5. A dew collector according to Claim 4, in which each individual dew collecting element tapers from its inlet opening to its outlet opening.



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6. A dew collector according to Claim 5, in which each dew collecting element has a conical shape.
7. A dew collector according to any one of Claims 4 to 6, in which the dew collecting elements are all substantially identical.
8. A dew collector according to Claim 2 or 3, in which the dew-forming structure comprises a unitary dew collecting element defining a succession of condensation regions.
9. A dew collector according to Claim 8, in which the unitary dew collecting element is formed by a helically wound strip the turns of which are nested one within another and each turn of which defines a respective condensation region.
10. A dew collector according to Claim 9, in which the helically wound strip is so shaped that each turn has a conical form.
11. A dew collector according to any one of Claims 2 to 10, in which the means for supporting the hollow structure comprises connections between adjacent condensation regions.
12. A dew collector according to Claim 11, in which the connections are releasable connections.
13. A dew collector according to Claim 12, in which each releasable connection comprises a connecting strip attached to a condensation region of the hollow structure and carrying at each end a fastening element for co-operating with a complementary fastening element on a connecting strip attached to an adjacent condensation region.

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14. A dew collector according to Claim 13, in which the complementary fastening elements of the connecting strips co-operate to form a snap fastener.
15. A dew collector according to any one of Claims 13 or 14, in which the connecting strips are made of flexible material.
16. A dew collector according to any preceding claim, in which the dew-forming structure is made of flexible sheet material.
17. A dew collector according to Claim 13, in which the dew-forming structure is made of fabric.
18. A dew collector according to any preceding claim, comprising a water reservoir for connection to the outer opening of the or a lowermost condensation region to collect water from the dew-forming structure.
19. A dew collector according to any one of Claims 1 to 17, comprising a water reservoir connected to a funnel adapted to receive a lowermost portion of the dew-forming structure to collect water from the structure.
20. A dew collector according to any preceding claim, in which the means for supporting the dew-forming structure comprises ropes for suspending the structure from an overhead support, such as a tree.
21. A dew collector according to any preceding claim, in which the means for supporting the dew-forming structure comprises ground engaging poles from which the structure is suspended.
22. A dew collector according to any preceding claim, in which a canopy is



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attached to an upper end of the dew-forming structure, which canopy covers the inlet opening of the or the uppermost condensation region and projects outwardly beyond the edge of the dew-forming structure to prevent debris from falling into the collector.

23. A dew collector according to Claim 22, in which the canopy is provided with attachment points for connection to the means for supporting the dew-forming structure in the air.

24. A dew collector according to any preceding claim, comprising an insect net for attachment to the dew-forming structure to encircle the structure and prevent insects entering the structure.

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