March 24, 1942. W. A. SPOFFORD 2,277,462

HEAT TRANSFER SURFACE

Filed Dec. 22, 1939

Fig. 1.

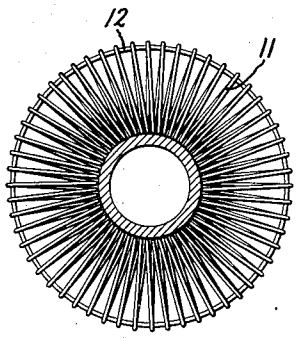


Fig. 2.

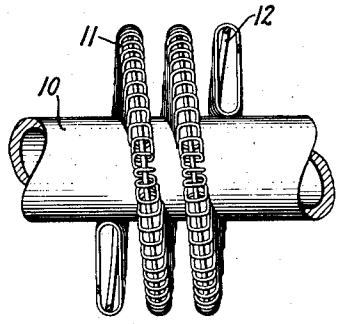
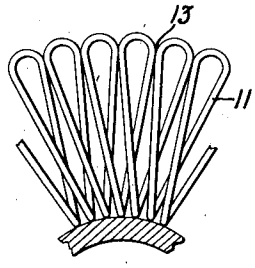


Fig. 3.



Inventor:
Warren A. Spofford,
by Harry E. Dunham
His Attorney.

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HEAT TRANSFER SURFACE

Warren A. Spofford, Glen Ridge, N. J., assignor to General Electric Company, a corporation of New York

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3 Claims. (Cl. 257—262)

My invention relates to heat transfer surfaces and more particularly to a heat transfer element of the type having a plurality of heat exchange surfaces in the form of loops such as a coil of spirally wound heat conductive material secured to a cooling conduit.

When an extended heat transfer surface of the above type is applied to air conditioning equipment in which air is both cooled and dehumidified, it has been found that under some conditions condensed moisture forms on the loops in large drops and is blown off into the air stream at relatively low air velocities. When this condensed moisture blows into the air stream, it is necessary to provide some means for extracting this moisture from the air stream either by some type of water eliminator or by a drain pan extended far enough to collect all the water before it strikes a surface where it may be drained from the conditioner in such a way as to cause damage. Extracting means of this type are comparatively expensive.

Accordingly, it is an object of my invention to provide simple and improved means for collecting condensed moisture from the loops of such a type of heat exchange element before such moisture can be carried off into the air stream.

Another object of my invention is to provide a continuous surface in the above described type of heat transfer surface on which condensed moisture may be collected and drawn to a point where it can be removed.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention reference may be had to the accompanying drawing in which Fig. 1 is an end view of a section of a cooling tube on which a heat transfer surface embodying the principles of my invention is arranged; Fig. 2 is a side view, partly in section, of the heat transfer element illustrated in Fig. 1; and Fig. 3 is an enlarged partial view of a modification of the heat transfer surface illustrated in Figs. 1 and 2.

In Figs. 1 and 2 I have illustrated one embodiment of my invention. There is shown a cooling conduit or tube 10 having a heat transfer surface comprising a coil 11 of spirally wound heat conductive material, such as copper wire, for example, wound on the tube 10 and suitably secured thereto in any desired manner as by soldering. A drainage member 12 is provided adjacent the loops of the coil 11 at the tips or outer periphery of the loops in order to collect any moisture which may be condensed on the loops of the coil 11. The drainage member 12 illustrated in Figs. 1 and 2 comprises a wire threaded axially through the hollow ribbon or loops of the spirally wound wire coil 11 in such a way that it follows the outer periphery of the loops as illustrated thereby providing a connection between the tips of the wire loops.

Any drop of water forming on the wire loops will wet the surface of the connecting or drainage member 12 and drain to the lowermost point of the heat transfer surface 11 before falling off.

The drainage member or connecting wire 12 may or may not be mechanically secured at the outer periphery of the loops of the coil 11. In order to effect drainage of moisture it is necessary only that the drainage member 12 be closely adjacent whereby it is sufficiently close to the loops of the coil 11 so that a drop of moisture when forming will contact the drainage member 12 before becoming of sufficient size to be blown off into the air stream. The collected moisture may be removed in any desired manner as by permitting the moisture to drop onto the surfaces below or into a drain pan, not shown.

While the drainage member 12 in the form of a wire is a simple means of providing for a continuous surface for the drainage of moisture, other methods of connecting the loops at the outer edge or periphery will occur to those skilled in the art. For example, a wire such as illustrated in Figs. 1 and 2 may be disposed adjacent the outer periphery of the loops of the coil 11 on either the inside or the outside of the loops.

In Fig. 3 I have shown a modification of my invention in which the drainage surface at the outer periphery of the coil 11 is provided by twisting the outer portion of the loops of the coil 11 so as to form a continuous engagement between adjacent loops as indicated by the numeral 13, for the drainage of moisture, although the twisted loops need not actually touch, if desired.

Other modifications will occur to those skilled in the art. For example, my invention is applicable to heat exchange members in which the loops have a substantially U-shaped configuration, the arms of the U's being secured to the conduit in some suitable manner, whether or not the members are disposed in a spiral.

While I have shown a particular embodiment of my invention, I do not desire my invention to be limited to the particular construction shown

and described and I intend in the appended claims to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a heat transmitting element of the type comprising a conduit having secured thereto a plurality of loops of heat conductive material, substantially continuous means connecting adjacent loops at substantially the outer periphery thereof for draining condensed moisture therefrom.

2. In a heat transmitting element of the type comprising a conduit having secured thereto a plurality of loops of heat conductive material, means for collecting condensed moisture from said loops, said means comprising a wire extending through said loops and disposed sufficiently close to the outer periphery of said loops to receive from said loops and to drain away therefrom any moisture condensing thereon.

3. In a heat transmitting element of the type comprising a conduit having secured thereto a spirally wound element comprising a plurality of loops of heat conductive material, means for collecting condensed moisture from said loops, said means comprising a wire extending axially through said loops and being disposed in engagement with said loops at the outer periphery thereof.

WARREN A. SPOFFORD.