

March 5, 1929.

C. E. SCOTT

1,704,409

HEAT EXCHANGE DEVICE

Filed Jan. 27, 1927

2 Sheets-Sheet 1

Fig. 2

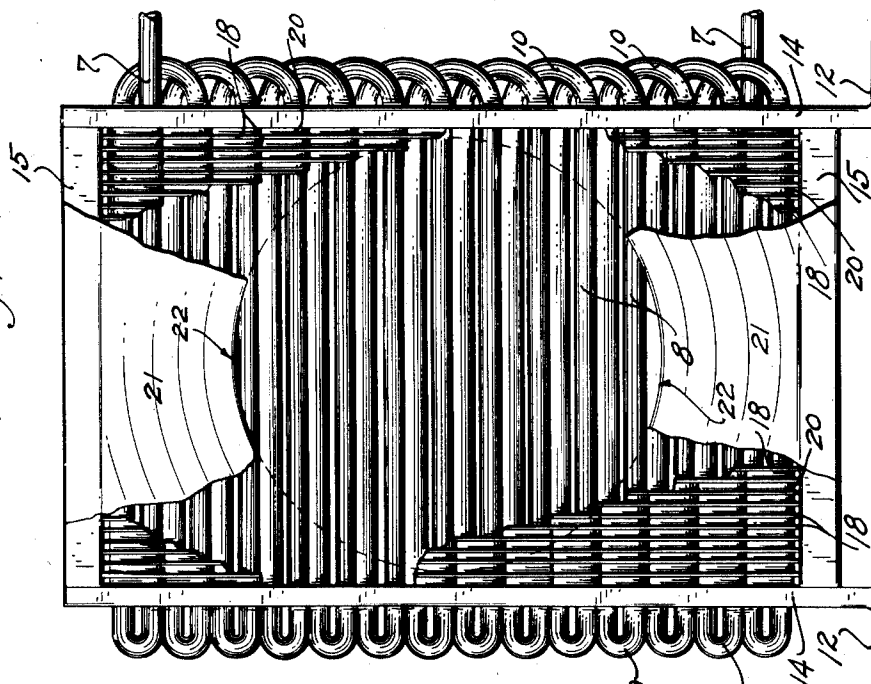
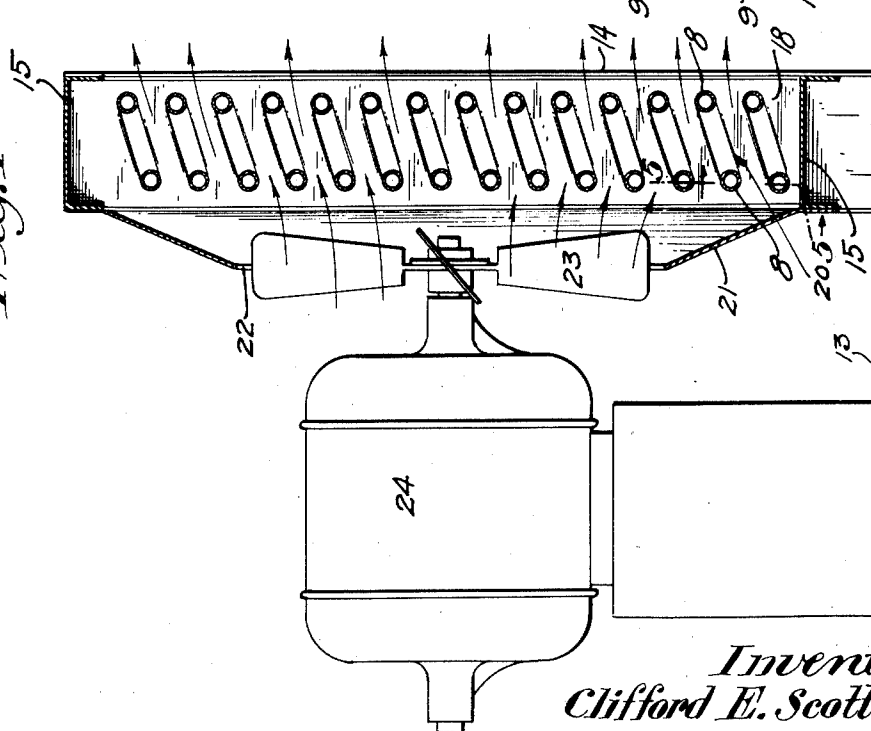


Fig. 1



Inventor
Clifford E. Scott
By his Attorneys
Murchant and Kilgore

March 5, 1929.

C. E. SCOTT

1,704,409

HEAT EXCHANGE DEVICE

Filed Jan. 27, 1927

2 Sheets-Sheet 2

Fig. 3

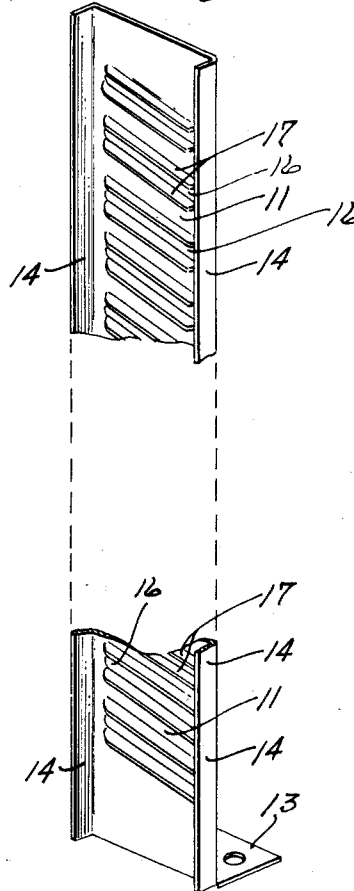


Fig. 4

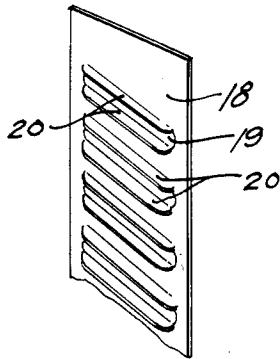


Fig. 5

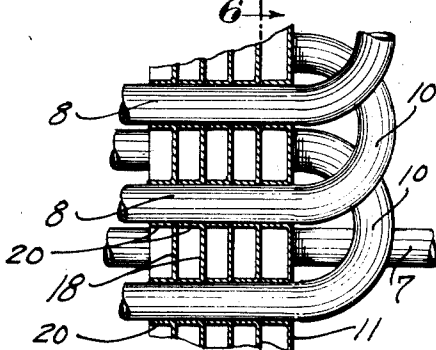
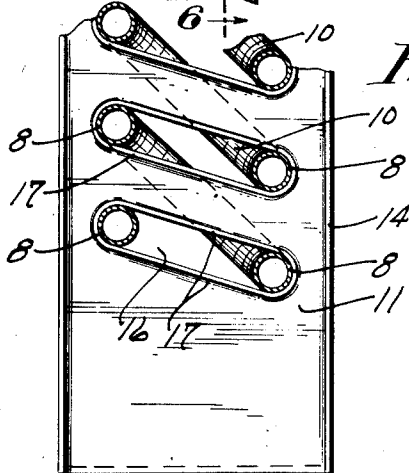


Fig. 6



Inventor
Clifford E. Scott
By his Attorneys
Merchant and Kilgore

UNITED STATES PATENT OFFICE.

CLIFFORD E. SCOTT, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO McQUAY RADIATOR CORPORATION, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF DELAWARE.

HEAT-EXCHANGE DEVICE.

Application filed January 27, 1927. Serial No. 164,103.

My invention has for its object to provide an extremely simple, compact, and highly efficient heat exchange device intended for general use, but especially well adapted as a condensing unit for use in connection with electric refrigeration.

To the above end, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view partly in side elevation and partly in central vertical section showing the cooling device;

Fig. 2 is a face view of the same with some parts broken away and other parts removed;

Fig. 3 is a fragmentary perspective view of one of the header plates;

Fig. 4 is a fragmentary perspective view of one of the fins;

Fig. 5 is a fragmentary detail view, with some parts sectioned on the line 5—5 of Fig. 1, on an enlarged scale; and

Fig. 6 is a fragmentary detail view with some parts sectioned on the line 6—6 of Fig. 5.

The numeral 7 indicates a continuous seamless tube for the circulation of a cooling medium, and which tube is bent to form a manifold in the form of a coil having substantially parallel runs 8 and segmental ends 9 and 10. The convolutions of the coil are laterally spaced and the runs 8 thereof are in staggered arrangement. By reference to Fig. 2, it will be noted that the segmental righthand ends 9 of the convolutions of the coil have a greater radii than the left-hand segmental ends 10 thereof in order to carry the tube 7 from one laterally spaced convolution to the other.

This cooling coil is mounted in a pair of upright laterally spaced header plates 11 having at their lower ends upturned foot flanges 12 which rest on a base 13 and are rigidly secured thereto by screws or otherwise. The vertical edge portions of the header plates 11 are extended laterally inward to afford reinforcing flanges 14. Top and bottom inverted channel members rigidly connect the header plates 11 with the coil therebetween, extend the full width of said plates and afford housing members 15 for said coil.

Formed in the header plates 11 are a plu-

rality of vertically spaced oblique slots 16 in which the convolutions of the coil rest and are held vertically spaced with the runs thereof in staggered arrangement. The segmental ends 9 and 10 project outward of the header plates 11 and the segmental ends 9 connect the runs 8 in each aligned pair of slots 16 which permits said header plates to be applied to the convolutions of the coil or removed therefrom by lateral movement. The large segmental ends 10 extend obliquely from one aligned pair of slots 16 to the other and connect the runs 8 in adjacent aligned pairs of slots 16, as best shown in Fig. 6. Said slots 16 are formed by piercing the header plates 11 and pressing the stock laterally inward to afford flanges 17.

A multiplicity of laterally spaced fins 18 are mounted on the runs 8 of the coil between the header plates 11. Each fin 17 is in the form of a thin flat upright plate which extends the full distance between the housing members 15 and has a plurality of vertically spaced oblique slots 19 through which the runs 8 extend. These slots 19 are formed in the same manner as the slots 16 and the stock pressed therefrom afford fin-spacing flanges 20 at each of said slots.

The longitudinal edge portions of the fins 18 are folded upon themselves to eliminate the sharp edges thereof and also to re-enforce said fins. In assembling the cooling device the fins 18 are applied to the runs 8 after the first header plate 11 is applied thereto and in the same manner. The flanges 17 hold the fins 18 laterally spaced from the header plates 11 and the flanges 20 hold the fins 18 laterally spaced from each other, and the runs 8 between said fins are substantially incased in the flanges 20.

An outwardly bulged housing plate 21 is secured to the header plates 11 and housing members 15 and is provided with an eye 22 in which operates a fan 23 mounted on the armature shaft of an electrical motor on the base 13.

The header plates 11 and fins 18 have metallic contact with the runs 8 and are secured thereto by having their flanges 17 and 20 attached thereto by sweating or otherwise to form a rigid unit and increase the radiating efficiency thereof.

Obviously, the coil, flanged header plates and flanged fins afford a very large and efficient radiating surface.

What I claim is:

1. A heat exchange device comprising a tube bent to form a coil, the convolutions of which have parallel runs, and fins having slots through which said runs extend, said slots adapting the fins to be applied to the convolutions by lateral movement over the connected ends of the runs of the respective convolutions.
2. The structure defined in claim 1 in which the convolutions are laterally spaced and in which the fins are in the form of plates.
3. A heat exchange device comprising a tube bent to form a coil, the convolutions of which have parallel runs, header plates, fins in the form of plates having slots through which said runs extend, said slots adapting the header plates and fins to be applied to the convolutions by lateral movement over the connected ends of the runs of the respective convolutions.
4. A heat exchange device comprising a tube bent to form a coil, the convolutions of which have parallel runs, said convolutions being laterally spaced and said runs being staggered, and fins in the form of plates having slots through which said runs extend, said slots adapting the fins to be applied to the convolutions by lateral movement over the connected ends of the runs of the respective convolutions.
5. A heat exchange device comprising a tube bent to form a coil the convolutions of which have parallel runs, header plates supporting said coil and holding the convolutions thereof laterally spaced and the runs thereof staggered, and fins on said runs.
6. The structure defined in claim 5 in which said header plates have their longitudinal edge portions laterally extended to afford reinforcing flanges and also have spaced oblique slots in which said convolutions are seated.
7. The structure defined in claim 5 in which said header plates have their longitudinal edge portions laterally extended to afford reinforcing flanges and also have spaced oblique slots in which said convolutions are seated, said header plates having laterally projecting tube-engaging flanges at the edges of their slots.
8. The structure defined in claim 5 in which said fins are in the form of plates having spaced oblique slots through which the convolutions of the coil extend.
9. The structure defined in claim 5 in which said fins are in the form of plates having spaced oblique slots through which the convolutions of the coil extend, said fins having at the edges of their slots fin-spacing and tube-engaging flanges.
10. A heat exchange device comprising a tube bent to form a coil the convolutions of which have parallel runs and segmental ends, said convolutions being laterally spaced and said runs being staggered, said segmental ends at one end of the runs having a greater radius than the segmental ends at the other end of said runs, and a pair of header plates supporting the coil.
11. The structure defined in claim 10 in further combination with fins applied to the convolutions of the coil.
12. A heat exchange device comprising a tube bent to form a coil the convolutions of which have parallel runs and segmental ends, said convolutions being laterally spaced and said runs being staggered, said segmental ends at one end of the runs having a greater radius than the segmental ends at the other end of said runs, a pair of laterally spaced header plates, and a plurality of laterally spaced fins in the form of plates between the header plates, said header plates and fins having spaced oblique slots, the convolutions of the coil being inserted through the oblique slots in the header plates and fins at their small segmental ends, said fins having at their slots laterally projecting fin-spacing and tube-engaging flanges.
13. A heat exchange device comprising a tube bent to form a coil, the convolutions of which have parallel runs and segmental ends, said convolutions being laterally spaced, said segmental ends at one end of the runs having a greater radius than the segmental ends at the other of said runs, and fins applied to the convolutions of the coil.
14. A heat exchange device comprising a tube bent to form a coil, the convolutions of which have parallel runs and segmental ends, header plates having slots through which said runs extend, said slots adapting the header plates to be applied to the convolutions by lateral movement over the connected ends of the runs of the respective convolutions, and fins applied to said parallel runs.

In testimony whereof I affix my signature.

CLIFFORD E. SCOTT