

No. 822,372.

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J. G. A. KITCHEN & L. P. PERKINS.
TUBE FOR RADIATING, COOLING, AND CONDENSING APPARATUS.
APPLICATION FILED FEB. 12, 1904.

Fig. 1

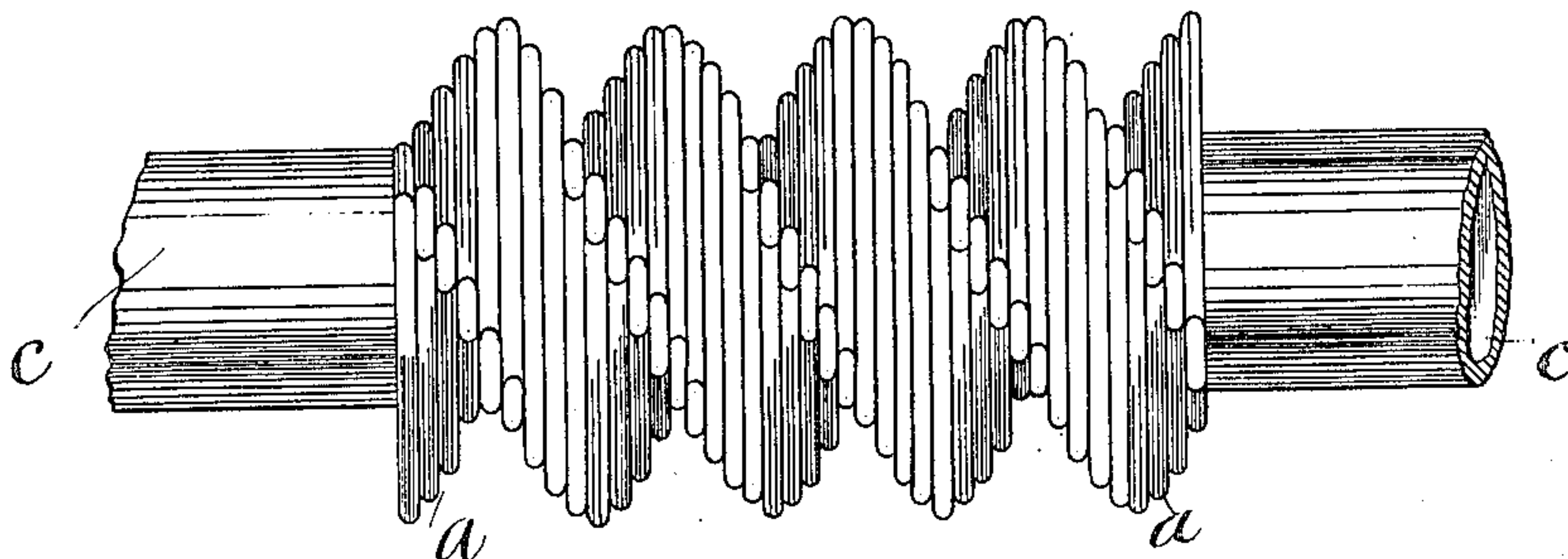


Fig. 2.

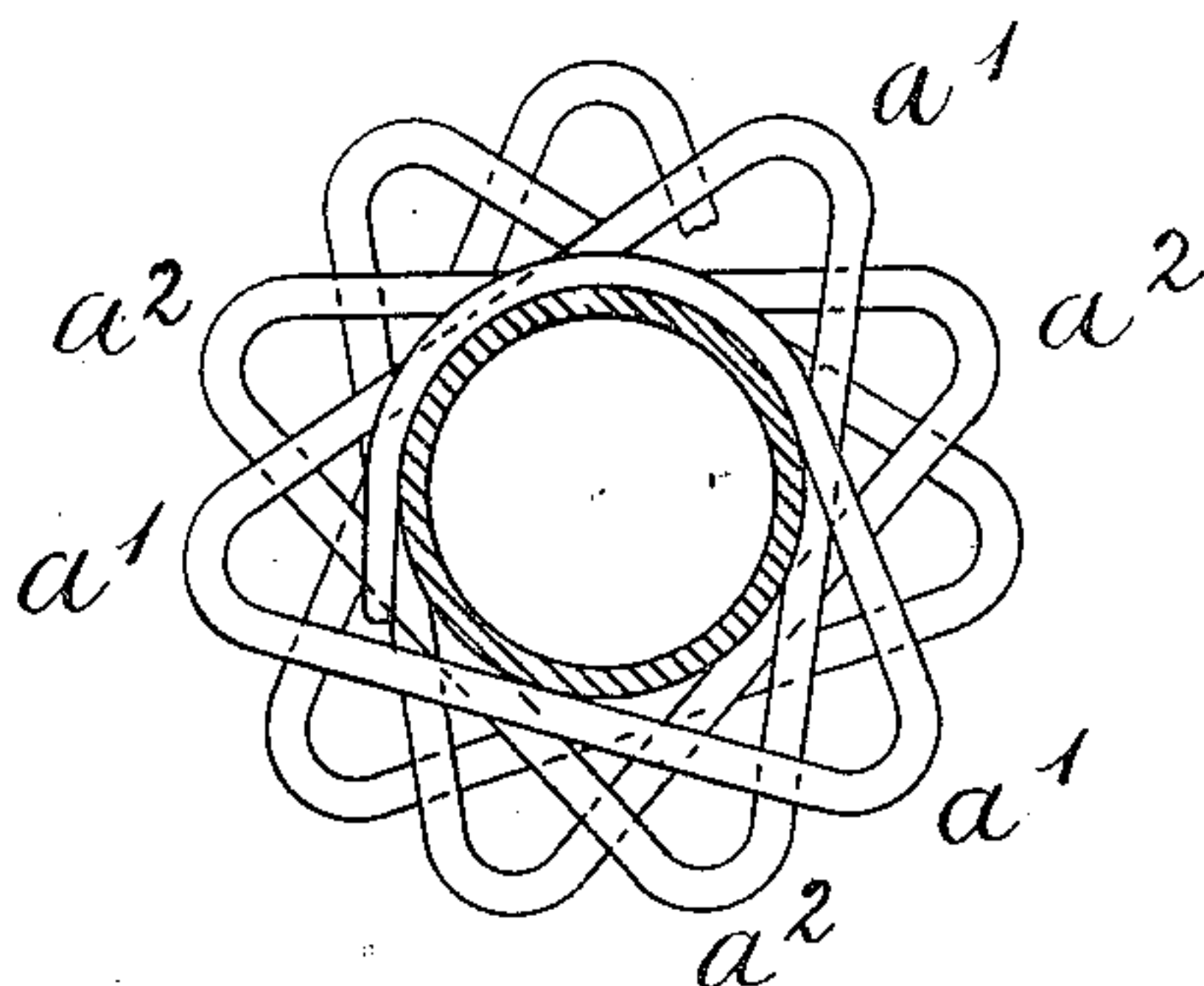


Fig. 3.

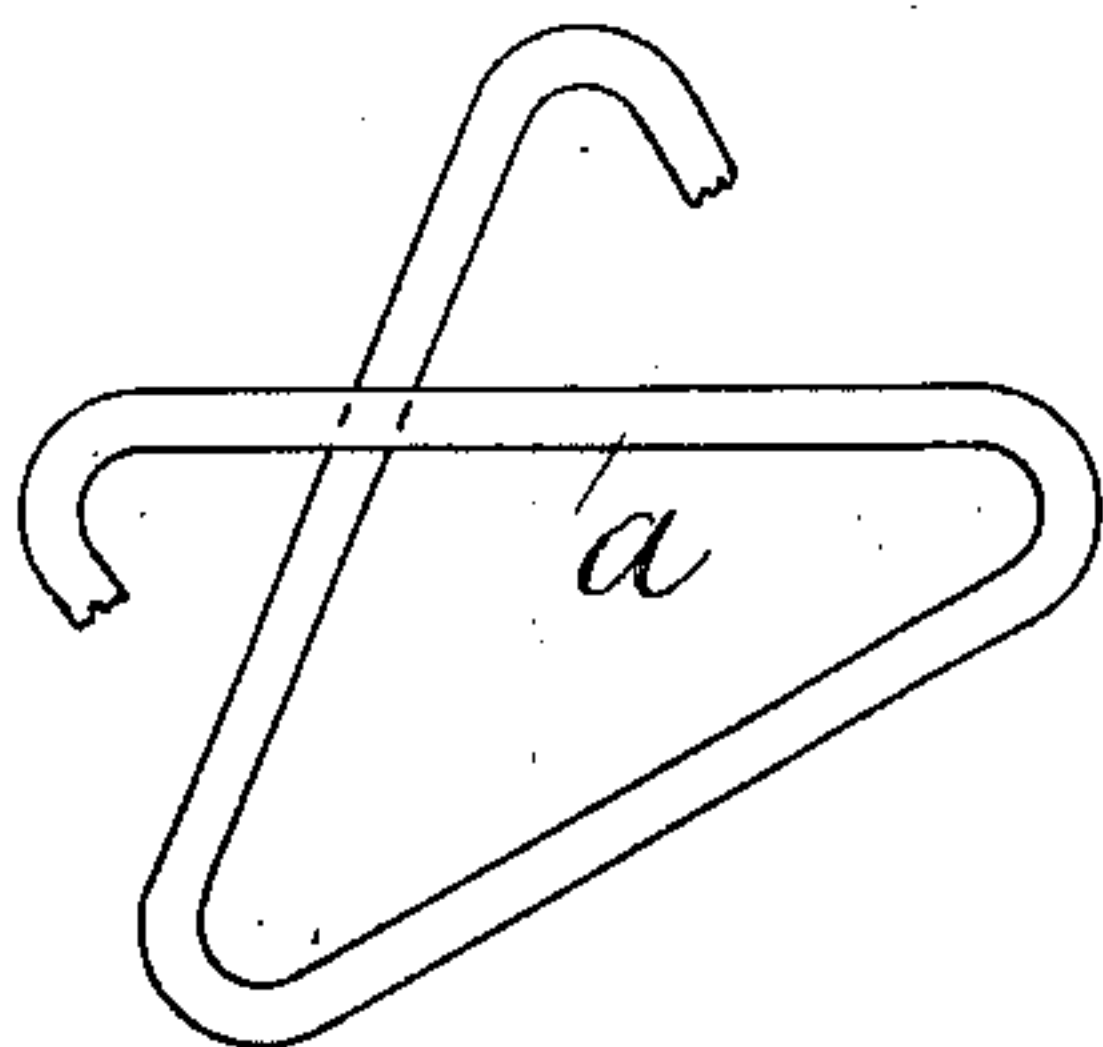
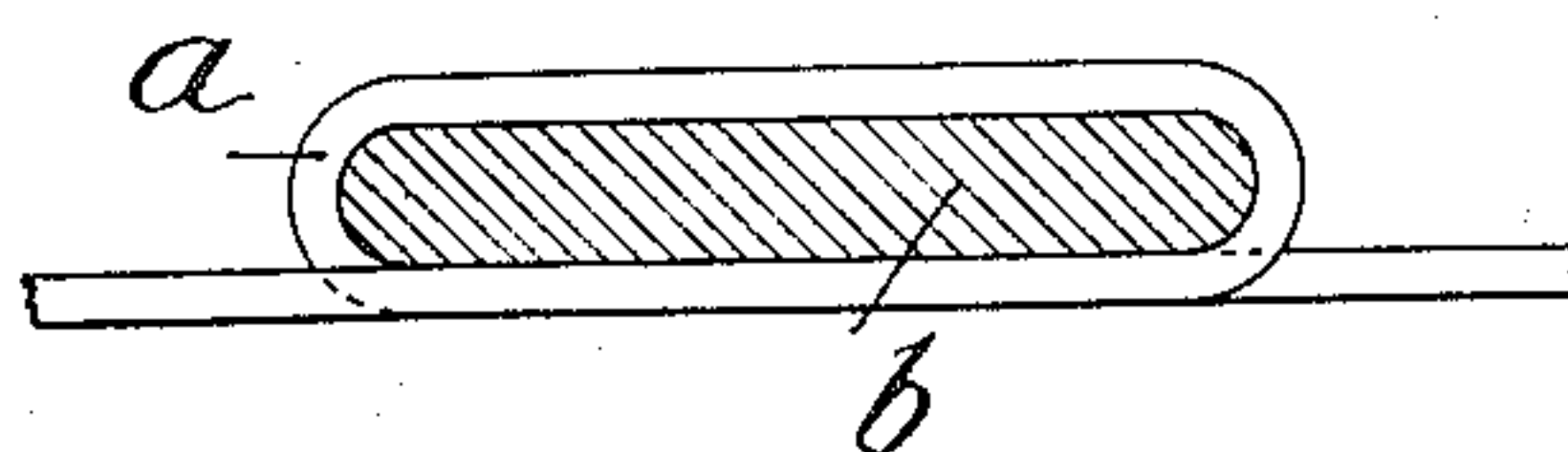


Fig. 4.



WITNESSES

William A. Kelly
L. O. Hicks

INVENTORS

JOHN G. A. KITCHEN
LUDLOW P. PERKINS

BY
Edward P. Thompson
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN GEORGE AULSEBROOK KITCHEN AND LUDLOW PATTON PERKINS,
OF LANCASTER, ENGLAND.

TUBE FOR RADIATING, COOLING, AND CONDENSING APPARATUS.

No. 822,372.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed February 12, 1904. Serial No. 193,276.

To all whom it may concern:

Be it known that we, JOHN GEORGE AULSEBROOK KITCHEN and LUDLOW PATTON PERKINS, subjects of the King of Great Britain, and residents of Lancaster, in the county of Lancaster, England, have invented certain new and useful Improvements in Tubes for Radiating, Cooling, and Condensing Apparatus, of which the following is a specification.

This invention relates to tubular radiating, cooling, or condensing apparatus, in which the temperature of a fluid is reduced by circulating or passing it through tubes having a comparatively large radiating or conducting surface in proportion to their internal capacity; and the invention consists in the improved construction and form of the radiating or conducting surface of the tubing, the object of which is to obtain greater efficiency and reduced cost of manufacture in this class of apparatus.

For the purpose of this invention the tubes are preferably of thin metal of a strength suitable to the requirements. The external radiating and conducting surface of the tubes is increased by fixing thereto a helical coil or coils of metal wire or ribbon of special configuration, as hereinafter described, having the axis of the helix coincident with the axis of the tube.

On the drawings annexed hereunto, Figure 1 shows a side view of the tube and helical coil; Fig. 2, an end view of the same; Fig. 3, a single lap of the coil before being put on the tube, and Fig. 4 a section of the mandrel on which the wire is wound.

A hollow helix of metal wire or ribbon having a polygonal internal configuration in cross-section when formed of a size adapted to that of the tube is first made in the following manner: The wire or ribbon a is wound onto a mandrel b , Fig. 4, having, preferably, an oblong cross-section with rounded ends, as shown. The elasticity of the wire when drawn off the mandrel causes each lap to open out to a triangular shape, as represented by Fig. 3. The dimensions of the mandrel and wire and the elasticity of the latter are so chosen that when the laps have opened out the corners of consecutive coils or rounds do not lie in the same longitudinal line, but that the corners of each succeeding convolution or round—for instance, a^2 —are a little in ad-

vance of or behind those a' of the preceding one, in consequence of which they will form a multiple helix. With the triangular coils shown the helix will have a triple thread. If the mandrel were shorter and thicker, the laps would open out to a quadrilateral figure, and a quadruple-threaded helix would be obtained. The dimensions of the mandrel and wire are so selected that the internal diameter of the polygonal figure formed by the inside of the helix is somewhat smaller than the diameter of the tube c it is intended for. The helix can be easily slipped over the tube by slightly untwisting it and is tightened thereon by the reaction of the coils. The ends of each helix are afterward secured to the tube, for instance, by bending the wire round the tube and hooking the end over one of the next coils, as shown by Fig. 2, or in any other suitable way. No binding-wire or soldering is necessary in order to obtain close and even contact of the helix with the tube.

Tubes having heat radiating and conducting surfaces so formed can be built up into various forms of apparatus for condensing, cooling, or heating fluids, and are especially suitable for radiators for cooling the circulating water of internal-combustion engines and for condensing the exhaust-steam of steam-engines when carried in an exposed position upon automobile cars, as the air can circulate freely not only along the outside of the helices, but also through the open spaces between the consecutive coils.

We claim as our invention—

1. The combination with a metallic tube of a polygonal coil of metal wire forming a multiple helix coaxial with the tube and gripping the outside of the tube.

2. As an article of manufacture a tube for radiating cooling and condensing apparatus consisting of a central tube surrounded by a polygonal coil of wire having straight sides and rounded corners forming a multiple helix coaxial with the tube.

3. A heat-radiator having parallel helical grooves formed of different portions of the same wire.

4. A heat-radiator consisting of the combination of a pipe, and a wire forming parallel perforated helical grooves around and in contact with said pipe.

5. A heat-radiator consisting of the combination of a pipe, a single wire wound around

and in contact with and gripping said pipe and bent to form helical grooves around said pipe, the surfaces of said grooves consisting of different portions of said wire crossing each other to form or leave openings between said portions in said surfaces.

6. A heat-radiator consisting of the combination of a conduit-pipe, a wire wound helically around said pipe, each convolution of said wire being so bent to form a polygon that the angles of the consecutive convolutions lie in parallel helices around said pipe, and their sides are in contact with said pipe and with each other and form helical perforated grooves between the helices formed by said angles.

7. A heat-radiator consisting of the combination of a cylindrical body, and a wire wound helically about said body, said wire

having at intervals projecting portions forming elbows.

8. A heat-radiator consisting of the combination of a cylindrical body, and a wire wound helically about said body and with the convolutions in contact with each other, said wire having at intervals projecting portions forming elbows, each of said elbows being out of alinement with the elbows next adjoining in the longitudinal direction of said body.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

JOHN GEORGE AULSEBROOK KITCHEN.
LUDLOW PATTON PERKINS.

Witnesses:

CHAS. H. SHEPHERD,
W. W. J. BEN.