

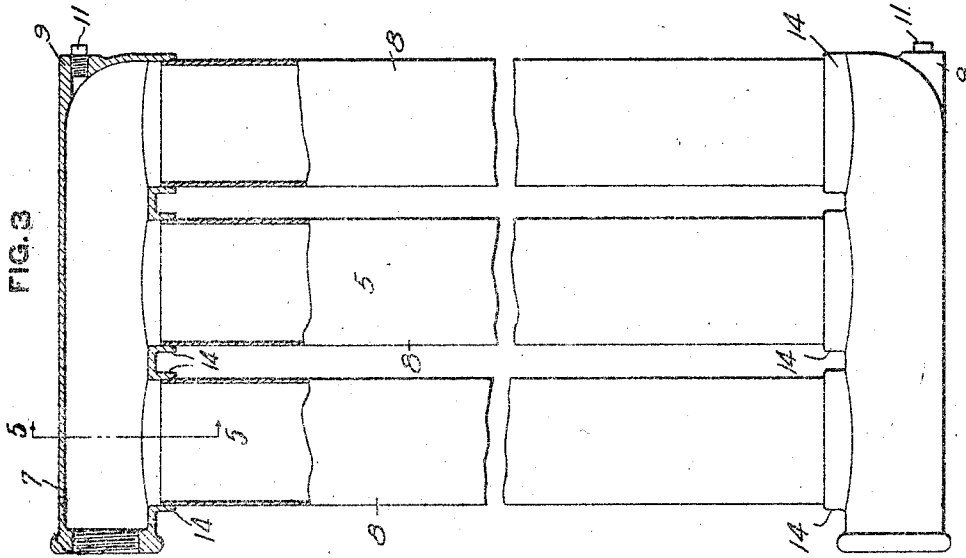
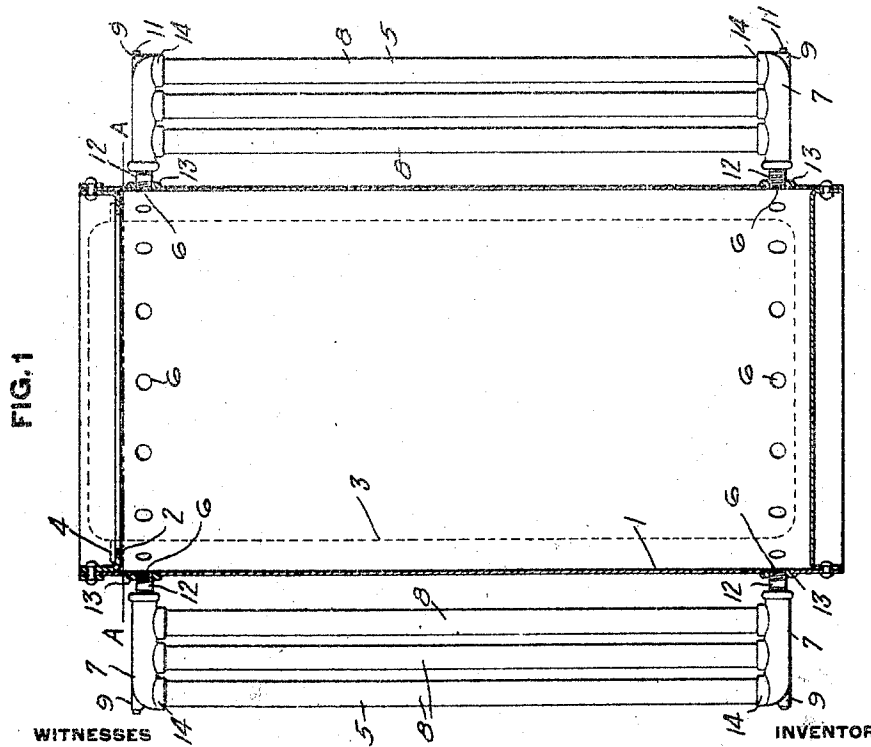
C. SONNEBORN.
HEAT RADIATOR.

APPLICATION FILED JAN. 22, 1916.

Patented May 15, 1917.

2 SHEETS—SHEET 1.

1,226,128.



WITNESSES

INVENTOR

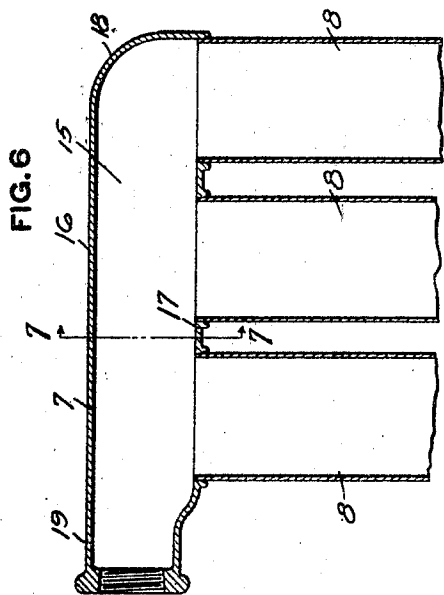
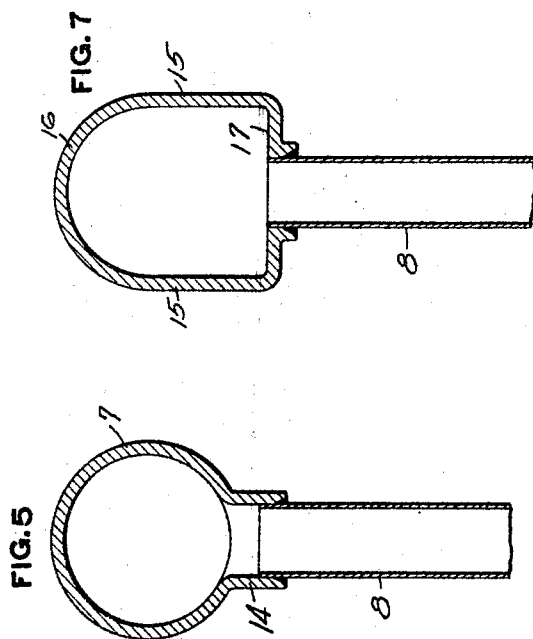
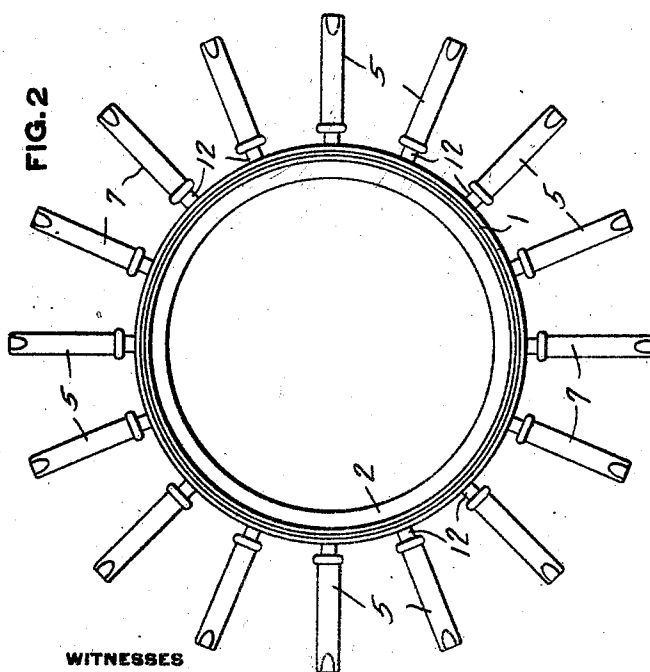
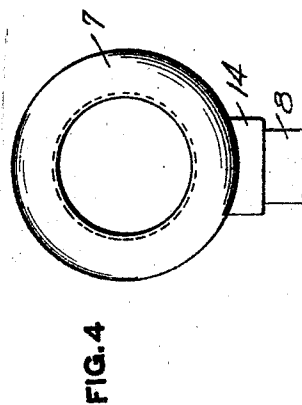
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES SONNEBORN, OF WEST PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO PRESSED METAL RADIATOR COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HEAT-RADIATOR.

1,226,128.

Specification of Letters Patent.

Patented May 15, 1917.

Application filed January 22, 1916. Serial No. 73,762.

To all whom it may concern:

Be it known that I, CHARLES SONNEBORN, a resident of West Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Heat-Radiators, of which the following is a specification.

This invention relates to heat radiators, and more particularly to heat radiators designed for use as transformer coolers.

The coils of large electrical transformers are usually immersed in a bath of oil to prevent short circuits and, by radiating to the atmosphere the heat generated in the transformer, to also protect the coils from injury. The object of this invention is to provide a cheap and efficient form of cooler, one which can compete with prior coolers built up of ordinary pipe and pipe fittings or other prior devices; one which is of light weight, is entirely leakproof and has a lesser number of joints or connections than prior coolers of this class; and one which can be operated with a proportionately small quantity of oil bath and is constructed to provide a large exposed surface area with thin columns of liquid so that the heat of the oil is quickly, thoroughly and efficiently radiated to the air.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 represents a sectional elevation of one form of cooler embodying the invention; Fig. 2 is a plan view thereof; Fig. 3 is a detail elevation, partly in section, and on a larger scale, of one of the radiator sections or units; Fig. 4 is a detail end view from the left in Fig. 3; Fig. 5 is a cross section on the line 5—5, Fig. 3; and Figs. 6 and 7 are detail sectional views, showing a modified form of header section.

The cooler shown in the drawings comprises a tank or reservoir 1 containing the oil bath, which is maintained at a level indicated by the dotted line A—A. This tank is provided with a ledge or series of projections 2 near its upper end serving as supports for the primary and secondary coils of a transformer shown in dotted lines at 3, and

which is provided with projections 4 resting upon the projections 3 to support the coils 55 immersed in the oil bath.

The heat generated by the coils is transmitted to the atmosphere by circulating the oil bath through a series of radiator units or sections 5, which are of special form and construction, enabling them to be made and assembled with the tank at low cost, and which also are of light weight, have maximum efficiency and are substantially leakproof.

The reservoir 1 is provided near its top and bottom with two series of openings 6 arranged in pairs vertically alined, one of said radiator units or sections communicating at its header ends with the alined openings of a pair.

Each radiator unit or section comprises a plurality of hollow cast metal header sections 7 and a plurality of comparatively thin walled rolled or drawn metal tubes 8 communicating therewith. Each header section is longitudinally of hollow tubular form provided at one end with a boss 9 which may be blank or may be provided with a threaded opening to receive a plug or a pet cock or drain valve device 11. At its opposite end each header section is provided with an internally threaded opening to receive one end of a right and left nipple 12 whose opposite end may be threaded or otherwise secured directly to an opening 6 of the reservoir but is shown as threaded into a flanged fitting 13 welded or brazed to the tank wall around said opening. Preferably, also, the threaded connections at both ends of the nipples 12 will be closed or sealed by welding or brazing after assembly to insure tight joints and absolutely prevent leakage.

Each header section is also provided with a suitable number, three being shown, of lateral openings or hollow bosses 14 to which the ends of the tubes 8 are connected. Said tubes are flattened or of oval or other thin oblong form to secure a large exposed surface area with a minimum overall thickness of radiator unit and to also give a minimum diameter of the liquid column so that the center of the column is nearer to the air than in a round or other form of tube. The openings or bosses 14 are of similar shape. The tubes are secured to the header

sections preferably by welding or brazing so as to secure a perfect seal and guard against leakage or loss of oil.

The header sections may be made of any suitable metal, preferably malleable iron castings, although castings of alloys, aluminum, brass, bronze, or ordinary cast iron are suitable. Malleable iron is preferable, due to its low cost, its homogeneous composition and texture and its usual freedom from blow-holes. The header sections are made as light as possible consistent with strength.

Figs. 6 and 7 show a modified form of header section having two parallel side walls 15 arched toward each other along one edge, as at 16, to form a roof or bottom, as the case may be, and joined at their opposite edges to form a straight wall or face 17 provided with openings to receive the oval tubes. One end of said section is curved or arched from the flat wall 17 to the arched roof 16, as at 18, while the other end is reduced to tubular form, as at 19, for connection to the tank or a nipple.

For the tubes 8 any thin wrought metal pipe which is of light weight and is impervious to oily liquids is suitable. Said pipes may be made of any metal, for example, copper, bronze, or the like, but preferably are formed of wrought iron, and may be commercially rolled or drawn tubing, seamed or seamless, and flattened or of oval or oblong form, as described.

The thin radiator sections, formed as described, are spaced around the periphery of the oil reservoir, as shown in Fig. 2. Their thin form overall enables them to be placed much more closely adjacent than other forms of radiator, thereby securing a large exposed surface area in a small space. The

sections are light in weight and the thin walled tubes largely increased the ability to quickly transmit the heat. The joints are all tight and the construction is not only strong but also entirely prevents loss of oil by leakage.

While the invention has been shown applied for use as a transformer cooler it is to be understood that it is not so restricted but is capable of other uses. For example, the tank or reservoir with the radiator sections applied thereto may be used for holding and cooling oil baths for quenching metals during heat treatment or for cooling other substances than oil.

What I claim is:—

1. A heat radiator, comprising a tank or reservoir for containing a liquid and provided with two series of openings near its top and bottom, and a series of built-up radiator units spaced around said tank, each unit comprising two header sections communicating with openings near the top and bottom of said tank, and metal tubes secured to and connecting said header sections.

2. A heat radiator, comprising a tank or reservoir for containing a liquid and provided with two series of openings near its top and bottom, and a series of radiator units spaced around said tank, each unit comprising two header sections communicating with openings near the top and bottom of said tank, and a plurality of metal tubes of oblong cross section welded or brazed to said header sections.

In testimony whereof, I have hereunto set my hand.

CHARLES SONNEBORN.

Witnesses:

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W. L. BROADBENT.