K. M. BOBLETT.

RADIATOR.

APPLICATION FILED JULY 14, 1910.

1,000,068.

Patented Aug. 8, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

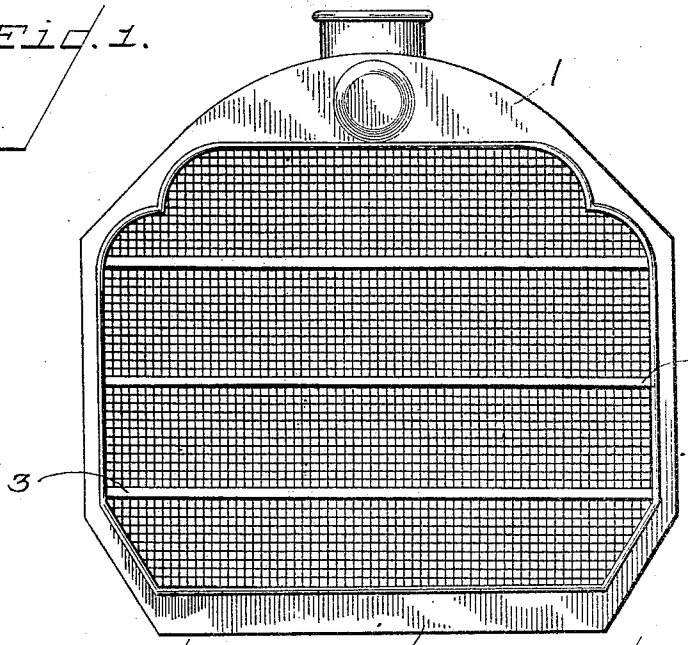


Fig. 2

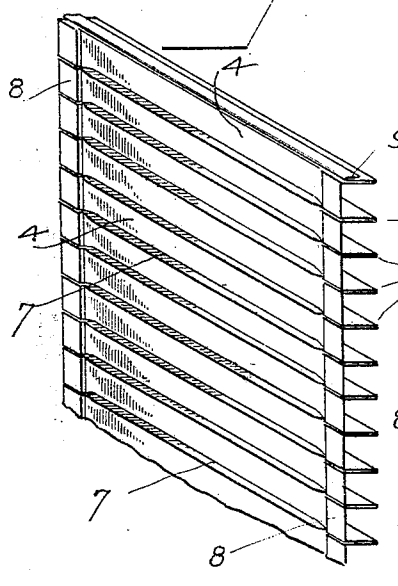


Fig. 11.

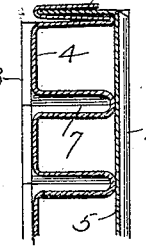
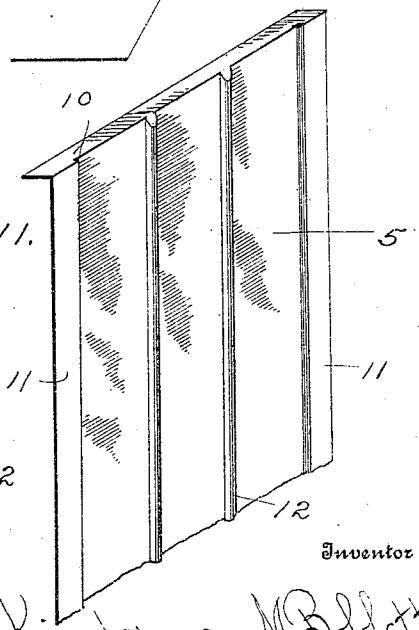


Fig. 3.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4

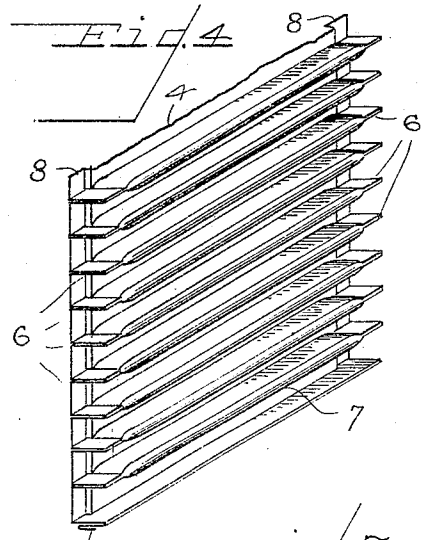


Fig. 5

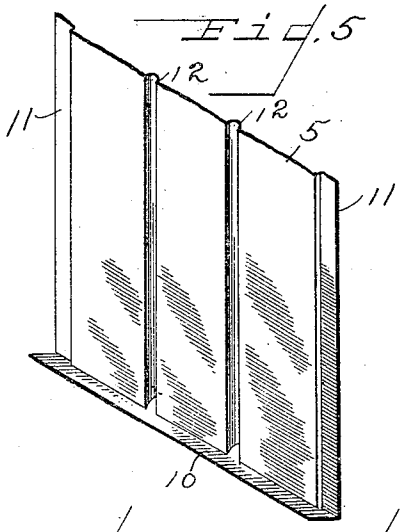


Fig. 7.

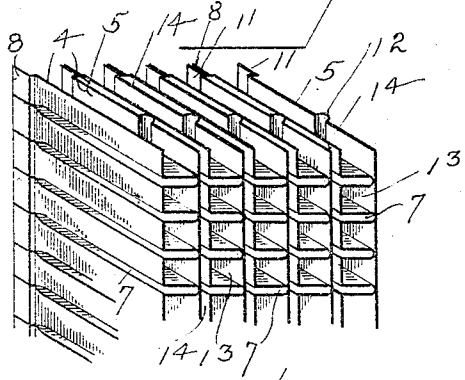


Fig. 6.

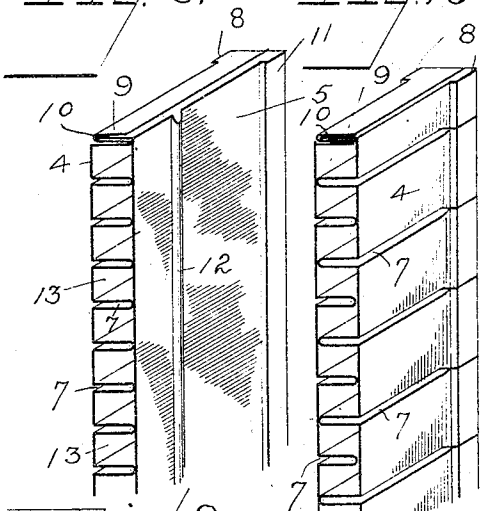


Fig. 10

Fig. 8

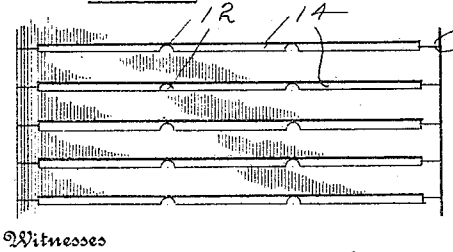
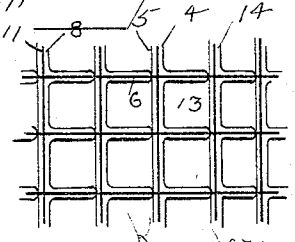


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

KINDERMAN M. BOBLETT, OF DAYTON, OHIO.

RADIATOR.

1,000,068. Specification of Letters Patent. **Patented Aug. 8, 1911.**

Application filed July 14, 1910. Serial No. 571,967.

To all whom it may concern:

Be it known that I, KINDERMAN M. BOBLETT, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

My invention relates to condensers or fluid cooling apparatus and more particularly to radiators for cooling the water which has been circulated about the cylinder of an explosive engine, and is especially adapted for use in automobile construction. The invention however is not limited to such use, but may be employed as a condenser in connection with steam engines, or in connection with refrigerating apparatus for cooling the refrigerating media, or under certain conditions it may be employed as a radiator for heating purposes.

The object of the invention is to greatly simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction, but will be more efficient and economical in operation and unlikely to get out of repair.

A further object is to provide an improved form of conduit which will present to the atmosphere a maximum amount of radiating surface, and which will readily permit the expansion and contraction of the conduit, due to varying thermal conditions, without subjecting the device to undue strain.

A further object is to provide a radiator made up of a plurality of separate identical units which may be assembled to form radiators of various sizes or proportions.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Figure 1 is a front elevation of the assembled radiator. Figs. 2 and 3 are detail perspective views of the two members or half units which are united to form a single unit, showing the exterior surfaces of the two members. Figs. 4 and 5 are similar detail perspective views of the separated unit parts, exhibiting the interior surfaces. Fig. 6 is a detail perspective view of a portion of the assembled unit. Fig. 7 is a sectional perspective view of a plurality of units assembled to form a portion of radiator. Fig. 8 is a plan view of a plurality of radiator units assembled in the radiator construction. Fig. 9 is an enlarged front elevation of a small portion of the assembled radiator. Fig. 10 is perspective view of a modified form of the radiator unit. Fig. 11 is an enlarged transverse sectional view of the radiator unit.

Like parts are indicated by similar characters of reference throughout the several views.

The radiator forming the subject matter hereof is of the cellular type, presenting a front surface of pleasing appearance divided into a multitude of geometrical figures of equal shape and proportion, which at the present time is a popular style. The radiator comprises essentially a frame having in the upper portion a receiving chamber 1, and a dispensing chamber 2 in the lower portion, connected with the receiving chamber by a plurality of conduits through which the water passes from the chamber 1 to the chamber 2. These conduits may be either continuous from one chamber to the other, or may be of short length and arranged in tiers separated by intervening water spaces or auxiliary chambers 3 as shown in Fig. 1. The conduits are formed by arranging a plurality of similar units side by side the units being so shaped that an intervening water space will be formed intermediate the succeeding units. The units which are all identical in size and construction comprise two parts or members 4 and 5 shown in Figs. 2 and 4 and Figs. 3 and 5 respectively. Each of the unit parts 4 and 5 are made from a single piece of material. The unit part 4 is formed from a strip of material folded at regular intervals to form a series of reverse bends or plaits 6 projecting laterally at right angles from the general plane or web of the member. Each of these folds or plaits is spread or opened intermediate its ends forming blind passages or *culs-de-sac* 7. The opposite edges of these folds are compressed to parallelism and united as shown in the drawings. The opposite edges of the exterior surface of the member are offset or flanged as indicated at 8. The folds or seams are opened only between such offset or flanged portions, but throughout such offset portion the folds are closed. The terminal fold of the member 4 is folded again upon itself to parallelism,

forming a fold of triple thickness as at 9, in which the edge of the opposite member is engaged to form a uniting seam. The other unit part 5 is stamped for a single sheet of material, the opposite ends of which are bent at right angles to the main plane thereof, as shown at 10. The opposite edges of the member are offset or flanged as at 11 in a manner corresponding to the offset or flange 8 of the member 4. Intermediate the offset portions 11 of the member 5 are preferably, though not necessarily one or more longitudinal beads 12 projecting above the general surface of the member. The unit parts 4 and 5 are united by introducing the projecting edge 10 of the member 5 within the terminal fold 9 of the member 4, the edges of the folds or seams 6 being brought into contact with the interior surface of the member 5, as shown particularly in Fig. 6, thereby forming a plurality of rectangular air passages 13 separated by the blind water spaces or *culs-de-sac* 7 which communicate with the vertical water conduit as hereafter described.

In constructing the radiator, a plurality of the units formed as described are placed side by side, as shown in Figs. 7 and 8, with the side 5 of one unit adjacent to the side 4 of the next succeeding unit. The offset or flanged portions 8 and 11 of adjacent units contact each other, separating the adjacent sides 4 and 5 of succeeding units, forming vertical water spaces or conduits 14, as shown in Figs. 7 and 8. The longitudinal ribs or beads 12 form spacers within the conduits, preventing the collapse of the conduit through expansion of the material or through undue pressure or accident. There is thus formed a vertical water space or conduit between the succeeding units as shown in Fig. 7, with which the blind passages or *culs-de-sac* 7 communicate, and of which they form lateral extensions. By referring to said figure, it will be seen that the radiator is made up of separate and independent passages 14 between each vertical series of air spaces 13, having lateral ramifications 7 extending above and below each air space 13. Thus each air space 13 is inclosed on all four sides by a water space, the vertical conduits connecting the radiator chambers bounding the air space 13 on opposite sides, and the blind passages 7 communicating with one of said conduits bounding each air space above and below. By this construction every portion of the structure exposed to the atmosphere becomes a radiating surface. Each vertical conduit 14 with its lateral ramifications is separate and independent of every other conduit and its ramifications. Likewise each vertical series of air spaces, that is the air spaces of each unit, are separate and independent of each other vertical series of air spaces or unit, but the air spaces of each series are intercommunicating through the interior of the beads 12, as is shown in Fig. 7. After a plurality of the units have been assembled they are united into one structure by soldering or by dipping which unites the offset portions 8 and 11 of succeeding units and closes the extremities of the folds or plaits 6.

The warm water discharged into the upper chamber 1 passes downward through the several conduits 14, and their ramifications 7 in a thin film or stratum, and is discharged into the lower chamber 2. By the series of ramifications 7 the passage is made of maximum length and the wall of such passage is exposed throughout to the atmosphere.

In Fig. 10 is shown a modification of the radiator unit formed by uniting two identical members similar to the member 4 except that the folds or plaits 6 are located at greater intervals on each half unit, and the folds of each unit intervene between those of the opposing unit. The placing side by side of a plurality of such modified units will form a plurality of vertical conduits as before described, except that the blind passages or *culs-de-sac* will extend in both directions from the conduit.

From the above description it will be apparent that there is thus produced a device of the character described, possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportion, detail construction, and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

Having thus described my invention I claim;

1. In a radiator, receiving and dispensing chambers, a radiating body comprising a series of strips of heat conductive material substantially straight throughout, a series of strips of similar material folded into a series of plaits projecting at right angles to the general plane of the strip, the said straight strip and folded strips being alternately arranged in parallel relation, means spacing the plane strip away from the web portion of the folded strip whereby an intermediate space will be formed with which the right angle folds communicate, and parallel longitudinal beads formed in the straight strip and contacting the web of the folded strip and dividing the intermediate space into a plurality of parallel conduits, said conduits communicating with the receiving and dispensing chambers.

2. In a radiator, receiving and dispensing chambers, a radiating body comprising a series of strips of heat conductive material substantially straight throughout, a series of strips of similar material folded into a series of plaits projecting at right angles

to the general plane of the strip, the said straight strip and folded strips being alternately arranged in parallel relation, offset portions adjacent to the opposite edges of each of the members comprising shoulders projecting perpendicular to the plane of the web of said members, and lateral extensions projecting outward from said shoulders in parallel relation with the said web portions, the said lateral extensions of the respective members being adapted to contact each other whereby an intermediate space will be formed between the web portions of the said members which communicate with the said chambers.

3. In a radiator, receiving and dispensing chambers, a radiating body comprising a series of strips of heat conductive material substantially straight throughout, a series of strips of similar material folded into a series of plaits projecting at right angles to the general plane of the strip, the said straight strips and folded strips being alternately arranged in parallel relation, the said plaits formed in one of said series of strips being opened intermediate their ends, but the opposite ends thereof contracted into contact thereby closing the plaits at their ends and forming each plait into a pocket complete in itself, integral offset portions formed on the said strips, the offset portion of each strip being adapted to engage the next succeeding strip to form an intermediate space, of which the integral offset portion forms the ends, and with which the pockets formed by the plaits will communicate, said space forming a means of communication between the said chambers.

In testimony whereof, I have hereunto set my hand this 5th day of July 1910.

KINDERMAN M. BOBLETT.

Witnesses:

THEODORE C. LINDSEY, JR.,

F. L. WALKER.